AGENDA

Introduction

1:30 Automatic Consent approval of the minutes from October 6, 2017

Approvals

1:35 Request to suspend admissions to the Capstone Certificate in International Politics and Practice from the Department of Political Science effective Spring 2018 (John Zumbrunnen)

1:40 Request to suspend admissions to the M.A./Ph.D. in Comparative Literature and Folklore Studies, including M.A./Ph.D. named options and doctoral minors in “Comparative Literature” and “Folklore Studies” effective Fall 2018 (Ernesto Livorni)

1:45 Request for approval of the following new programs from the Department of Geography effective Fall 2018 (Lisa Naughton)
   - Named Option “Accelerated/Non-Thesis” in the M.S. Cartography and Geographic Information Systems
   - Capstone Certificate in “GIS Fundamentals”
   - Capstone Certificate in “Advanced GIS”

2:10 Request to rename the M.S. in Rehabilitation Psychology to Rehabilitation Counseling from the Department of Rehabilitation Psychology and Special Education effective Fall 2018 (David Rosenthal)

2:15 Request to approve the following named options from the College of Engineering (Laura Albert, Lee DeBaillie)
   - Named Option “Fundamentals of Applied Mechanics” in the M.S. Engineering Mechanics from the Department of Engineering Physics (Wendy Crone) effective Summer 2018
   - Named Option “Nanomaterials and Nanoengineering” in the M.S. Materials Science and Engineering from the Department of Materials Science and Engineering effective Summer 2018 (Xudong Wang)
   - Named Option “Computer Modeling & Simulation in Mechanical Engineering” in the M.S. Mechanical Engineering from the Department of Mechanical Engineering effective Fall 2018 (Dan Negrut)

2:40 Request to move the M.Eng. Civil and Environmental Engineering Named Option “Environmental Engineering” to the M.S. Civil and Environmental Engineering effective Spring 2018 (David Noyce, Michael Doran)
Approval Updates

2:50  Three-Year Progress Report Check-in of M.S. Environmental Conservation (Parmesh Ramanathan)

Program Reviews and Updates

3:00  Ten-Year Program Review Update from Biophysics M.S./Ph.D./Doctoral Minor (Parmesh Ramanathan)

3:05  Ten-Year Program Review of M.S./Ph.D./Doctoral Minor in Biological Systems Engineering (Michael Graham)

2017-2018 Meeting Schedule
December 1, January 12, February 9, March 9, April 13, May 11, June 8
1:30 p.m. – 3:30 p.m.
52 Bascom Hall
Members Present: Caroline Alexander, Lara Collier, Kristin Eschenfelder, Yu Hen Hu (arrived after first voting item), William Karpus, Steffen Lempp, Christopher Livanos, Lisa Martin, Christa Olson, Nicole Perna, John Pfotenhauer, Parmesh Ramanathan, Tracy Schroepfer (arrived after first voting item), Steph Tai, Monica Turner, Earline Ward, Kirsten Wolf

Members Absent: Michael Graham, Leslie Smith III

Guests: Elaine Klein, Jocelyn Milner, Tejumola Olaniyan, Sue Zaeske

Staff: Eileen Callahan, Marty Gustafson, Michelle Holland, Elena Hsu, LaRuth McAfee, Emily Reynolds

Dean William Karpus called the meeting to order.

The minutes of September 8, 2017, were approved as a matter of automatic consent.

Information Items:


Program Reviews and Updates:

1. Professor Tejumola Olaniyan, Chair of the Department of African Cultural Studies, introduced updates on the Institutional (10-Year) Review of the M.A./Ph.D./Doctoral Minor in African Languages and Literature. Professor Olaniyan noted that the department recently restructured to revamp its identity and curriculum to appeal to the modern student, including the new department name and the forthcoming new name of its academic programs to African Culture Studies. They hope this will help with recruiting and address the lack of underrepresented minority students. Professor Olaniyan also noted the department has met with Graduate School Assistant Dean for Diversity, Inclusion, and Funding LaRuth McAfee, and has created publicity materials to further support recruiting. Professor Olaniyan expressed concerns with his department’s lack of ability to fund students, but new undergraduate courses offered by the department have created additional teaching assistant opportunities.

2. Associate Dean Ramanathan introduced the Institutional (10-Year) Review of the Clinical and Community Outcomes Capstone and Graduate/Professional Certificates on behalf of former GFEC member Susan Thibeault. Ramanathan noted the strengths of the programs, which include an interdisciplinary design that fills an important niche in translational research and acts as an essential part of the Institute for Clinical and Translational Research’s community engagement and outreach priorities, a complementary piece of the M.S./Ph.D. programs, projects often resulting in a publication,
clearly stated requirements, satisfied students, an engaged director, and yearly surveying of students. Ramanathan also discussed challenges to the program, including a difficult sequence of coursework for students to complete without careful planning and heavy reliance on one staff member. Ramanathan also mentioned concerns that came up during the review process which the program has since addressed, including a history of low enrollment, no handbook, and attrition issues. Ramanathan noted review committee recommendations, including increasing the sense of community, monitoring drop-out students from the program, developing a five-year plan, and increasing mentor/mentee interactions. The GFEC commends the program on its strengths and recommends it continues to engage in efforts to address the review committee’s concerns.

Motion: Moved and seconded to accept the Institutional (10-Year) Supplemental Accreditation Review of the Clinical and Community Outcomes Capstone and Graduate/Professional Certificates. The motion was passed unanimously.

3. GFEC member Kirsten Wolf introduced the Institutional (10-Year) Review of the M.A./Ph.D. in Comparative Literature and Folklore Studies, including M.A./Ph.D. Named Options and Doctoral Minors in “Comparative Literature” and “Folklore Studies”. Wolf noted the strengths of the program, including a deep history and graduate students that highly value their faculty advisors and mentors. Wolf also discussed challenges to the program, including not having enough faculty to sustain the Ph.D. named option in Folklore Studies, a dated Comparative Literature program with few new courses, language requirements that are too demanding and increase student time-to-degree, problems with advising and guidance in Comparative Literature, and no professional seminar offered. Wolf discussed review committee recommendations for Folklore Studies, including separating it from Comparative Literature and reworking the Folklore Studies program into a certificate program. Wolf also discussed review committee recommendations for Comparative Literature, including reducing requirements for the major, revising and updating courses and readings to reflect current interests, creating a professional seminar, and organizing exams and dissertation committees that include an outside faculty member from the beginning. The review committee strongly recommended that the program be substantially remodeled. Dean Karpus asked Associate Dean Sue Zaeske to update the GFEC on actions the College of Letters & Science has taken since the review was undertaken, which include steps to decouple Folklore Studies from Comparative Literature. The GFEC noted many significant weaknesses of the current program and recommends the department quickly engage in efforts to address the review committee’s concerns including suspension of admissions to the existing program while major restructuring is undertaken.

Motion: Moved and seconded to accept the Institutional (10-Year) Review of the M.A./Ph.D. in Comparative Literature and Folklore Studies, including M.A./Ph.D. Named Options and Doctoral Minors in “Comparative Literature” and “Folklore Studies”. The motion was passed with 15 for, 1 abstention.

4. GFEC Member Nicole Perna introduced the Institutional (10-Year) Review of the M.S./Ph.D./Doctoral Minor in Biomedical Engineering. Perna noted the strengths of the program, which include exceptionally well-funded faculty, very strong junior faculty, student satisfaction and student career opportunities, a flexible curriculum tailored to individual students, effective recruitment of underrepresented minority students, a good gender balance, and a positive climate. Perna also noted review committee recommendations, including seeking funding to support rotations for incoming Ph.D. students, improving communications with junior faculty and students with particular regard to revisions to program structure, creating a more sustainable approach to assessment and qualifying exams,
working with the College of Engineering to improve student interactions with Career Services, increasing teaching opportunities for Ph.D. students, and balancing the demands of undergraduate and graduate teaching to ensure availability of specialized courses. The GFEC commends the program on its strengths and recommends it engage in efforts to address the review committee’s concerns.

**Motion:** Moved and seconded to accept the Institutional (10-Year) Review of the M.S./Ph.D./Doctoral Minor in Biomedical Engineering. The motion was passed unanimously.

5. GFEC Member Caroline Alexander introduced the Institutional (10-Year) Review of the Ph.D./Doctoral Minor in Physiology. Alexander noted the strengths, including outstanding productivity and performance among graduate students, career outcomes that are consistent with training, clear and flexible course work, significant student satisfaction with the program, a diverse student body, required teaching during graduate training and a highly-regarded graduate coordinator. Alexander noted review committee recommendations included the need to increase faculty participation in training, update the website and promotional materials, continue to review the curriculum to improve training and reduce time-to-degree, and to discontinue the doctoral minor. The review committee also suggested the program create a succession plan for leadership roles. Associate Dean Martin noted that students that are teaching but not formally appointed as teaching assistants or lecturers should receive the same training as formally appointed teaching assistants. The GFEC commends the program on its strengths and recommends it engage in efforts to address the review committee’s concerns.

**Motion:** Moved and seconded to accept the Institutional (10-Year) Review of the Ph.D./Doctoral Minor in Physiology. The motion was passed unanimously.

**Adjournment:**
**Motion:** Moved and seconded to adjourn. The motion passed unanimously.
6 October 2017

TO: John Zumbrunnen, Professor and Chair, Political Science

FROM: John Karl Scholz, Dean

RE: Request to Suspend Admissions: International Politics and Practice Capstone Certificate

CC: Cal Bergman, Associate Dean for Student Academic Affairs, L&S
Greg Downey, Associate Dean for Social Science, L&S
Katy Duren, Associate Dean for Academic Affairs, Division of Continuing Studies
Marty Gustafson, Assistant Dean, Graduate School
Elaine Klein, Assistant Dean for Academic Planning, L&S
Sarah Kuba, Academic Planner, Academic Planning and Institutional Research
Jocelyn Milner, Vice Provost and Director, Academic Planning and Institutional Research
James Montgomery, Associate Dean for Fiscal Initiatives, L&S
Nancy Westphal-Johnson, Associate Dean for Academic Administration

On October 3, 2017, the L&S Academic Planning Council considered the attached request to suspend admission to the International Politics and Practice Capstone Certificate. Council members greatly appreciated your efforts to steward this program wisely, and readily agreed that best service to students would be found in suspending admissions to the program while you and your colleagues reconsider the form and format of the program.

We understand that there may be as many as 11 students enrolled in the program, and that the department will continue to offer courses to help these students complete it. Please be in touch with Associate Deans Greg Downey and Elaine Klein if you need advice or assistance in proceeding with “teaching out” this iteration of the program. They will also be happy to talk with you about how the program might be reformulated.

The L&S APC approved this request unanimously, and agreed that it would be best to have an update on your progress by the end of April 2018.
September 28, 2017

Dean John Karl Scholz
College of Letters and Science
105 South Hall, 1055 Bascom Mall
Madison, WI 53706

Dear Dean Scholz:

I write to request a temporary suspension of admissions for the International Politics and Practice Capstone Certificate (IPPCC). I have consulted with all relevant Political Science faculty members, and the Political Science executive committee unanimously endorsed the request on September 27.

Though housed administratively in Political Science, the IPPCC program was originally conceived as a cross-department certificate. After the departure of key faculty from other units, Political Science faculty members now teach all relevant courses. We have managed this workload by offering the necessary graduate level coursework in conjunction with similar undergraduate classes during summer sessions, though this situation is not ideal. Meanwhile, though the program was originally designed to appeal especially to active duty military officers, the forecast enrollment has not materialized consistently. The past admissions cycle yielded only two new students. During summer 2017, a total of nine students enrolled in three IPPCC courses. There are, then, a total of 11 students currently enrolled in the program.

In this context, we wish to suspend admissions effective immediately. We will then convene a working group to consider revisions to the IPPCC program design that might yield greater numbers of students. Possibilities include offering IPPCC courses regularly during the academic year and expanding the scope of the certificate to include other relevant courses in International Relations and Comparative Politics. Although the program will not accept new students we will ensure that the students currently enrolled in the program have an opportunity to complete their certificate, using the summer ‘meets with’ arrangement described above. Upon approval of this request, we will change the IPPCC website to indicate that admissions have been paused, and
contact current students to inform them that despite the suspension of admissions, they will have the opportunity to complete the program and be awarded the certificate. We hope to reach a decision on the program’s future by the end of the current academic year.

Sincerely,

John Zumbrunnen
Professor and Chair of Political Science
24 October 2017

TO: Sarah Mangelsdorf, Provost

FROM: John Karl Scholz, Dean

RE: Request to Suspend Admissions to Academic Programs in the Department of Comparative Literature and Folklore Studies

CC: Ernesto Livorni, Professor of Italian and Chair, Comparative Literature and Folklore Studies
Marty Gustafson, Assistant Dean, Graduate School
Elaine M. Klein, Associate Dean for Academic Planning
Sarah Kuba, Academic Planning & Institutional Research
Lisa Martin, Associate Dean, Graduate School
Jocelyn Milner, Vice Provost for Academic Affairs
Scott Owczarek, Registrar
Parmesh Ramanathan, Associate Dean, Graduate School
Susan Zaeske, Associate Dean for Arts and Humanities

On October 17, 2017, the L&S Academic Planning Council met to discuss request submitted by the Department of Comparative Literature and Folklore Studies, seeking to suspend admission to the following academic programs in the department:

a. Bachelor of Arts, Bachelor of Science (MAJ 225, AMAJ 225) “Comparative Literature and Folklore Studies”
b. Master of Arts – Comparative Literature and Folklore Studies, with named options in “Comparative Literature” and in “Folklore Studies” (MA 225L&S)
c. Doctor of Philosophy – Comparative Literature and Folklore Studies, with named options in “Comparative Literature” and in “Folklore Studies” (PHD 225L&S)
d. Doctoral Minor in Comparative Literature (GMIN225)
e. Doctoral Minor in Folklore (GMIN423)
f. Undergraduate Certificate in Folklore (CRT 424)

You will recall from my previous correspondence with the department that this request arises from the recently completed program review; in addition, changes in the faculty profile (retirements and departures) make it very difficult to field the array of programs in Folklore in particular. As a result, the L&S APC determined that the merger of Comparative Literature and
Folklore faculty and programs has not achieved the outcomes intended at the time of merger. The council instructed the department to submit a request to suspend admissions to the programs, which will afford each group of faculty time to focus on preparing proposals for restructuring (including relocating the Folklore Certificate), to discontinue the named options at the graduate level, and to rename all of the CLFS programs to remove the reference to Folklore Studies.

During this period, the faculty in CLFS will continue to teach required courses and to provide guidance and advising to serve students enrolled in the programs.

- At this time, there are three students enrolled in the CLFS undergraduate major.
- There are no students in the MA-CLFS or in the doctoral minor programs.
- There are 23 students in the CLFS doctoral program (13 are not declared in an option; there are 5 students in each of the CL and FS options). The department faculty met with graduate students on September 26, 2017 to discuss the outcome of the academic program review, including the review committee report, departmental response, and my memo summarizing the L&S APC’s instructions. Our colleagues have reassured students that they will be able to complete the programs of study to which they were admitted. In addition, Associate Deans Zaeske and Klein have offered to meet with students to discuss academic program restructuring; they will coordinate any such meetings with the Graduate School, of course.
- Five students are declared in the Folklore Certificate. In a recent meeting with the Folklore Studies leadership, the faculty expressed their intention to reach out to students who may be working toward completing requirements but who have not yet declared, to encourage them to do so at the earliest opportunity.

The L&S Academic Planning Council unanimously approved this request to suspend admission to these programs during the restructuring process.
Dear Karl Scholz,
105 South Hall

Dear Dean Scholz,

Upon your request on Monday, October 9, 2017, the Department of Comparative Literature and Folklore Studies met for a special meeting of both Department and Executive Committee to complete the task that the department had already started in September in response to the measures to be taken in the current Fall 2017 semester.

At its regular monthly meeting on Tuesday, October 3, 2017, the CLFS Departmental Committee voted unanimously "to submit a request to restructure the Department of CLFS to the College of Letters and Science." Later that day, the CLFS Executive Committee then voted unanimously "to accept and approve the motion by the Departmental Committee to restructure."

On Tuesday, October 10, 2017, the CLFS Departmental Committee convened again in an Extraordinary Meeting, and voted unanimously "to request the suspension of graduate and undergraduate admissions to CLFS academic programs, in accordance with the memorandum of July 24, 2017, from Dean Karl Scholz." Shortly afterwards, the CLFS Executive Committee also voted unanimously "to accept and approve the Departmental Committee’s motion to request suspension of graduate and undergraduate admissions to CLFS academic programs."

Please let me know whether you need further information regarding the concern you raised after the October GFEC meeting regarding admission to the graduate program for the next academic year (hence, the need not to accept applications in the current Fall semester).

Sincerely,

Ernesto Livorni
Chair, Comparative Literature and Folklore Studies

Cc: Susan Zaeske, Associate Dean
Elaine Klein, Associate Dean
24 July 2017

TO: Thomas DuBois, Chair, Comparative Literature and Folklore Studies (Fall 2016)
Mary Layoun, Chair, Comparative Literature and Folklore Studies (Spring/Summer 2017)
Ernesto Livorni, Incoming Chair, Comparative Literature and Folklore Studies (2017-18)

FROM: John Karl Scholz, Dean

RE: Review of Department of Comparative Literature and Folklore Studies programs, including:

- Bachelor of Arts, Bachelor of Science – Comparative Literature and Folklore Studies
- Master of Arts – Comparative Literature and Folklore Studies, with named options in “Comparative Literature” and in “Folklore Studies”
- Doctor of Philosophy – Comparative Literature and Folklore Studies, with named options in “Comparative Literature” and in “Folklore Studies”
- Undergraduate Certificate in Folklore

XC: Marty Gustafson, Assistant Dean, Graduate School
Elaine M. Klein, Associate Dean for Academic Planning, L&S
Sarah Kuba, Academic Planner, Academic Planning and Institutional Research
Lisa Martin, Associate Dean, Graduate School
Jocelyn Milner, Associate Provost and Director, Academic Planning and Institutional Research
Susan Zaeske, Associate Dean for Arts and Humanities, L&S

On May 2, 2017, the L&S Academic Planning Council considered the review of academic programs overseen by the Department of Comparative Literature and Folklore Studies. Associate Dean Susan Zaeske led discussion of the department’s self-study, the review committee report, and of the corrections and comments offered about the committee report. This review of the programs was conducted for several reasons, most of which relate to the timing of prior reviews: the last “regular, ten-year” review of the Comparative Literature Department was completed in 1999, a specially convened departmental review was completed in 2002-03, and the certificate programs in Folklore have never before been reviewed. In addition, it has been four years since the department was restructured to become the Department of Comparative Literature and Folklore Studies, and it is important for the college and faculty to evaluate carefully academic programs in departments that have been restructured, so we may consider program function and purpose and whether and how faculty reconfigurations serve our students.

Before summarizing the L&S Academic Planning Council’s discussion of the program review and its recommendations, I want to assure you that we understand that the review process is time-consuming as well as intellectually and emotionally challenging. Our hope is that the
process adds value to the work you and your colleagues do and provides an opportunity to think carefully about how to configure academic programs to best serve our students.

Dean Zaeske’s presentation began with the observation that Comparative Literature will be celebrating its 100th anniversary in the coming year. This celebration comes on the heels of several years of significant change, including the merger of Comparative Literature with Folklore, a number of faculty retirements, and a notable number of new faculty hires. We appreciate the effort you and your colleagues have invested in the review process, as well as the work invested for the past several years, working on the new departmental entity. We also greatly appreciate the efforts of the review committee to offer thoughtful, though challenging, recommendations about the future.

The L&S APC had a wide ranging discussion on the self-study and review committee reports. Members were particularly struck by the review committee’s observations that “almost everyone in CLFS agrees that Folklore Studies faculty have not been fully integrated into the merged department,” and that there are substantial disagreements between the faculty in areas ranging from instruction, graduate training and TA allocation, to governance. The review committee expressed concern about disagreements regarding Graduate program requirements, as well as the difficulty the faculty has had to articulate a common undergraduate program of study (within the constraints of the L&S baccalaureate degree requirements) that integrates both Comparative Literature and Folklore. More seriously, the committee offered comment on the department’s capacity to offer the nominally integrated programs for which it is responsible, with serious concern expressed about whether there are sufficient Folklore faculty to offer courses at levels to serve that array of programs (certificate, undergraduate major, graduate minor and degrees). The report suggests that program development and renovation that was anticipated at the time of merger has failed to come to fruition, and that in addition to the Folklore Program not being well integrated into the Comparative Literature program, Folklore retirements and departures have eroded the ability of CLFS to offer an integrated curriculum.

The evaluation of the committee suggests, and the L&S APC concurs, that the attempt to merge these academic areas has failed. To remediate the situation, the council has asked the department to consider reconceptualizing the merger of these programs, with the following recommended sequence of actions:

- By the end of Fall 2017, CLFS should submit a request to restructure.
- By the end of Fall 2017, CLFS should submit a request to suspend admission to CLFS program(s) during reconceptualization. Suspension of program admissions beginning in Fall 2018 will afford the faculty time to plan for the future. CLFS programs include:
  - Undergraduate major (Bachelor of Arts, Bachelor of Science) – Comparative Literature and Folklore Studies
  - Master of Arts – Comparative Literature and Folklore Studies, with named options in “Comparative Literature” and in “Folklore Studies”
  - Doctor of Philosophy – Comparative Literature and Folklore Studies, with named options in “Comparative Literature” and in “Folklore Studies”
  - Undergraduate Certificate in Folklore
  - Doctoral Minor in Comparative Literature
Doctoral Minor in Folklore

- By end of Spring 2018, Folklore faculty (expanded to include folklorists beyond the department) should submit a proposal to relocate the existing Folklore Certificate.
- By end of Fall 2017, the Comparative Literature faculty and interested affiliates should submit a plan for engaging in efforts to reconceptualize the programs (perhaps convening a “Future of CL Task Force,” similar to the “Future of Asian Studies” task force)? Our hope is to see a broadly configured committee that will be able to engage in discussion of the future of CL as highly connected, interdisciplinary program with comparative literary (and other) study at its core.
- By end of Fall 2018, CLFS should ask to revise the CLFS program names, update program requirements (and, if necessary, discontinue the named options), and request permission to reopen admissions.

Finally, with respect to the programs as they currently exist, the APC also spent some time considering CLFS’ assessment strategy, and how this process can be used to inform discussions of student learning and program design. Members noted that while it is useful to have a sense of student satisfaction with programs and students’ perceptions of learning in them, this type of indirect assessment often is not useful to programs with very small student numbers. (And indeed, the CLFS self-study also expressed concern about how generalizable survey results may be.) APC members suggest that as the faculty in Comparative Literature and in Folklore discuss program redesign, they give serious consideration to revisiting the survey approach for assessing student learning. Also, since Comparative Literature courses serve students in other programs, it is worth considering how to assess and improve learning at the course level, to ensure that the discipline’s contributions to other areas of study is secure and strong. Council members encourage you also to consider methods of more directly assessing student learning, and to use what is found to guide program improvement in both areas.

The L&S Academic Planning Council approved a motion to accept this review as complete, with the understanding that there is a considerable amount of work to be done and several steps to be taken to address concerns raised in the report, to protect students enrolled in CLFS programs, and to ensure that there is a future for the discipline at UW-Madison.

This report, and the department’s response to it, signals a beginning of a much longer conversation about the future of CLFS, which will involve faculty from Comparative Literature and Folklore as well as the input from colleagues from other units. I want to commend the review committee for its work and for making what were certainly difficult recommendations. This review, and the seriousness with which it was undertaken by all parties, reminds us that academic program review affords us all an opportunity to identify strengths as well as areas needing improvement: it is a process that keeps a great university great. Please accept my thanks for embracing this opportunity.
20 October 2017

TO: Sarah Mangelsdorf, Provost

FROM: John Karl Scholz, Dean

RE: Department of Geography, Request to Create New Named Option, MS-Cartography and Geographic Information Systems (MS 146L&S)

CC: Greg Downey, Associate Dean for Social Science, L&S
Katy Duren, Associate Dean, DCS
Marty Gustafson, Assistant Dean, Graduate School
Elaine Klein, Assistant Dean for Academic Planning, L&S
Sarah Kuba, Academic Planner, Academic Planning and Institutional Research
Lisa Martin, Associate Dean, Graduate School
Jocelyn Milner, Vice Provost and Director, Academic Planning and Institutional Research
James Montgomery, Associate Dean for Fiscal Initiatives, L&S
Lisa Naughton, Professor and Chair, Geography
Parmesh Ramanathan, Associate Dean, Graduate School
Nancy Westphal-Johnson, Associate Dean for Academic Administration

On October 17 2017, the L&S Academic Planning Council considered the attached request to create a new named option in the Department of Geography’s MS-Cartography and Geographic Information Systems program (MS 146L&S). The proposed “Accelerated / Non-Thesis” option is intended to create a pathway to a master’s degree for students who wish to continue their studies in this professional area, and has been designed to complement a new Capstone Certificate that has also been proposed (the Advanced GIS Capstone Certificate).

These programs are founded on the current 22-credit Capstone Certificate in Cartography/GIS, which will be retired after the new programs are approved for implementation. Like the existing capstone program, the new certificates and this non-thesis, professional master’s program will use the non-pooled (revenue generating) funding model, and will be supported by the revenue they generate. The Department of Geography has prior experience administering non-pooled tuition programs, and has staff and structures in place to administer these programs. The department has worked with the Division of Continuing Studies to develop these programs and market them.
The L&S Curriculum Committee reviewed this request and recommended that the L&S Academic Planning Council also support it. When the L&S APC considered it, members approved it with a unanimous vote, and expressed hope that it and the others in the suite of programs proposed will be successful.
1. **Summary/Overview**

1.1. Option name: Accelerated/ Non-Thesis

1.2. Home Department: Geography

1.3. Home School/College: Letters and Science, College of

1.4. Additional Department(s)/Academic unit(s) information, if relevant: NA

1.5. Faculty director of the Capstone certificate program (name, title email):

   The GISPP Oversight Committee consists of four rotating members: the Departmental Chair/GISPP Oversight Committee Chair, the Curriculum Committee Chair, the Financial Committee Chair, and a faculty representative from the Cart/GIS subgroup selected by the Departmental Chair. The GISPP Director and Manager are ex officio, non-voting members.

   - GISPP Oversight Committee:
     - Lisa Naughton, Geography Department Chair/ GISPP Oversight Committee Chair
     - Jack Williams, Finance Committee Chair
     - Joe Mason, Curriculum Committee Chair
     - Qunying Huang, GIS Faculty Representative

   - GISPP Staff
     - Ian Muehlenhaus, GISPP Director
     - Brittney Markle, GISPP Manager

1.6. Primary staff contact (name, title, email):

   Ian Muehlenhaus, GISPP Director, muehlenhaus@wisc.edu, and Brittney Markle, GISPP Manager bmarkle@wisc.edu

1.7. Primary school/college dean’s office contact (name, title, email): Greg Downey, Associate Dean for Social Sciences, greg.downey@wisc.edu

1.8. Date form completed: 9/11/2017

2. **Approval, Implementation, and Expectations for Review**
2.1. School/College Approval Date:

2.2. GFEC Approval Date:

2.3. UAPC Approval Date:

2.4. Expected first term of student enrollment (usually 2-3 terms after UAPC approval; typically the following Fall term): Fall 2018

2.5. Year of three year check-in to GFEC (3 years after first student enrollment): 2021

2.6. Year of first program review (5 years after first student enrollment): 2023

2.7. Are all academic programs in the home academic unit are up to date for program review? Yes
   - If no, please provide an explanation:
     Type an explanation here. (1000 word limit)

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

3. Background/ Rationale

3.1. What is the purpose of the named option? How does the named option relate to the major and to other named options in the major, if relevant? How does it contribute to the mission of the sponsoring unit(s)?

We are proposing the Accelerated/Non-Thesis Option in the M.S. in GIS/Cartography as a new non-pooled tuition revenue program for five reasons.

1. Our legacy GIS Capstone is 22 credits, only eight credits shy of a master’s degree. Moreover, this residential capstone is in stagnation and experience a slow decline in enrollment. This new option is part of a broader overhaul in which we are offering two online capstone certificate programs (12 credits each) and this proposed accelerated, non-thesis master’s degree option.
2. Many current capstone students intentionally take over 22 credits to learn as much as they can while enrolled as special students. They deserve the option to earn a master’s degree instead of a certificate.
3. Built-in onboarding. Many of our undergraduate geography students, and students graduating from other UW programs, would be interested in pursuing a master’s if it meant they only had to stay in Madison an additional year.
4. Most terminal-degree master’s students do not want to write a research thesis. They want to take classes that teach them applicable concepts and technology skills that help them secure high-paying jobs. This option is for these types of students.
5. Revenue generation. Adding an accelerated master’s option could help bolster our in-house enrollments, rejuvenate, and reinvent our residential offerings for professional students.
The Department of Geography has been involved in 131-based programs for well over a decade. Seventeen years ago we developed an in-residence GIS Capstone that has seen great success. In recent years, however, due to increased competition and the amount of credits in our capstone, enrollments have stagnated and slightly declined. Crucially for this proposal, we see a bifurcation of existing capstone students into two distinct camps.

In the first group, many students fail to graduate due to the oversized credit load (22 credits, which were grandfathered in) and the psychological hurdle of a large capstone project. In the other group, we have many students who purposefully delay Capstone completion to keep taking all the GIS classes offered by the department (e.g., well over 30 credits).

In a very real sense, we propose this new named option as a revamping and reinvention of the legacy capstone. The proposed Accelerated/ Non-Thesis Option of the existing M.S. Cartography/GIS would appeal to the second group of students above – those who take well over 30 credits anyway and are not daunted by a capstone project. For only eight (8) credits more, students will earn a bona fide master’s instead of a largely ceremonial capstone certificate. This new option to the Geography M.S. is named Accelerated/ Non-Thesis for good reason. Scheduled time to degree will be twice as short as our traditional master’s offering, which requires a thesis. In lieu of a thesis, students in this program will be required to take Geog 778: GIS Practicum. This is a project based, professional development course where students will be required to exemplify all program learning outcomes. Specifically, this new option will appeal to three additional groups beyond our traditional capstone students:

1. Recent undergraduates from other disciplines across campus who want to learn GIS to augment their disciplinary skills.
2. Current undergraduate students in Geography who have a 3.0 GPA or better. They could simply apply during their senior year to stay for a fifth-year as a Graduate student. Similar to our traditional residence MS program, accepted undergraduate students can only transfer up to seven (7) undergraduate credits into the program according to university guidelines, meaning Geography undergraduates with a Cart/GIS focus may be overqualified for this program.
   Current GIS Capstone students and alumni can transfer up to fifteen (15) credits taken as University Special Students into the program according to university guidelines.
3. It may attract many additional students from around the country who want to live in Madison and experience graduate life but are not interested in writing a thesis or spending two years in a program.

The current Capstone would remain in place, but it is shifting to being considered a “Legacy” degree by the Geography Department. At 22 credits, the current Capstone is too big to remain competitive nationally, where certificate programs are increasingly online and in the 10-16 credit range.

This will not be the first 131-fund option for the M.S. in Cartography/GIS. In 2015 the University approved our 100% online, GIS Development option for the M.S. We began offering this program online via rolling admissions in Fall 2016 and it currently has over 70 students enrolled (expected 110 by Fall 2017). This Accelerated/ Non-Thesis option would differ from the GIS Development option in two distinct ways:

1. First, the GIS Development option is entirely online, while the Accelerated / Non-Thesis option would be exclusively in-house and residential.
2. The Accelerated / Non-Thesis option curriculum would be more open to those interested in all facets of GIS, not just development. Whereas the GIS Development option curriculum is largely
set in stone, with no electives at this time, the Accelerated/ Non-Thesis option would allow students to pursue different or mixed avenues of learning, including courses from Visualization, Cartography, Spatial Analysis, Remote Sensing, and Development. In a way, the Accelerated/ Non-Thesis option reflects our traditional master’s elective scheme, but without the thesis requirement.

3.2. What is the evidence that there is a student demand for the named option?

Although many geography programs in the nation and around the world are moving to provide training in GIS, the Cartography/GIS programs in Geography at UW-Madison have distinct advantages in this competition. The Cart/GIS program at UW-Madison Department of Geography is world renowned and has a long tradition of excellence in the field. Our Geography Department is ranked 1st and 6th in the U.S., according to R-rank or S-rank criteria, respectively (NRC 2011). Our excellence in GIS is recognized beyond the U.S.; for example, we host an annual workshop for top graduate students from Beijing Normal University. We also have demonstrated experience in running a successful revenue-based professional program. Our current capstone certificate in GIS, developed based on the innovative idea of Chancellor Ward in 1999, has been running very successfully for over 10 years with an annual revenue of about $250,000. Through running the capstone program, we also have gained a good sense of the growing need for training in areas beyond what the current capstone certificate program offers. We also offer an online master’s in Cartography and GIS, which has exceeded our original enrollment expectations.

Increasing popularity in GIS education and 5th Year Master’s programs across the country combined with our steady GIS Capstone Certificate Program enrollment numbers (approximately 22/semester) provide significant evidence that student demand for this named option exists. Again, our legacy capstone certificate program has remained remarkably successful for over 15 years. We expect this popularity to continue and increase once the option to receive a Master’s degree rather than a certificate is made available.

4. Curriculum

4.1. Delivery modality:

☒ Face-to-face
☐ Distance

Distance-delivered programs are those certificate or degree programs in which 50% or more of the required courses may be taken as distance-delivered courses.

4.2. Provide a complete list of requirements.

- 4 core courses:
  - Geog 370: Introduction to Cartography
  - Geog 377: Introduction to GIS
  - Geog 378: Geocomputing
  - Geog 778: GIS Practicum

- 4 Electives:
  - Geog 560: Advanced Quantitative Methods
  - Geog 572: Graphic Design in Cartography
  - Geog 574: Spatial Databases
- Geog 575: Interactive Cartography & Geovisualization
- Geog 576: Spatial Web & Mobile Programming
- Geog 578: GIS Applications
- Geog 579: GIS & Spatial Analysis

- Chart student progression through the curriculum.

<table>
<thead>
<tr>
<th>Semester students will take the course</th>
<th>Department</th>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
<th>Instructor</th>
<th>Semester &amp; year last taught</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st or 2nd semester</td>
<td>Geography</td>
<td>370</td>
<td>Introduction to Cartography</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Summer 2017</td>
</tr>
<tr>
<td>1st or 2nd semester</td>
<td>Geography</td>
<td>377</td>
<td>Introduction to GIS</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Summer 2017</td>
</tr>
<tr>
<td>1st or 2nd semester</td>
<td>Geography</td>
<td>378</td>
<td>Geocomputing</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Summer 2017</td>
</tr>
<tr>
<td>3rd or final semester</td>
<td>Geography</td>
<td>778</td>
<td>GIS Practicum</td>
<td>4</td>
<td>Ian Muehlenhaus</td>
<td>Summer 2017</td>
</tr>
<tr>
<td>1st, 2nd, or 3rd semester</td>
<td>Geography</td>
<td>560</td>
<td>Advanced Quantitative Methods</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Spring 2017</td>
</tr>
<tr>
<td>2nd or 3rd semester</td>
<td>Geography</td>
<td>572</td>
<td>Graphic Design in Cartography</td>
<td>4</td>
<td>Ian Muehlenhaus</td>
<td>Fall 2017</td>
</tr>
<tr>
<td>2nd or 3rd semester</td>
<td>Geography</td>
<td>574</td>
<td>Spatial Databases</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Spring 2017</td>
</tr>
<tr>
<td>2nd or 3rd semester</td>
<td>Geography</td>
<td>575</td>
<td>Interactive Cartography &amp; Geovisualization</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Spring 2017</td>
</tr>
<tr>
<td>2nd or 3rd semester</td>
<td>Geography</td>
<td>576</td>
<td>Spatial Web &amp; Mobile Programming</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Summer 2017</td>
</tr>
<tr>
<td>2nd or 3rd semester</td>
<td>Geography</td>
<td>578</td>
<td>GIS Applications</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Spring 2017</td>
</tr>
<tr>
<td>2nd or 3rd semester</td>
<td>Geography</td>
<td>579</td>
<td>GIS &amp; Spatial Analysis</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Summer 2017</td>
</tr>
</tbody>
</table>

4.3. Total credits required: 32

4.4. Semesters to completion: 2-3

4.5. Describe the student progression (one-course per semester for several semesters, all courses taken in one intensive semester, other:

- Part-time (< 8 credits fall and spring semesters, < 4 credits summer term)
  Students can choose to take 1 course per semester for 7 consecutive semesters.
- Full-time, time-compressed, intensive
Students can take 12 credits for the first two consecutive semesters and 11 credits in the 3rd semester.
☐ Other
Students can alternate fulltime semesters and part time semesters to program completion.

5. Assessment

5.1. ☒ Attach an assessment plan when submitting this proposal.

5.2. Provide a summary of the assessment plan, including learning goals, key methods and assessment approaches, and how assessment information will be reviewed and acted on.
Type summary here. (1000 word limit)

In addition to the existing learning goals of the Master's in Cart/GIS, we would add two comprehensive student learning goals for this option. First, students will use GIS and visualization tools to identify and help solve real-world spatial problems. Second, students will use proprietary, open-source, and scripted tools to achieve two of the following: a) Conduct spatial analysis; b) Manage large spatial datasets; c) Create compelling visualizations; d) Develop web-based GIS tools. Learning goals will be assessed directly every semester from Geog 778 final projects using a course-specific rubric that incorporates program-level criteria and performance evaluations from project supervisors that are required for all students enrolled in the final practicum course before completing the program. Learning goals will be assessed indirectly through: 1) course evaluation surveys (deployed for all courses to gain insight into the student’s experience in the course, perceptions of instruction, and improvements that could be incorporated into the curriculum) and 2) program exit surveys deployed to completing students by DCS to gain insight into the student perceptions of learning, career expectations, and improvements that could be incorporated into the curriculum and program. Direct and indirect methods will be assessed on an annual basis in addition to a 3-year review cycle for effectiveness.

6. Overlap and Related Programs

This would compete with and directly replace our own, existing 131-capstone certificate program within geography. It would not directly compete with any other program that we're aware of on campus. In the interest of transparency, however, we notified Nelson Institute of our plans. We received an email from Janet Silbernagel noting that this in no way overlaps with what they are doing (see Appendix C).

7. Admissions and Enrollment

7.1. Does the proposed named option have limits on admission? If yes, explain the admissions criteria and process.
- Applicants must have completed their sixth semester in a four-year Bachelor’s degree from an accredited institution of higher learning and have a minimum GPA of 3.0 by the time they graduate with their four-year Bachelor’s degree.
- Applicants must have one course in quantitative methods or statistics.
- Applicants may not be enrolled in other UW-Madison graduate coursework or programs concurrently while in our program.
• Non-native English speakers must take either the TOEFL exam or the IELTS exam and submit scores during the application process. Minimum acceptable scores must meet the UW Graduate School requirements:
  o TOEFL - 92 for internet based test (IBT) and 580 for paper test.
  o IELTS - 7.0

7.2. Projected annual enrollment:
• Year 1: 25 students
• Year 2: 35 students

7.3. Maximum enrollment that can be supported with existing instructional and student services resources: 25 students

7.4. Describe plans for supporting enrollments that are much higher or much lower than the anticipated enrollment.

Should enrollment exceed our expectations, we plan to hire additional qualified lectures to assist faculty associates in course instruction. We are currently compiling a list of qualified professionals that have expressed interest in teaching some of our courses. This would undoubtedly increase student exposure to professional experiences and contacts.

Should enrollment fall below our expectations, faculty associates will be expected to allocate additional time towards curriculum updates. The GIS industry is rapidly evolving and it is crucial that we keep up with (and hopefully surpass) our competitors. We already intend to allocate time for course updates; however, in the case of lower enrollments, we would take advantage of the opportunity by increasing our efforts in this mission.

7.5. Prior coursework requirements will adhere to the policy outlined by the Graduate School. Special consideration will be taken for admission of our original GIS Certificate Program alumni, such that previous coursework will be transferable (up to 15 credits); however, they will still need to meet the 16 graduate credit minimum requirement.

8. Student Services & Advising

8.1. List the names of program advisor(s) with title and departmental affiliation(s).
   Ian Muehlenhaus, GISPP Director
   Brittney Markle, GISPP Manager
   Joel Gruley, GISPP Administrative Assistant

8.2. How will the resource load of the additional student services support and advising be met?

The Department of Geography has hired an administrative assistant fully dedicated to GISPP to assist with day-to-day support on a half time appointment. This hire will take on many administrative duties and some student service duties that would have otherwise prevented the other GISPP staff from increasing student support. Student service responsibilities will be divided amongst all GISPP staff. As GISPP grows, we intend to hire more support staff as needed.
Confirm that program advisor(s) have been consulted and reviewed this proposal.

9. Governance & Faculty

9.1. The named option is governed by:

☒ Existing department and school/college governance committees
☐ New governance committees

-if the named option is governed by a new committee, define and outline governance structures and procedures for the certificate program. Define and outline governance structures and procedures here. (1000 word limit)

Provide information on how program faculty are identified and provisions for transition in the faculty program director. Who will appoint the director and to whom will the director report?

9.2. List the core program faculty and staff with title and departmental affiliation(s) who are primarily involved and will participate in delivery and oversight of the Capstone certificate.

- GISPP Oversight Committee:
  o Lisa Naughton, Geography Department Chair/ GISPP Oversight Committee Chair
  o Jack Williams, Finance Committee Chair
  o Joe Mason, Curriculum Committee Chair
  o Qunying Huang, GIS Faculty Representative

- GISPP Staff
  o Ian Muehlenhaus, GISPP Director
  o Brittney Markle, GISPP Manager
  o Joel Gruley, GISPP Administrative Assistant

- GIS Faculty:
  o Qunying Huang, Assistant Professor in Geography
  o A-Xing Zhu, Professor of Geography
  o Robert Roth, Associate Professor of Geography
  o Song Gao, Assistant Professor in Geography

10. Fiscal Structure and Ongoing Commitment

Proposals need to provide an overview of plans for funding the named option including but not limited to program administration, instructional/curricular delivery, technology needs, and program assessment. What impacts will the named option have on staffing needs beyond the immediate program? How are those needs being met?

10.1. The named option will be supported using non-pooled tuition

10.2. For programs supported using non-pooled tuition, what resources are allocated to the Accelerated Master's certificate program?
The GIS Professional Programs will provide administrative coverage of the new Master's, as well as student advising. The program will be supported using current revenue from our online Master's and Capstone programs.
10.3. For programs supported using non-pooled tuition, planned enrollment is expected to generate enough paid tuition to cover instructional costs, direct student support costs, and any other fixed or required costs. Although detailed fiscal plans are not required in the academic program proposal, it is helpful to provide the following summary taken from the non-pooled tuition budget:

Fiscal Annual Summary
*Please refer to Appendix D: GISPP 5 Year Budget Plan

Required attachments

☒ Supporting letters/memos

Provide letters or memos from other academic units that will have overlapping interest. This will include departments/schools/colleges that provide courses for the certificate, share a student audience, represent a closely related area of study, have overlapping faculty, or have program names that are similar.

☐ Cover Letter from Dean of the school/college that will be the home of the named option—When a proposal for a new named option is forwarded for approval, it will have a cover letter to the provost from the supporting dean.

☒ Assessment plan

See the Basic Assessment Plan and Template for Capstone Certificates for detail. The Basic Assessment Plan for Capstone Certificates and the Template are posted at http://apir.wisc.edu/certificates.htm

Programs supported using non-pooled tuition must attach:

☒ Core Criteria Checklist
☒ Additional Requirements Checklist

See the current “Non-pooled Program Requirements Process” document posted at http://apir.wisc.edu/academicplanning.htm
ASSESSMENT PLAN
New Named Option within the M.S. Cartography/GIS

Identifying Information
School/College: Letters and Sciences
Graduate Degree/Major Program Name: Cartography/GIS (Option Name: Accelerated/ Non-Thesis)
Graduate Degree Level: MS
Faculty Director Contact/Title:
Program oversight has been delegated to an oversight committee, rather than an individual faculty director. The GIS Professional Programs Oversight Committee consists of four rotating members and 2 ex-officio members (GISPP Director and Manager).

Current Oversight Committee Members:
- Lisa Naughton, Geography Department Chair/ GISPP Oversight Committee Chair
- Joe Mason, Curriculum Committee Chair
- Jack Williams, Finance Committee Chair
- Qunying Huang, GIS Faculty Representative

GISPP Staff:
- Ian Muehlenhaus, GISPP Director
- Brittny Markle, GISPP Manager

Primary Program Contact Name, Contact information, Title:
Ian Muehlenhaus, muehlenhaus@wisc.edu, GISPP Director
Brittny Markle, bmarkle@wisc.edu, GISPP Manager

Date this Assessment Plan was adopted by the program faculty: 9/11/2017

Student Learning Goals (What)
1. Use GIS and visualization tools to identify and help solve real-world spatial problems.
2. Use proprietary, open-source, and scripted tools to achieve two of the following:
   a) Conduct spatial analysis
   b) Manage large spatial datasets
   c) Create compelling visualizations
   d) Develop web-based GIS tools
## Graduate Degree Program Curriculum Mapping Worksheet (Where)

| **Fifth Year Master’s Program Courses** | Use GIS and visualization tools to identify and help solve real-world spatial problems. | Use proprietary, open-source, and scripted tools to achieve two of the following:  
- a) Conduct spatial analysis  
- b) Manage large spatial datasets  
- c) Create compelling visualizations  
- d) Develop web-based GIS tools |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 377: Intro to GIS</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 370: Intro to Cartography</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 378: Geocomputing</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 778: GIS Practicum</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 371: Environmental Intro to Remote Sensing</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 560: Advanced Quantitative Methods</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 572: Graphic Design in Cartography</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 574: Spatial Databases</td>
<td>X</td>
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<tr>
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<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 578: GIS Applications</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 579: GIS &amp; Spatial Analysis</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Plan for Assessing Each Student Learning Goal

<table>
<thead>
<tr>
<th>Assessment Planning (How)</th>
<th>Use GIS and visualization tools to identify and help solve real-world spatial problems.</th>
<th>Use proprietary, open-source, and scripted tools to achieve two of the following: a) Conduct spatial analysis b) Manage large spatial datasets c) Create compelling visualizations d) Develop web-based GIS tools</th>
</tr>
</thead>
</table>
| Method for assessing learning (at least one direct method required) | **Direct**  
Final projects from Geog 778 will be assessed every semester using a course-specific rubric that incorporates program-level criteria and performance evaluations from project supervisors that are required for all students enrolled in the final practicum course before completing the program.  

**Indirect**  
1) Every semester a course evaluation survey will be deployed for each course taken to gain insight into the students experience in the course, perceptions of the instructor, and improvements that could be incorporated into the curriculum.

2) Every year an exit survey will be deployed to completing students (following the completion of Geog 778) to gain insight into the student perceptions of learning, career expectations, and improvements that could be incorporated into the curriculum. |
| Timetable for assessment activity (at least one activity each year; all goals reviewed in a 3-year cycle) | Direct and indirect methods will be assessed on an annual basis and reviewed in a three-year cycle for effectiveness. |

Assessment Review and Reporting (So What)

From Grad School Template 8/15
1. **Who is responsible for assessment?**

GISPP staff is responsible for direct and indirect assessment.

2. **What is the plan for review of the assessment information?**

Direct assessment will be completed every year by reviewing the results of student performance evaluations from their final 602 Capstone project. Indirect assessment will be evaluated yearly via student evaluations. DCS will also conduct a program exit survey and these results will be assessed annually. All of these assessments will be reviewed in a three-year cycle for effectiveness.

3. **What is the plan for production of an annual summary report?**

A report will be comprised of relevant data (described above), charts/graphs with explanations, and recommendations for future changes.

It will be presented in PDF format with an executive summary listing:
- The strengths of the program,
- Possible curriculum changes, and
- Recommended changes/action items to implement over the next year.

4. **How will recommendations be implemented?**

The GISPP Oversight Committee will agree by consensus, or if a vote is called, by simple majority, regarding the changes to implement. The Oversight Committee will meet at least twice per year, or more often as necessary.
APPENDIX A. CORE CRITERIA CHECKLIST
FOR ACADEMIC PROGRAMS WITH NON-POOLED TUITION

1. New and Additional Student Enrollments to Support Program Costs

☒ The program must bring in NEW and ADDITIONAL students. Overall enrollment in all other school/college programs must not be eroded. The program cannot compete with or draw students away from existing programs that support the central tuition pool.

☒ Faculty/staff must plan for sufficient enrollments to have enough tuition to cover instructional, direct student support costs, and any other fixed or required costs. Experience shows that enrollments of at least 30 students are necessary to have enough tuition to meet direct program costs.

☒ School/college Budget Officers must be involved in planning and must approve plans and budgets for these programs before the program is submitted to the school/college APC for academic approval.

2. Designed for Non-Traditional Students

☒ Has an applied, practice-oriented curriculum, or integrates practice with theory

☒ Is offered in a modality that allows non-traditional audiences to attend (evening, weekend, online, intensive, or some combination)

☒ Has demonstrated a workforce demand for the program graduates

☒ Has defined learning goals that are oriented to market considerations

☒ Has a clearly defined curriculum that is “self-contained”, meaning that program students are confined only to courses from the approved, prescribed curriculum

☒ Has a clearly defined (often lockstep) curriculum with few options or electives that follows a predictable timeline for offerings and completion

3. Distinctly Identifiable Program (Code) With Governance Approval

☒ The program must be distinctly identifiable in the student record system, either as a degree/major or as an option of a degree/major, or as a Capstone certificate.

☒ The program must develop a proposal for the academic approval process, during which it must demonstrate that the school/college Dean and Budget Officer are aware and supportive of the program being run on a non-pooled tuition model.
APPENDIX B. ADDITIONAL REQUIREMENTS CHECKLIST
FOR ACADEMIC PROGRAMS WITH NON-POOLED TUITION

Use this checklist in conjunction with the Core Criteria Checklist

If core criteria are met, the program must adhere to the additional requirements below.

Note: Not all new programs are suited for the non-pooled program requirements. New programs that seek to take advantage of a wide range of course and curricular/program offerings on campus and are not market-oriented should be developed under traditional (101) pooled tuition funding models.

1. Fiscal Requirements:

☐ School/college budget officer has approved the budget and fiscal plan.

☐ School/college dean and budget officer are committed to assuming fiscal responsibility for costs not covered by non-pooled tuition to the program. The school/college will back up the budget with a commitment to cover any costs not met from tuition from other sources.

☒ The program structure fits within standard academic administrative structures and allocates expenses of the program so that the program does not create additional burdens on traditional/101 program resources or student services such as advising, ESL, Registrar’s Office, Bursar’s Office, Graduate School and other support services.

☒ Programs have two options for tuition. One option is to charge standard graduate tuition according to the UW-Madison tuition schedule. This includes standard rates for WI resident, MN, and non-resident students and any compulsory fees that apply. Or, for fully online programs, they have the option of charging all students one of tuition tiers (Appendix D). Although not currently allowed, it is potentially possible in the future the tiered tuition may be available to face-to-face programs. Because students who have graduate assistantships receive tuition waivers, some non-pooled tuition graduate degree programs choose to prohibit students from accepting a graduate assistantship (RA/TA/PA). If a program allows their students to take graduate assistantships they it must forgo the tuition revenue. To ensure full receipt of non-pooled tuition and to counter challenges from students, the program must adhere to the following:

☒ The program faculty/staff must disclose this program policy to students in the recommendation of admission letter, program website, program handbook, and program orientation.

☒ Please see Appendix E for links and Appendix F for a sample of a specific non-pooled program template for a recommendation of admission letter and a general template for a program handbook. The program faculty/staff must provide details on this and any other program policies the program handbook in at least the following areas: satisfactory
progress (good standing) requirements, any ways to return to good standing, and a program grievance process if done does not already exist.

2. Requirements for International Students:

☐ Programs may not admit students who need ESL services without building sufficient ESL support into their fiscal model, and having an explicit MOU with the ESL provider about funding to support the ESL services.

☐ Graduate degree/major programs must use Graduate School standards for English Proficiency. Capstone certificates should be designed so that admission requirements ensure that ESL support is not needed.

☐ If the program is NOT completely online and admits international students, the program is responsible for honoring federal visa regulations related but not limited to: length of stay requirements for visa requests, online course restrictions for visa holders, and waiting for federal program approval (up to a year) if the program represents a new degree type or capstone certificate previously not offered at UW-Madison.

3. Requirements for Program/Course Enrollment:

☐ Non-pooled tuition program students can only be enrolled in one program at a time; enrollment in a second major, named option, certificate program, or courses beyond the prescribed program curriculum is not permitted. Non-compliance with this requirement will jeopardize the receipt of tuition for a non-pooled program. Regular audits will be conducted to ensure these requirements are met.

☐ To ensure full receipt of non-pooled program tuition and to counter challenges from students who want to be dually enrolled, the program must adhere to the following:

☐ The program must provide information to students about prohibitions on concurrent program enrollment and out-of-program course enrollment. Programs must note this in recruiting materials, in recommendations of admission, on the program website, program handbook, and program orientation.

☐ Please see Appendix E for links and Appendix F for language for a specific non-pooled program template for a recommendation of admission letter and a general template for a program handbook. The program faculty/staff must provide details on this and any other program policies in the program handbook in at least following areas: satisfactory
progress (good standing) requirements, ways to return to good standing, and a program grievance process if one does not already exist.

☒ The program communicates to students each semester prior to course enrollment the expectation that students can enroll only in program courses and not in courses outside the approved, prescribed curriculum.

☒ For students who enroll in the non-pooled program and then decide they want to pursue traditional/101 programs that allow dual enrollment, the program must help the student transfer to a different program(s) that allow such activity.
20 October 2017

TO: Sarah Mangelsdorf, Provost

FROM: John Karl Scholz, Dean

RE: Department of Geography, Request to Create Two New Capstone Certificates: “GIS Fundamentals” and “Advanced GIS”

CC: Greg Downey, Associate Dean for Social Science, L&S
    Katy Duren, Associate Dean, DCS
    Marty Gustafson, Assistant Dean, Graduate School
    Elaine Klein, Assistant Dean for Academic Planning, L&S
    Sarah Kuba, Academic Planner, Academic Planning and Institutional Research
    Lisa Martin, Associate Dean, Graduate School
    Jocelyn Milner, Vice Provost and Director, Academic Planning and Institutional Research
    James Montgomery, Associate Dean for Fiscal Initiatives, L&S
    Lisa Naughton, Professor and Chair, Geography
    Parmesh Ramanathan, Associate Dean, Graduate School
    Nancy Westphal-Johnson, Associate Dean for Academic Administration

On October 17 2017, the L&S Academic Planning Council considered the attached request to create two new capstone certificate programs to be offered in the Department of Geography, the GIS Fundamentals Capstone Certificate, and the Advanced GIS Capstone Certificate.

These programs are founded upon the existing Capstone Certificate in Cartography/GIS, which will be superseded by these programs. Like the existing certificate, these programs are intended to be non-pooled tuition (revenue generating) programs that will be supported by the revenue they generate; however, these certificates require fewer credits to complete, and “stack” in a way that provides more flexible entry and exit points for students interested in this increasingly popular professional field. In the proposal, our colleagues note declining enrollments in the existing 22-credit program; they also report concerns that the existing program is an ineffective pathway into master’s level study. This program redesign is intended to address the needs of students who may wish either to acquire basic conceptual and methodological underpinnings of GIS (“GIS Fundamentals”) or to extend their knowledge and skills in this area, and apply those skills in a wide variety of disciplines (“Advanced GIS”). Some students may want only one of these certificates; some may choose to complete both.
The Department of Geography has long had experience administering non-pooled tuition programs, and has staff and structures in place to administer these programs. The department has worked with the Division of Continuing Studies to develop these programs and market them.

The L&S Curriculum Committee reviewed this request and recommended its support to the L&S Academic Planning Council. When the L&S APC considered it, members voted unanimously to support this request. We are enthusiastic about these programs, and look forward to their success.
INSTRUCTIONS FOR PROPOSING CAPSTONE CERTIFICATES and USE OF PROPOSAL FORM

A Capstone certificate program is a designated set of for-credit courses focused upon a specific topic or theme that give students the opportunity to pursue a subject of interest in a formalized way that is documented on the transcript. Capstone certificates are designed to offer a focused educational experience in a format that is friendly to working professionals. The curriculum may represent a more practice-oriented subset of an existing graduate discipline or field of study.

PLANNING THE CAPSTONE CERTIFICATE

- Planning starts with idea development among the program faculty and staff.
- Begin to fill out the Capstone Certificate Proposal Form.
- When your ideas are starting to take shape, consult with your school/college dean’s office. Non-pooled Capstone certificates should also contact the school/college budget officer. If you aren’t sure who to talk to in your school/college dean’s office or if you have questions and want to discuss your plans, contact Jocelyn Milner, Director of Academic Planning and Institutional Research.
- When you have a full draft of a completed Capstone Certificate Proposal Form, and ideally before school/college approval, send the proposal to Jocelyn Milner and Graduate School Assistant Dean Marty Gustafson for a check-in and proposal review. This will help make sure that the certificate meets all components of the UAPC guidelines and will identify any implementation questions.

APPROVAL STEPS FOR CAPSTONE CERTIFICATES

1. The program faculty who are sponsoring the Capstone certificate program (most often the faculty or executive committee in a department) formally approve the certificate proposal.
2. The school/college that houses the certificate considers the certificate for approval, usually at the school/college Academic Planning Council.
3. After school/college approval, the dean forwards the proposal to the provost and the dean of the Graduate School with a copy to the director of Academic Planning and Institutional Research and the Graduate School Assistant Dean for Academic Planning and Assessment.
4. The Graduate Faculty Executive Committee considers the certificate for approval.
5. The provost will seek a recommendation for approval from the University Academic Planning Council.

FOR INFORMATION AND FORMS: [http://apir.wisc.edu/certificates.htm](http://apir.wisc.edu/certificates.htm)

At this URL you will find links to the following information:

- Detailed instructions and the Capstone Certificate Proposal Form
- Capstone Certificate Guidelines, which is the policy framework for the proposal form (adopted April 2013)
- Certificate Knowledge Base - The KB houses certificate forms and frequently asked questions.

QUESTIONS: Sarah Kuba, Academic Planner, APIR (sarah.kuba@wisc.edu)
Jocelyn Milner, Director, Academic Planning and Institutional Research (jocelyn.milner@wisc.edu)
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QUESTIONS: Sarah Kuba, Academic Planner, APIR (sarah.kuba@wisc.edu)
Jocelyn Milner, Director, Academic Planning and Institutional Research (jocelyn.milner@wisc.edu)
PROPOSAL FORM
CAPSTONE CERTIFICATE PROGRAMS

Capstone certificates are available to University Special (non-degree seeking) students who hold a bachelor’s degree or equivalent credential from an accredited college or university and are designed to offer a focused professionally oriented educational experience. This form is to be used in concert with the Capstone certificate guidelines. Complete the form and save as a Microsoft Word document.

1. **Capstone certificate name and academic home**
   
   1.1. Capstone certificate name: GIS Fundamentals Capstone Certificate
   
   1.2. Home Department/Academic Unit (Name/UDDS): Geography/A482942
   
   *The home department/academic unit is responsible for the academic oversight, delivery, and administration of the certificate.*
   
   1.3. Home School/College: Letters and Science, College of

   1.4. Additional Department(s)/Academic unit(s) information, if relevant:
   
   N/A

   1.5. Faculty director of the Capstone certificate program (name, title email):

   The GISPP Oversight Committee consists of four rotating members: the Departmental Chair/GISPP Oversight Committee Chair, the Curriculum Committee Chair, the Financial Committee Chair, and a faculty representative from the Cart/GIS subgroup selected by the Departmental Chair. The GISPP Director and Manager are ex officio, non-voting members.

   - GISPP Oversight Committee:
     - Lisa Naughton, Geography Department Chair/ GISPP Oversight Committee Chair
     - Jack Williams, Finance Committee Chair
     - Joe Mason, Curriculum Committee Chair
     - Qunying Huang, GIS Faculty Representative
   
   - GISPP Staff
     - Ian Muehlenhaus, GISPP Director
     - Brittney Markle, GISPP Manager

   1.6. Primary Capstone certificate program contact (name, title, email): Ian Muehlenhaus, GISPP Director, muehlenhaus@wisc.edu, and Brittney Markle, GISPP Manager, bmarkle@wisc.edu

   1.7. Primary school/college dean’s office contact (name, title, email): Greg Downey, Associate Dean for Social Sciences, greg.downey@wisc.edu

   1.8. Date form completed: 9/11/2017

Capstone Certificate Proposal Form, Page 2 of 13
2. Approval, Implementation, and Review

2.1. School/College Approval Date: October 17, 2017

2.2. GFEC Approval Date:

2.3. UAPC Approval Date:

2.4. Expected first term of student enrollment (usually 2-3 terms after UAPC approval; typically the following Fall term): Fall 2018

2.5. Year of three year check-in to GFEC (3 years after first student enrollment): 2021

2.6. Year of first program review (5 years after first student enrollment): 2023

2.7. Are all academic programs in the home academic unit are up to date for program review? Yes
- If no, please provide an explanation:
  Type an explanation here. (1000 word limit)

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

3. Purpose, rationale, justification

Describe the purpose, rationale, and justification for the Capstone certificate:

3.1. What is the purpose of the Capstone certificate program? How does it contribute to the mission of the sponsoring unit(s)?
Describe the purpose of the Capstone certificate here. (1000 word limit)

The current Geographic Information Systems (GIS) Capstone Certificate is a longstanding program with the University of Wisconsin-Madison in the Department of Geography that has maintained successful enrollment and completion since its inception in 1999. However, in recent years enrollments have largely stagnated, likely due to increased competition and the high amount of credits in our capstone. Crucially for this proposal, we see two groups of existing capstone students that are not being well served by the current Capstone. In the first group, we have many students who purposefully delay Capstone completion to keep taking all the GIS classes offered by the department (e.g., well over 30 credits). For this audience, the current Capstone curriculum does not offer enough courses to meet their needs. In the second group, some students fail to graduate due to the large credit load (22 credits, which were grandfathered in) relative to typical certificate programs at UW-Madison (15 credits max.) and the psychological hurdle of a large capstone project.

We therefore propose to offer two, stackable (i.e., students can progress through the capstone programs into the online master’s), 12 credit, 100% online capstone certificate options: 1) a GIS Fundamentals Capstone Certificate (described here) and 2) an Advanced GIS Capstone Certificate (see separate proposal). The GIS Fundamentals Capstone Certificate is intended to produce individuals, both inside and outside of Wisconsin, skilled in the basic conceptual and methodological
underpinnings of GIS technology and able to make informed use of current GIS applications in real-world problem solving. GIS Fundamentals Capstone Certificate students will acquire basic technological skills needed in applying GIS towards a wide variety of disciplines while gaining experience with common commercial and open-source GIS software. The course package will provide foundational competency in mapping science and spatial analysis; consisting of 3 core courses. These core courses include two introductory courses covering fundamentals in cartography and GIS and a third more intensive programming course.

Establishing a stackable set of online capstone certificates will contribute to the mission of the Department of Geography in two ways. First, we will significantly increase enrollment of our capstone certificate programs by allowing working professionals to take this program without leaving their jobs or home, particularly for international audiences. Second, the redesigned capstones will act as feeders into our successful and already growing Online Professional Master’s in GIS Development. Students in both online capstone certificate programs will be able to transfer several courses into the Online Professional Master’s Program if they decide to move forward with their GIS training.

The program will be run on a non-pooled program model (i.e., as a 131 fund) and is expected to be fully self-supporting. Funds generated by the program beyond program costs will be used to strengthen the Geography Department’s teaching, research, and student service missions. We intend to make this program available fall 2018, if approved.

3.2. What is the evidence that there is a student demand for the Capstone certificate program?
Provide evidence of student demand for the Capstone certificate program

Although many geography programs in the nation and around the world are moving to provide training in GIS, the Cartography/GIS programs in Geography at UW-Madison have distinct advantages in this competition. The Cart/GIS program at UW-Madison Department of Geography is world-renowned and has a long tradition of excellence in the field. Our Geography Department is ranked 1st or 6th in the U.S., according to R-rank and S-rank criteria, respectively (NRC 2011). Our excellence in GIS is recognized beyond the U.S.; for example, we host an annual workshop for top students from Beijing Normal University. We also have demonstrated experience in running a successful revenue-based professional program. Our current capstone certificate in GIS, developed based on the innovative idea of Chancellor Ward in 1999, has been running very successfully for over 10 years with an annual revenue of about $250,000. Through running the capstone program, we also have gained a good sense of the growing need for training in areas beyond what the current capstone certificate program offers. We also offer an online master’s in Cartography and GIS, which has exceeded our original enrollment expectations.

Another downfall to our current capstone program lies in its delivery. This is an in-house program intended to serve students on-campus. We are seeing increasing demand for online GIS education daily through numerous inquiries from outside the University as well as from undergraduate and graduate students across the disciplines. Our proposed capstone certificates in GIS Fundamentals and Advanced GIS are designed to fill this void and expand the UW brand in GIS beyond Madison, Wisconsin.

3.3 What is the evidence that there is a market demand for graduates of the Capstone certificate program?
Provide evidence of market demand for the Capstone certificate program
Proposals for new Capstone certificates must provide a demonstrated need for such a program: this provision must be defined in terms of external markets (i.e. external demand for the skills associated
with such a certificate) and must describe how the Capstone certificate program will attract new student enrollments.

Increasingly we are seeing the impact GIS has on our everyday lives as it rapidly becomes a major expanding sector in the global economy. It is not only a vital component of Geography, but has increasing importance to other academic and practitioner fields ranging from engineering to natural sciences to social sciences. The United States Department of Labor identifies GIS and Geospatial Technology broadly as a key area of growth. It is indicated that there currently are approximately 424,000 Americans working in geospatial occupations and that an additional 148,700 jobs in geospatial occupations are expected to be created in the next ten years, a growth rate of approximately 35% (see US Department of Labor website). In addition, the initial wave of professionals in GIS who started their careers in the mid-1980s will be nearing retirement age, meaning the level of demand for GIS professionals should remain high for decades to come. The 2013 NRC report, Future U.S. Workforce for Geospatial Intelligence, assesses the supply of expertise in 10 geospatial intelligence fields and identifies cartography/GIS as the core area of expertise needed. It indicates that due to competition from private companies it is already difficult to find qualified experts in GIS techniques. This shortfall is expected to continue for at least 20 years.

Over the last few decades, the tools for analysis, visualization, processing, and archiving of spatial information have become increasingly complex, prompting a large demand for individuals with formal training in Geographic Information Science. Taken together, these data support a significant need for the training our proposed scalable certificate programs will deliver. The rapid growth of similar (but not interchangeable) professional GIS training programs in competing universities like Penn State provides further evidence of the high demand for this type of skills training.

4. Curriculum

4.1. Delivery modality:

☐ Face-to-face
☒ Distance

Distance-delivered programs are those certificate or degree programs in which 50% or more of the required courses may be taken as distance-delivered courses.

4.2. Provide a complete list of requirements.

- Geog 370: Introduction to Cartography (core course)
- Geog 377: Introduction to GIS (core course)
- Geog 378: Geocomputing (core course)

Program requirements should provide content that leads to the completion of Capstone certificate learning goals. See section 8 Assessment.

4.3. Chart student progression through the curriculum.

<table>
<thead>
<tr>
<th>Semester students will take the course</th>
<th>Department</th>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
<th>Instructor</th>
<th>Semester &amp; year last taught</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st, 2nd, or 3rd semester</td>
<td>Geography</td>
<td>370</td>
<td>Introduction to Cartography</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Summer 2017</td>
</tr>
</tbody>
</table>
4.4. Total credits required: 12

*Adjuncts will instruct as necessary

Capstone certificate programs are usually 9 to 12 credits and may not be more than 15 credits.

4.5. Semesters to completion: 1-3

4.6. Describe the student progression (one-course per semester for several semesters, all courses taken in one intensive semester, other:

☒ Part-time (< 8 credits fall and spring semesters, < 4 credits summer term)
Students can choose to take 1 course per semester for 3 consecutive semesters.
☒ Full-time, time-compressed, intensive
Students can choose to take all three courses in one intensive semester.
☒ Other
Students can choose to take three courses over two semesters with one light semester (1 course) and one heavy semester (2 courses).

Checklist for Verification of Curricular Policy Requirements*
You will have an opportunity to provide explanation and rationale for any Curricular Policy Requirements that have not been affirmed in the text box that follows the check list, below.

☒ Courses for the Capstone certificate are numbered 300 or higher.
☒ Courses are offered on a regular basis (as identified in student progression chart in section 4).
☒ Courses have enrollment capacity for students in the Capstone certificate program.
☒ Courses in the proposed Capstone certificate have been approved.
☒ All of the Capstone certificate credits must be earned “in residence” (which includes on campus and distance-delivered courses) at UW-Madison while enrolled in the Capstone certificate program. Because a Capstone certificate is comprised of just a few courses, it is not appropriate for students who already have completed the same or similar coursework at UW-Madison or another institution.
☒ Students must earn a minimum grade of C on all attempted Capstone certificate coursework.
☒ Courses in which a student elects the pass/fail option will not meet Capstone certificate requirements.
☐ All Capstone certificate program requirements must be met; waiving requirements is not permitted.
☒ Units must maintain Capstone certificate requirements so that they are up-to-date; all curriculum changes must be approved through the appropriate school/college academic planning council (APC) or curriculum committee. The school/college APC or curriculum committee will notify the Office of the Registrar, the Graduate School, and DCS-ACSSS about approved curricular changes to the certificate. Typically, any changes in requirements will be effective no sooner than the fall semester after approval.

*Provide explanation and rationale for any Curricular Policy Requirements that have not been affirmed.

This Capstone Program is intended to be 12 credits. However, we anticipate that some students will have already taken a single, entry-level GIS or Cartography course as an undergrad. In this case, we must make
an exception for one of these courses or risk losing the student to a competitor, as both of these courses are prerequisites of our advanced capstone certificate and our Online GIS & Web Mapping MS Program. Thus, we will allow them to transfer that single 4-credit course into the Fundamentals Capstone but insist they take the other 8 credits before continuing on to the Advanced GIS Capstone.

5. **Student Services & Advising**

5.1. List the names of Capstone certificate program advisor(s) with title and departmental affiliation(s).

Ian Muehlenhaus, GISPP Director, Department of Geography  
Brittney Markle, GISPP Manager, Department of Geography  
Joel Gruley, GISPP Administrative Assistant, Department of Geography

5.2. How will the resource load of the additional student services support and advising be met? Describe how student services and advising will be supported here. (1000 word limit)

*Do the individuals or offices have the capacity to add student services support for the Capstone certificate program? Does the program have the resources to support all aspects of advising and student support?*

The Department of Geography has hired an administrative assistant fully dedicated to GISPP to assist with day-to-day support on a half time appointment. This hire will take on many administrative duties and some student service duties that would have otherwise prevented the other GISPP staff from increasing student support. Student service responsibilities will be divided amongst all GISPP staff. As GISPP grows, we intend to hire more support staff as needed.

5.3. ☑ Confirm that program advisor(s) have been consulted and reviewed this proposal.

6. **Admissions**

6.1. Minimum bachelor’s degree GPA for admission to the Capstone certificate program (if relevant): 3.0

6.2. List additional admission criteria:

- Applicants must have a four-year Bachelor’s degree from an accredited institution of higher learning.
- Applicants may not be enrolled in other UW-Madison graduate coursework or programs concurrently with our program.
- Non-native English speakers must take either the TOEFL exam or the IELTS exam and submit scores during the application process. Minimum acceptable scores must meet the UW Graduate School requirements:
  - TOEFL - 92 for internet based test (IBT) and 580 for paper test.
  - IELTS - 7.0

*In order to provide greater flexibility and meet the needs of specific target student populations, each Capstone certificate program shall identify any tests and minimum scores (for example GRE and TOEFL where applicable), and other similar criteria required of applicants to the program. These elements must be clearly communicated to applicants and students. In planning, programs should give special attention to English-language proficiency for non-native English speakers and consider how proficiency*
will be determined in the admission process; ESL support is not generally available to students in Capstone certificate programs.

Checklist for Verification of Admission Policy Requirements*
You will have an opportunity to provide explanation and rationale for any Admission Policy Requirements that have not been affirmed in the text box that follows the checklist.

☒ Degree-seeking students may not be concurrently enrolled in a Capstone certificate program.
☒ To be eligible for admission to a Capstone program, a student must hold an earned bachelor’s degree or equivalent credential from an accredited college or university.
☒ Prospective Capstone certificate students apply to the University and are admitted through the Adult Career and Special Student Services office in the Division of Continuing Studies (DCS-ACSSS) in consultation with the Capstone certificate faculty program director or designee. Once admitted, Capstone certificate students carry a University Special student classification (UNCS). University Special students apply via an online application system by selecting the Capstone certificate program of choice from a program list on the application. DCS-ACSSS codes the applicant for that program and defers final admission until a decision is made by the Capstone program faculty/staff. DCS-ACSSS serves as the advising, admissions, and academic dean’s office for all University Special students.

*Provide explanation and rationale for any Admission Policy Requirements that have not been affirmed in the above checklist.
Type explanations for Admission Policy Requirements not affirmed here.

7. Enrollment Planning and Marketing

7.1. Projected annual enrollment: 50
Capstone certificates that will be supported by non-pooled tuition should project enrollments of at least 30 students; experience shows this is the threshold for generating sufficient revenue to meet direct program costs.

7.2. Maximum enrollment that can be supported with existing instructional and student services resources: 50

7.3. Describe plans for supporting enrollments that are much higher or much lower than the anticipated enrollment.

Should enrollment exceed our expectations we plan to hire additional qualified lectures to assist faculty associates in course instruction. We are currently compiling a list of qualified professionals that have expressed interest in teaching some of our courses. This would undoubtedly increase student exposure to professional experiences and contacts.

Should enrollment fall below our expectations, faculty associates will be expected to allocate additional time towards curriculum updates. The GIS industry is rapidly evolving and it is crucial that we keep up with (and hopefully surpass) our competitors. We already intend to allocate time for course updates; however, in the case of lower enrollments, we would take advantage of the opportunity by increasing our efforts in this mission.

7.4. Will this Capstone certificate enroll international students? Yes
Programs who will seek to enroll international students must plan accordingly. International students (any student who needs a UW I-20 for a student visa) may only enroll in a program if the Capstone certificate is offered full-time, if students are enrolled full-time, and if the program has been approved to receive international students by the US government. That approval process is conducted through the Office of International Student Services and can be initiated after academic approvals are complete; such approvals may take up to a year. Note that fully online programs are not subject to this restriction because international students do not need a visa.

7.5. What is the marketing plan for the Capstone certificate?
Describe marketing plan here. (1000 word limit)

We will work with the Division of Continuing Resources to market this program alongside the proposed Advanced GIS Capstone Certificate and our already successful Online Master’s Program. We intend to market these programs online as well as in person at popular conferences. We will market all programs together under the umbrella “GIS Professional Programs” to offer an ecosystem of educational options for prospective students.

8. Assessment

8.1. ☒ Attach an assessment plan when submitting this proposal.
See the Basic Assessment Plan for Capstone Certificates for instructions and the accompanying template. The Basic Assessment Plan and Template are minimum expectations for this information. Programs that have developed plans that exceed what is specified in the basic plan may provide that information.

8.2. Provide a summary of the Capstone certificate’s assessment plan, including learning goals, key methods and assessment approaches, and how assessment information will be reviewed and acted on.
Type summary here. (1000 word limit)
There are two comprehensive student learning goals. First, students will establish a foundation of conceptual underpinnings of GIS technology in order to make informed use of GIS applications in real world problem solving. Second, students will acquire basic technological skills needed in applying GIS towards a wide variety of disciplines while gaining experience with common commercial and open-source GIS software. Learning goals will be assessed directly through rubric implementation in all course assessments to evaluate learning goal achievement and indirectly through: 1) course evaluation surveys (deployed for all courses to gain insight into the student’s experience in the course, perceptions of instruction, and improvements that could be incorporated into the curriculum) and 2) program completion surveys deployed to completing students by DCS to gain insight into the student perceptions of learning, career expectations, and improvements that could be incorporated into the curriculum and program. Direct and indirect methods will be assessed on an annual basis in addition to a 3-year review cycle by GISPP staff.

The GISPP staff will review program enrollment, progression, and completion data, as well as direct and indirect assessment data with the GISPP Oversight Committee in an annual report comprised of relevant data (described above), charts/graphs with explanations, and recommendations for future changes. This report will be presented in a PDF document with an executive summary listing the strengths of the program, possible curriculum changes, and recommended changes/action items to
implement over the next year. The GISPP Oversight Committee will agree by consensus, or if a vote is called, by a simple majority which changes to implement once per year or twice per year as necessary.

9. Related Programs

9.1. This Capstone certificate will be offered as a: Capstone certificate only.

Students may not earn a Capstone certificate and Graduate/Professional Certificate of the same name. If the Capstone certificate will be offered as a Capstone certificate and a new Graduate/Professional certificate, a Graduate/Professional certificate proposal form must be completed.

9.2. Specify any other major/degree or certificate program that is related to this Capstone certificate. List any major/degree or certificate programs are related to this Capstone certificate here. Related programs include those that share a student audience, represent a closely related area of study, or have program names that are similar. These programs must provide a supporting memo (see required attachments). Capstone certificates supported using non-pooled tuition cannot compete with or draw students away from existing programs that support the central tuition pool.

This would compete with and directly replace our own, existing 131-capstone certificate program within geography. It would not directly compete with any other program that we are aware of on campus. In the interest of transparency, however, we notified Nelson Institute of our plans. We received an email from Janet Silbernagel noting that this in no way overlaps with what they are doing (see Appendix C).

10. Governance & Faculty

10.1. The Capstone certificate is governed by:

☒ Existing department and school/college governance committees
☐ New Capstone certificate governance committees

If the Capstone certificate is governed by a new committee, define and outline governance structures and procedures for the certificate program. Define and outline governance structures and procedures here. (1000 word limit)

Provide information on how program faculty are identified and provisions for transition in the faculty program director. Who will appoint the director and to whom will the director report?

10.2. List the core program faculty and staff with title and departmental affiliation(s) who are primarily involved and will participate in delivery and oversight of the Capstone certificate.

• GISPP Oversight Committee:
  o Lisa Naughton, Geography Department Chair/ GISPP Oversight Committee Chair
  o Jack Williams, Finance Committee Chair
  o Joe Mason, Curriculum Committee Chair
  o Qunying Huang, GIS Faculty Representative

• GISPP Staff
  o Ian Muehlenhaus, GISPP Director
  o Brittney Markle, GISPP Manager
  o Joel Gruley, GISPP Administrative Assistant
11. Progress & Certificate Completion

11.1. ☒ Using SIS, the faculty program director and staff will be able to identify University Special students enrolled in the Capstone certificate program.

11.2. ☒ Using DARS, the faculty program director and staff will monitor students’ progress in the Capstone certificate program.

11.3. ☒ The faculty program director will notify the degree audit department in the Registrar’s Office and DCS/ACSSS by email (degreeaudit@em.wisc.edu, karen.ripley@wisc.edu) when a student has completed all of the requirements for the Capstone certificate. When the certificate is completed, the program faculty director or designee must notify the Registrar’s Office in order for the Capstone certificate to be recorded on the official student record and for it to print to the transcript. If the program wishes to provide a physical certificate of completion for the student, they may do so.

11.4. Identify standards for good academic standing.
   - Cumulative GPA of 3.0 or above
   - Minimum C grade must be earned on all course work attempted for the certificate program.

At a minimum, C grades must be earned on all course work attempted for the certificate program. Academic standing is verified by the program faculty and staff. (Only graduate-level work from the Capstone certificate that is earned with a grade of B or better is eligible for subsequent application to a UW-Madison graduate degree minimum graduate-level credit requirement.)

12. Fiscal Structure and Ongoing Commitment

12.1. The Capstone certificate program will be supported using non-pooled tuition

12.2. For programs that will be supported using standard general purpose revenue, what resources are allocated or reallocated to the Capstone certificate program? Describe Capstone certificate resources here. (1000 word limit)

Is there a source of new funding? If the funding is from reallocation, what activities will be reduced as a result? Both the proposal from the program faculty and the school/college dean’s office cover memo should specify that the resource commitment is being made to the program.

12.3. For programs supported using non-pooled tuition, what resources are allocated to the Capstone certificate program?

Describe Capstone certificate resources here. (1000 word limit)
Programs supported using non-pooled tuition must also submit the attachments listed in the required attachments section.

The GIS Professional Programs will provide administrative coverage of the new Master's, as well as student advising. The program will be supported using current revenue from our online Master's and Capstone programs.

12.4. For programs supported using non-pooled tuition, planned enrollment is expected to generate enough paid tuition to cover instructional costs, direct student support costs, and any other fixed or required costs. Although detailed fiscal plans are not required in the academic program proposal, it is helpful to provide the following summary taken from the non-pooled tuition budget:

Fiscal Annual Summary
*Please refer to Appendix D: GISPP 5 Year Budget Plan

12.5. The department or program will not consider students enrolled in the Capstone certificate for departmental financial aid.

Capstone certificate students cannot receive federal financial aid.

12.6. Students enrolled in Capstone certificate programs are NOT eligible for teaching assistant (TA), research assistant (RA), project assistant (PA) nor graduate fellowship support. Programs must disclose this program policy to Capstone certificate students in the recommendation of admission letter, program website, program handbook, and program orientation.

12.7. The Capstone certificate program faculty are responsible for seeking appropriate governance approval for significantly altering the Capstone certificate’s curriculum, suspending admissions or discontinuing the certificate program.

12.8. The faculty/staff will check-in with GFEC three years after first student enrollment.

12.9. The faculty/staff will engage in program review five years after implementation and at least once every ten years after that.

12.10. The program faculty/staff will ensure the program is encoded into DARS and will work with the Registrar’s Office DARS liaison to keep approved revisions to the curriculum current.

12.11. The program faculty/staff will ensure the program website and Advance Your Career materials are current and consistent across all locations where information is provided.

Required attachments

☒ Supporting letters/memos

Provide letters or memos from other academic units that will have overlapping interest. This will include departments/schools/colleges that provide courses for the certificate, share a student audience, represent a closely related area of study, have overlapping faculty, or have program names that are similar.

☒ Assessment plan
See the Basic Assessment Plan and Template for Capstone Certificates for detail. The Basic Assessment Plan for Capstone Certificates and the Template are posted at [http://apir.wisc.edu/certificates.htm](http://apir.wisc.edu/certificates.htm)

Programs supported using **non-pooled tuition** must attach:
- ☒ Core Criteria Checklist
- ☒ Additional Requirements Checklist

*See the current “Non-pooled Program Requirements Process” document posted at [http://apir.wisc.edu/academicplanning.htm](http://apir.wisc.edu/academicplanning.htm)*
ASSESSMENT PLAN
GIS FUNDAMENTALS CAPSTONE CERTIFICATE

Capstone Certificate Program Name: GIS Fundamentals Capstone Certificate

Faculty Director Name, Contact information, Title:
Program oversight has been delegated to an oversight committee, rather than an individual faculty director. The GIS Professional Programs Oversight Committee consists of four rotating members and 2 ex-officio members (GISPP Director and Manager).

Current Oversight Committee Members:
- Lisa Naughton, Geography Department Chair/ GISPP Oversight Committee Chair
- Joe Mason, Curriculum Committee Chair
- Jack Williams, Finance Committee Chair
- Qunying Huang, GIS Faculty Representative

GISPP Staff:
- Ian Muehlenhaus, GISPP Director
- Brittny Markle, GISPP Manager

Primary Program Contact Name, Contact information, Title:
- Ian Muehlenhaus, muehlenhaus@wisc.edu, GISPP Director
- Brittny Markle, bmarkle@wisc.edu, GISPP Manager

Date this Assessment Plan was adopted by the program faculty: 9/11/2017

Student Learning Goals (What)
Students will:

1. Establish a foundation in the conceptual underpinnings of GIS technology in order to make informed use of current GIS applications in real world problem solving.
2. Acquire basic technological skills needed in applying GIS towards a wide variety of disciplines while gaining experience with common commercial and open-source GIS software.
**Curriculum Map (Where)**

<table>
<thead>
<tr>
<th>Capstone Certificate Program Courses</th>
<th>Establish a foundation in the conceptual underpinnings of GIS technology in order to make informed use of current GIS applications in real world problem solving.</th>
<th>Acquire basic technological skills needed in applying GIS towards a wide variety of disciplines while gaining experience with common commercial and open-source GIS software.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 377: Intro to GIS</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 370: Intro to Cartography</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 378: Geocomputing</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**Assessment Planning (How)**

For each learning goal, indicate how you plan to assess whether or not students are meeting the expectation, as well as when each learning goal will be assessed. Keep in mind that each academic degree program is expected to engage in at least one assessment activity per year and assessment activities, in total, must include one direct assessment method.

**Method for assessing learning (at least one direct method required)**

- **Direct:** Rubrics will be implemented in all course assessments to evaluate learning goal achievement.

- **Indirect:**
  1) Every semester a course evaluation survey will be deployed for all courses to gain insight into the student’s experience in the course, perceptions of instruction, and improvements that could be incorporated into the curriculum.
  2) Every semester DCS will deployed an exit survey to completing students to gain insight into the student perceptions of learning, career expectations, and improvements that could be incorporated into the curriculum and program.

**Timetable for assessment activity (at least one activity each year; all goals reviewed in a 3-year cycle)**

Direct and indirect methods will be assessed on an annual basis and reviewed in a 3-year cycle for effectiveness.

*For examples of direct and indirect methods of assessment, see: http://provost.wisc.edu/assessment/doing-assessment.htm.*
Assessment Review and Reporting (So What)

1. **Who is responsible for assessment?**

   GISPP staff is responsible for direct and indirect assessment.

2. **What is the plan for review of the assessment information?**

   Direct assessment will be completed every year by reviewing course rubrics. Indirect assessment will be evaluated yearly via student evaluations. DCS will also conduct a program exit survey and these results will be assessed annually. All of these assessments will be reviewed in a three-year cycle for effectiveness.

3. **What is the plan for production of annual summary report?**

   A report will be comprised of relevant data (described above), charts/graphs with explanations, and recommendations for future changes.

   It will be presented in a PDF document with an executive summary listing:
   - The strengths of the program
   - Possible curriculum changes
   - Recommended changes/action items to implement over the next year.

4. **How will recommendations be implemented?**

   The GISPP Oversight Committee will agree by consensus, or if a vote is called, by simple majority, regarding the changes to implement. The Oversight Committee will meet at least twice per year, or more often as necessary.

Use this form in conjunction with the “Basic Assessment Plan for Capstone Certificates” guidelines.
For information on Capstone certificates see: [http://apir.wisc.edu/certificates.htm](http://apir.wisc.edu/certificates.htm)
For information on assessment see [http://provost.wisc.edu/assessment/](http://provost.wisc.edu/assessment/)
APPENDIX A.  CORE CRITERIA CHECKLIST
FOR ACADEMIC PROGRAMS WITH NON-POOLED TUITION

1. New and Additional Student Enrollments to Support Program Costs
   ☒ The program must bring in NEW and ADDITIONAL students. Overall enrollment in all other school/college programs must not be eroded. The program cannot compete with or draw students away from existing programs that support the central tuition pool.
   ☒ Faculty/staff must plan for sufficient enrollments to have enough tuition to cover instructional, direct student support costs, and any other fixed or required costs. Experience shows that enrollments of at least 30 students are necessary to have enough tuition to meet direct program costs.
   ☒ School/college Budget Officers must be involved in planning and must approve plans and budgets for these programs before the program is submitted to the school/college APC for academic approval.

2. Designed for Non-Traditional Students
   ☒ Has an applied, practice-oriented curriculum, or integrates practice with theory
   ☒ Is offered in a modality that allows non-traditional audiences to attend (evening, weekend, online, intensive, or some combination)
   ☒ Has demonstrated a workforce demand for the program graduates
   ☒ Has defined learning goals that are oriented to market considerations
   ☒ Has a clearly defined curriculum that is “self-contained”, meaning that program students are confined only to courses from the approved, prescribed curriculum
   ☒ Has a clearly defined (often lockstep) curriculum with few options or electives that follows a predictable timeline for offerings and completion

3. Distinctly Identifiable Program (Code) With Governance Approval
   ☒ The program must be distinctly identifiable in the student record system, either as a degree/major or as an option of a degree/major, or as a Capstone certificate.
   ☒ The program must develop a proposal for the academic approval process, during which it must demonstrate that the school/college Dean and Budget Officer are aware and supportive of the program being run on a non-pooled tuition model.
APPENDIX B. ADDITIONAL REQUIREMENTS CHECKLIST
FOR ACADEMIC PROGRAMS WITH NON-POOLED TUITION

Use this checklist in conjunction with the Core Criteria Checklist

If core criteria are met, the program must adhere to the additional requirements below.
Note: Not all new programs are suited for the non-pooled program requirements. New programs that seek to take advantage of a wide range of course and curricular/program offerings on campus and are not market-oriented should be developed under traditional (101) pooled tuition funding models.

1. Fiscal Requirements:

☐ School/college budget officer has approved the budget and fiscal plan.

☐ School/college dean and budget officer are committed to assuming fiscal responsibility for costs not covered by non-pooled tuition to the program. The school/college will back up the budget with a commitment to cover any costs not met from tuition from other sources.

☒ The program structure fits within standard academic administrative structures and allocates expenses of the program so that the program does not create additional burdens on traditional/101 program resources or student services such as advising, ESL, Registrar’s Office, Bursar’s Office, Graduate School and other support services.

☒ Programs have two options for tuition. One option is to charge standard graduate tuition according to the UW-Madison tuition schedule. This includes standard rates for WI resident, MN, and non-resident students and any compulsory fees that apply. Or, for fully online programs, they have the option of charging all students one of tuition tiers (Appendix D). Although not currently allowed, it is potentially possible in the future the tiered tuition may be available to face-to-face programs.

Because students who have graduate assistantships receive tuition waivers, some non-pooled tuition graduate degree programs choose to prohibit students from accepting a graduate assistantship (RA/TA/PA). If a program allows their students to take graduate assistantships they it must forgo the tuition revenue. To ensure full receipt of non-pooled tuition and to counter challenges from students, the program must adhere to the following:

☒ The program faculty/staff must disclose this program policy to students in the recommendation of admission letter, program website, program handbook, and program orientation.

☒ Please see Appendix E for links and Appendix F for a sample of a specific non-pooled program template for a recommendation of admission letter and a general template for a program handbook. The program faculty/staff must provide details on this and any other program policies the program handbook in at least the following areas: satisfactory
progress (good standing) requirements, any ways to return to good standing, and a program grievance process if done does not already exist.

2. Requirements for International Students:

☒ Programs may not admit students who need ESL services without building sufficient ESL support into their fiscal model, and having an explicit MOU with the ESL provider about funding to support the ESL services.

☒ Graduate degree/major programs must use Graduate School standards for English Proficiency. Capstone certificates should be designed so that admission requirements ensure that ESL support is not needed.

☒ If the program is NOT completely online and admits international students, the program is responsible for honoring federal visa regulations related but not limited to: length of stay requirements for visa requests, online course restrictions for visa holders, and waiting for federal program approval (up to a year) if the program represents a new degree type or capstone certificate previously not offered at UW-Madison.

3. Requirements for Program/Course Enrollment:

☒ Non-pooled tuition program students can only be enrolled in one program at a time; enrollment in a second major, named option, certificate program, or courses beyond the prescribed program curriculum is not permitted. Non-compliance with this requirement will jeopardize the receipt of tuition for a non-pooled program. Regular audits will be conducted to ensure these requirements are met.

☒ To ensure full receipt of non-pooled program tuition and to counter challenges from students who want to be dually enrolled, the program must adhere to the following:

☒ The program must provide information to students about prohibitions on concurrent program enrollment and out-of-program course enrollment. Programs must note this in recruiting materials, in recommendations of admission, on the program website, program handbook, and program orientation.

☒ Please see Appendix E for links and Appendix F for language for a specific non-pooled program template for a recommendation of admission letter and a general template for a program handbook. The program faculty/staff must provide details on this and any other program policies in the program handbook in at least following areas: satisfactory
progress (good standing) requirements, ways to return to good standing, and a program grievance process if one does not already exist.

☒ The program communicates to students each semester prior to course enrollment the expectation that students can enroll only in program courses and not in courses outside the approved, prescribed curriculum.

☒ For students who enroll in the non-pooled program and then decide they want to pursue traditional/101 programs that allow dual enrollment, the program must help the student transfer to a different program(s) that allow such activity.
PROPOSAL FORM
CAPSTONE CERTIFICATE PROGRAMS

Capstone certificates are available to University Special (non-degree seeking) students who hold a bachelor’s degree or equivalent credential from an accredited college or university and are designed to offer a focused professionally oriented educational experience. This form is to be used in concert with the Capstone certificate guidelines. Complete the form and save as a Microsoft Word document.

1. Capstone certificate name and academic home

1.1. Capstone certificate name: Advanced GIS Capstone Certificate

1.2. Home Department/Academic Unit (Name/UDDS): Geography/A482942
   The home department/academic unit is responsible for the academic oversight, delivery, and administration of the certificate.

1.3. Home School/College: Letters and Science, College of

1.4. Additional Department(s)/Academic unit(s) information, if relevant:
   N/A

1.5. Faculty director of the Capstone certificate program (name, title email):

   The GISPP Oversight Committee consists of four rotating members: the Departmental Chair/GISPP Oversight Committee Chair, the Curriculum Committee Chair, the Financial Committee Chair, and a faculty representative from the Cart/GIS subgroup selected by the Departmental Chair. The GISPP Director and Manager are ex officio, non-voting members.
   • GISPP Oversight Committee:
     o Lisa Naughton, Geography Department Chair/ GISPP Oversight Committee Chair
     o Jack Williams, Finance Committee Chair
     o Joe Mason, Curriculum Committee Chair
     o Qunying Huang, GIS Faculty Representative
   • GISPP Staff
     o Ian Muehlenhaus, GISPP Director
     o Brittney Markle, GISPP Manager

1.6. Primary Capstone certificate program contact (name, title, email): Ian Muehlenhaus, GISPP Director, muehlenhaus@wisc.edu, and Brittney Markle, GISPP Manager, bmarkle@wisc.edu

1.7. Primary school/college dean’s office contact (name, title, email): Greg Downey, Associate Dean for Social Sciences, greg.downey@wisc.edu
1.8. Date form completed: 9/11/2017

2. Approval, Implementation, and Review

2.1. School/College Approval Date: October 17, 2017

2.2. GFEC Approval Date:

2.3. UAPC Approval Date:

2.4. Expected first term of student enrollment (usually 2-3 terms after UAPC approval; typically the following Fall term): Fall 2018

2.5. Year of three year check-in to GFEC (3 years after first student enrollment): 2021

2.6. Year of first program review (5 years after first student enrollment): 2023

2.7. Are all academic programs in the home academic unit are up to date for program review? Yes
   ▪ If no, please provide an explanation:
     Type an explanation here. (1000 word limit)

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

3. Purpose, rationale, justification

Describe the purpose, rationale, and justification for the Capstone certificate:

3.1. What is the purpose of the Capstone certificate program? How does it contribute to the mission of the sponsoring unit(s)?
   Describe the purpose of the Capstone certificate here. (1000 word limit)

   The current Geographic Information Systems (GIS) Capstone Certificate is a longstanding program with the University of Wisconsin-Madison in the Department of Geography that has maintained successful enrollment and completion since its inception in 1999. However, in recent years enrollments have largely stagnated, likely due to increased competition and the high amount of credits in our capstone. Crucially for this proposal, we see two groups of existing capstone students that are not being well served by the current Capstone. In the first group, we have many students who purposefully delay Capstone completion to keep taking all the GIS classes offered by the department (e.g., well over 30 credits). For this audience, the current Capstone curriculum does not offer enough courses to meet their needs. In the second group, some students fail to graduate due to the large credit load (22 credits, which were grandfathered in) relative to typical certificate programs at UW-Madison (15 credits max.) and the psychological hurdle of a large capstone project.
We therefore propose to offer two, stackable (i.e., students can progress through the capstone programs into the online master’s), 12 credit, 100% online capstone certificate options: 1) a GIS Fundamentals Capstone Certificate (see separate proposal) and 2) an Advanced GIS Capstone Certificate (described here). The Advanced GIS Capstone Certificate is intended to produce individuals, both inside and outside of Wisconsin, skilled in the conceptual and methodological underpinnings of advanced GIS technology and able to make informed use of current GIS applications in real world problem solving. Advanced GIS Capstone Certificate students will acquire advanced GIS and related technological skills needed in a wide variety of disciplines, while gaining experience with common commercial and open-source GIS software. The course package will provide broad competency in mapping science and spatial analysis; consisting of three elective courses, including advanced courses in cartographic design, geovisualization, geocomputing, and spatial and web programming. We provide these courses to serve multiple, diverse interest groups, namely those interested in representation (cartography), spatial analysis, and web design (programming). Other electives may be added over time, if demand so indicates.

Establishing a stackable set of online capstone certificates will contribute to the mission of the Department of Geography in two ways. First, we will significantly increase enrollment of our capstone certificate programs by allowing working professionals to take this program without leaving their jobs or home, particularly for international audiences. Second, the redesigned capstones will act as feeders into our successful and already growing Online Professional Master’s in GIS Development. Students in both online capstone certificate programs will be able to transfer several courses into the Online Professional Master’s Program if they decide to move forward with their GIS training.

The program will be run on a non-pooled program model (i.e., as a 131 fund) and is expected to be fully self-supporting. Funds generated by the program beyond program costs will be used to strengthen the Geography Department’s teaching, research, and student service missions. We intend to make this program available fall 2018, if approved.

3.2. What is the evidence that there is a student demand for the Capstone certificate program?
Provide evidence of student demand for the Capstone certificate program

Although many geography programs in the nation and around the world are moving to provide training in GIS, the Cartography/GIS programs in Geography at UW-Madison have distinct advantages in this competition. The Cart/GIS program at UW-Madison Department of Geography is world-renowned and has a long tradition of excellence in the field. Our Geography Department is ranked 1st or 6th in the U.S., according to R-rank and S-rank criteria, respectively (NRC 2011). Our excellence in GIS is recognized beyond the U.S.; for example, we host an annual workshop for top graduate students from Beijing Normal University. We also have demonstrated experience in running a successful revenue-based professional program. Our current capstone certificate in GIS, developed based on the innovative idea of Chancellor Ward in 1999, has been running very successfully for over 10 years with an annual revenue of about $250,000. Through running the capstone program, we also have gained a good sense of the growing need for training in areas beyond what the current capstone certificate program offers. We also offer an online master’s in Cartography and GIS, which has exceeded our original enrollment expectations.

Another downfall to our current capstone program lies in its delivery. This is an in-house program intended to serve students on-campus. We are seeing increasing demand for online GIS education daily through numerous inquiries from outside the University as well as from undergraduate and graduate...
students across the disciplines. Our proposed capstone certificates in GIS Fundamentals and Advanced GIS are designed to fill this void and expand the UW brand in GIS beyond Madison, Wisconsin.

3.3 What is the evidence that there is a market demand for graduates of the Capstone certificate program? Provide evidence of market demand for the Capstone certificate program

Proposals for new Capstone certificates must provide a demonstrated need for such a program: this provision must be defined in terms of external markets (i.e. external demand for the skills associated with such a certificate) and must describe how the Capstone certificate program will attract new student enrollments.

Increasingly we are seeing the impact GIS has on our everyday lives as it rapidly becomes a major expanding sector in the global economy. The United States Department of Labor identifies GIS and Geospatial Technology broadly as a key area of growth. There currently are approximately 424,000 Americans working in geospatial occupations, while an additional 148,700 jobs in geospatial occupations are expected to be created in the next ten years, a growth rate of approximately 35% (see US Department of Labor website). In addition, the initial wave of professionals in GIS who started their careers in the mid-1980s are nearing retirement age, meaning the level of demand for GIS professionals should remain high for decades to come. The 2013 NRC report, Future U.S. Workforce for Geospatial Intelligence, assessed the supply of expertise in 10 geospatial intelligence fields and identified cartography/GIS as the core area of expertise needed. It indicated that due to competition from private companies, intelligence agencies are already having difficulties finding qualified experts in GIS techniques. This shortfall is expected to continue for at least 20 years.

Over the last few decades, the tools for analysis, visualization, processing, and archiving of spatial information have become increasingly complex, prompting a large demand for individuals with formal training in Geographic Information Science. Taken together, these data support a significant need for the training our proposed scalable certificate programs will deliver. The rapid growth of similar (but not interchangeable) professional GIS training programs in competing universities like Penn State provides further evidence of the high demand for this type of skills training.

4. Curriculum

4.1. Delivery modality:
- □ Face-to-face
- ☑ Distance

Distance-delivered programs are those certificate or degree programs in which 50% or more of the required courses may be taken as distance-delivered courses.

4.2. Provide a complete list of requirements.
- Geog 574: Spatial Databases (elective)
- Geog 378: Geocomputing (elective)
- Geog 572: Graphic Design in Cartography (elective)
- Geog 575: Interactive Cartography & Geovisualization (elective)
- Geog 576: Spatial Web & Mobile Programming (elective)
- Geog 579: GIS & Spatial Analysis (elective)

Program requirements should provide content that leads to the completion of Capstone certificate learning goals. See section 8 Assessment.
4.3. Chart student progression through the curriculum.

<table>
<thead>
<tr>
<th>Semester students will take the course</th>
<th>Department</th>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
<th>Instructor</th>
<th>Semester &amp; year last taught</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st, 2nd, or 3rd semester</td>
<td>Geography</td>
<td>378</td>
<td>Geocomputing</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Summer 2017</td>
</tr>
<tr>
<td>1st, 2nd, or 3rd semester</td>
<td>Geography</td>
<td>572</td>
<td>Graphic Design in Cartography</td>
<td>4</td>
<td>Ian Muehlenhaus</td>
<td>Fall 2017</td>
</tr>
<tr>
<td>1st, 2nd, or 3rd semester</td>
<td>Geography</td>
<td>574</td>
<td>Spatial Databases</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Spring 2017</td>
</tr>
<tr>
<td>1st, 2nd, or 3rd semester</td>
<td>Geography</td>
<td>575</td>
<td>Interactive Cartography &amp; Geovisualization</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Spring 2017</td>
</tr>
<tr>
<td>1st, 2nd, or 3rd semester</td>
<td>Geography</td>
<td>576</td>
<td>Spatial Web &amp; Mobile Programming</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Summer 2017</td>
</tr>
<tr>
<td>1st, 2nd, or 3rd semester</td>
<td>Geography</td>
<td>579</td>
<td>GIS &amp; Spatial Analysis</td>
<td>4</td>
<td>Faculty Associate</td>
<td>Summer 2017</td>
</tr>
</tbody>
</table>

*Adjuncts will instruct as necessary

4.4. Total credits required: 12

Capstone certificate programs are usually 9 to 12 credits and may not be more than 15 credits.

4.5. Semesters to completion: 1-3

4.6. Describe the student progression (one-course per semester for several semesters, all courses taken in one intensive semester, other:

- Part-time (< 8 credits fall and spring semesters, < 4 credits summer term)
- Full-time, time-compressed, intensive
- Other

Checklist for Verification of Curricular Policy Requirements*

You will have an opportunity to provide explanation and rationale for any Curricular Policy Requirements that have not been affirmed in the text box that follows the checklist, below.

- Courses for the Capstone certificate are numbered 300 or higher.
- Courses are offered on a regular basis (as identified in student progression chart in section 4).
- Courses have enrollment capacity for students in the Capstone certificate program.
- Courses in the proposed Capstone certificate have been approved.
☒ All of the Capstone certificate credits must be earned “in residence” (which includes on campus and distance-delivered courses) at UW-Madison while enrolled in the Capstone certificate program. Because a Capstone certificate is comprised of just a few courses, it is not appropriate for students who already have completed the same or similar coursework at UW-Madison or another institution.
☒ Students must earn a minimum grade of C on all attempted Capstone certificate coursework.
☒ Courses in which a student elects the pass/fail option will not meet Capstone certificate requirements.
☒ All Capstone certificate program requirements must be met; waiving requirements is not permitted.
☒ Units must maintain Capstone certificate requirements so that they are up-to-date; all curriculum changes must be approved through the appropriate school/college academic planning council (APC) or curriculum committee. The school/college APC or curriculum committee will notify the Office of the Registrar, the Graduate School, and DCS-ACSSS about approved curricular changes to the certificate. Typically, any changes in requirements will be effective no sooner than the fall semester after approval.

*Provide explanation and rationale for any Curricular Policy Requirements that have not been affirmed.

5. **Student Services & Advising**

5.1. List the names of Capstone certificate program advisor(s) with title and departmental affiliation(s).
   - Ian Muehlenhaus, GISPP Director, Department of Geography
   - Brittney Markle, GISPP Manager, Department of Geography
   - Joel Gruley, GISPP Administrative Assistant, Department of Geography

5.2. How will the resource load of the additional student services support and advising be met?
   Describe how student services and advising will be supported here. (1000 word limit)
   *Do the individuals or offices have the capacity to add student services support for the Capstone certificate program? Does the program have the resources to support all aspects of advising and student support?*

   The Department of Geography has hired an administrative assistant fully dedicated to GISPP to assist with day-to-day support on a half time appointment. This hire will take on many administrative duties and some student service duties that would have otherwise prevented the other GISPP staff from increasing student support. Student service responsibilities will be divided amongst all GISPP staff. As GISPP grows, we intend to hire more support staff as needed.

5.3. ☒ Confirm that program advisor(s) have been consulted and reviewed this proposal.

6. **Admissions**

6.1. Minimum bachelor’s degree GPA for admission to the Capstone certificate program (if relevant):
   - 3.0

6.2. List additional admission criteria:
   - Applicants must have a four-year Bachelor’s degree from an accredited institution of higher learning.
   - Applicants must have a minimum background in GIS; including, two undergraduate level courses in introductory GIS and/or cartography. Equivalent work experience will also be considered.
• Applicants may not be enrolled in other UW-Madison graduate coursework or programs concurrently with our program.
• Non-native English speakers must take either the TOEFL exam or the IELTS exam and submit scores during the application process. Minimum acceptable scores must meet the UW Graduate School requirements:
  o TOEFL - 92 for internet based test (IBT) and 580 for paper test.
  o IELTS - 7.0

In order to provide greater flexibility and meet the needs of specific target student populations, each Capstone certificate program shall identify any tests and minimum scores (for example GRE and TOEFL where applicable), and other similar criteria required of applicants to the program. These elements must be clearly communicated to applicants and students. In planning, programs should give special attention to English-language proficiency for non-native English speakers and consider how proficiency will be determined in the admission process; ESL support is not generally available to students in Capstone certificate programs.

Checklist for Verification of Admission Policy Requirements*
You will have an opportunity to provide explanation and rationale for any Admission Policy Requirements that have not been affirmed in the text box that follows the checklist.

☒ Degree-seeking students may not be concurrently enrolled in a Capstone certificate program.
☒ To be eligible for admission to a Capstone program, a student must hold an earned bachelor’s degree or equivalent credential from an accredited college or university.
☒ Prospective Capstone certificate students apply to the University and are admitted through the Adult Career and Special Student Services office in the Division of Continuing Studies (DCS-ACSSS) in consultation with the Capstone certificate faculty program director or designee. Once admitted, Capstone certificate students carry a University Special student classification (UNCS). University Special students apply via an online application system by selecting the Capstone certificate program of choice from a program list on the application. DCS-ACSSS codes the applicant for that program and defers final admission until a decision is made by the Capstone program faculty/staff. DCS-ACSSS serves as the advising, admissions, and academic dean's office for all University Special students.

*Provide explanation and rationale for any Admission Policy Requirements that have not been affirmed in the above checklist.
Type explanations for Admission Policy Requirements not affirmed here.

7. Enrollment Planning and Marketing

7.1. Projected annual enrollment: 50
  
  Capstone certificates that will be supported by non-pooled tuition should project enrollments of at least 30 students; experience shows this is the threshold for generating sufficient revenue to meet direct program costs.

7.2. Maximum enrollment that can be supported with existing instructional and student services resources: 50

7.3. Describe plans for supporting enrollments that are much higher or much lower than the anticipated enrollment.
Should enrollment exceed our expectations we plan to hire additional qualified lectures to assist faculty associates in course instruction. We are currently compiling a list of qualified professionals that have expressed interest in teaching some of our courses. This would undoubtedly increase student exposure to professional experiences and contacts.

Should enrollment fall below our expectations faculty associates will be expected to allocate additional time towards curriculum updates. The GIS industry is rapidly evolving and it is crucial that we keep up with (and hopefully surpass) our competitors. We already intend to allocate time for course updates; however, in the case of lower enrollments, we would take advantage of the opportunity by increasing our efforts in this mission.

7.4. Will this Capstone certificate enroll international students? Yes
Programs who will seek to enroll international students must plan accordingly. International students (any student who needs a UW I-20 for a student visa) may only enroll in a program if the Capstone certificate is offered full-time, if students are enrolled full-time, and if the program has been approved to receive international students by the US government. That approval process is conducted through the Office of International Student Services and can be initiated after academic approvals are complete; such approvals may take up to a year. Note that fully online programs are not subject to this restriction because international students do not need a visa.

7.5. What is the marketing plan for the Capstone certificate?
Describe marketing plan here. (1000 word limit)

We will work with the Division of Continuing Resources to market this program alongside the proposed GIS Fundamentals Capstone Certificate and our already successful Online Master’s Program. We intend to market these programs online as well as in person at popular conferences. We will market all programs together under the umbrella “GIS Professional Programs” to offer an ecosystem of educational options for prospective students.

8. Assessment

8.1. ☒ Attach an assessment plan when submitting this proposal.
See the Basic Assessment Plan for Capstone Certificates for instructions and the accompanying template. The Basic Assessment Plan and Template are minimum expectations for this information. Programs that have developed plans that exceed what is specified in the basic plan may provide that information.

8.2. Provide a summary of the Capstone certificate’s assessment plan, including learning goals, key methods and assessment approaches, and how assessment information will be reviewed and acted on.
Type summary here. (1000 word limit)
There are two comprehensive student-learning goals. First, students will become grounded in the conceptual underpinnings of advanced GIS technology in order to make informed use of complex GIS applications in real world problem solving. Second, students will acquire advanced technological skills needed in applying GIS towards a wide variety of disciplines while gaining experience with common commercial and open-source GIS software. Learning goals will be assessed directly through rubric implementation in all course assessments to evaluate learning goal achievement and indirectly
through: 1) course evaluation surveys (deployed for all courses to gain insight into the student’s experience in the course, perceptions of instruction, and improvements that could be incorporated into the curriculum) and 2) program completion surveys deployed to completing students by DCS to gain insight into the student perceptions of learning, career expectations, and improvements that could be incorporated into the curriculum and program. Direct and indirect methods will be assessed on an annual basis in addition to a 3-year review cycle by GISPP staff.

The GISPP staff will review program enrollment, progression, and completion data, as well as direct and indirect assessment data with the GISPP Oversight Committee in an annual report comprised of relevant data (described above), charts/graphs with explanations, and recommendations for future changes. This report will be presented in a PDF document with an executive summary listing the strengths of the program, possible curriculum changes, and recommended changes/action items to implement over the next year. The GISPP Oversight Committee will agree by consensus, or if a vote is called, by a simple majority which changes to implement once per year or twice per year as necessary.

9. Related Programs

9.1. This Capstone certificate will be offered as a: Capstone certificate only.

_Students may not earn a Capstone certificate and Graduate/Professional Certificate of the same name._

_If the Capstone certificate will be offered as a Capstone certificate and a new Graduate/Professional certificate, a Graduate/Professional certificate proposal form must be completed._

9.2. Specify any other major/degree or certificate program that is related to this Capstone certificate.

List any major/degree or certificate programs are related to this Capstone certificate here.

_Related programs include those that share a student audience, represent a closely related area of study, or have program names that are similar. These programs must provide a supporting memo (see required attachments). Capstone certificates supported using non-pooled tuition cannot compete with or draw students away from existing programs that support the central tuition pool._

This would compete with and directly replace our own, existing 131-capstone certificate program within geography. It would not directly compete with any other program that we are aware of on campus. In the interest of transparency, however, we notified Nelson Institute of our plans. We received an email from Janet Silbernagel noting that this in no way overlaps with what they are doing (see Appendix C).

10. Governance & Faculty

10.1. The Capstone certificate is governed by:

☑ Existing department and school/college governance committees
☐ New Capstone certificate governance committees

▪ If the Capstone certificate is governed by a new committee, define and outline governance structures and procedures for the certificate program.

Define and outline governance structures and procedures here. (1000 word limit)

_Provide information on how program faculty are identified and provisions for transition in the faculty program director. Who will appoint the director and to whom will the director report?_
10.2. List the core program faculty and staff with title and departmental affiliation(s) who are primarily involved and will participate in delivery and oversight of the Capstone certificate.

- GISPP Oversight Committee:
  - Lisa Naughton, Geography Department Chair/ GISPP Oversight Committee Chair
  - Jack Williams, Finance Committee Chair
  - Joe Mason, Curriculum Committee Chair
  - Quying Huang, GIS Faculty Representative

- GISPP Staff
  - Ian Muehlenhaus, GISPP Director
  - Brittney Markle, GISPP Manager
  - Joel Gruley, GISPP Administrative Assistant

- GIS Faculty:
  - Quying Huang, Assistant Professor in Geography
  - A-Xing Zhu, Professor of Geography
  - Robert Roth, Associate Professor of Geography
  - Song Gao, Assistant Professor in Geography

11. Progress & Certificate Completion

11.1. ☒ Using SIS, the faculty program director and staff will be able to identify University Special students enrolled in the Capstone certificate program.

11.2. ☒ Using DARS, the faculty program director and staff will monitor students’ progress in the Capstone certificate program.

11.3. ☒ The faculty program director will notify the degree audit department in the Registrar’s Office and DCS/ACSSS by email (degreeaudit@em.wisc.edu, karen.ripley@wisc.edu) when a student has completed all of the requirements for the Capstone certificate. When the certificate is completed, the program faculty director or designee must notify the Registrar’s Office in order for the Capstone certificate to be recorded on the official student record and for it to print to the transcript. If the program wishes to provide a physical certificate of completion for the student, they may do so.

11.4. Identify standards for good academic standing.

- Cumulative GPA of 3.0 or above
- Minimum C grade must be earned on all course work attempted for the certificate program.

At a minimum, C grades must be earned on all course work attempted for the certificate program. Academic standing is verified by the program faculty and staff. (Only graduate-level work from the Capstone certificate that is earned with a grade of B or better is eligible for subsequent application to a UW-Madison graduate degree minimum graduate-level credit requirement.)

12. Fiscal Structure and Ongoing Commitment

12.1. The Capstone certificate program will be supported using non-pooled tuition
12.2. For programs that will be supported using standard general purpose revenue, what resources are allocated or reallocated to the Capstone certificate program? Describe Capstone certificate resources here. (1000 word limit)
Is there a source of new funding? If the funding is from reallocation, what activities will be reduced as a result? Both the proposal from the program faculty and the school/college dean’s office cover memo should specify that the resource commitment is being made to the program.

12.3. For programs supported using non-pooled tuition, what resources are allocated to the Capstone certificate program? Describe Capstone certificate resources here. (1000 word limit)
Programs supported using non-pooled tuition must also submit the attachments listed in the required attachments section.
The GIS Professional Programs will provide administrative coverage of the new Master's, as well as student advising. The program will be supported using current revenue from our online Master's and Capstone programs.

12.4. For programs supported using non-pooled tuition, planned enrollment is expected to generate enough paid tuition to cover instructional costs, direct student support costs, and any other fixed or required costs. Although detailed fiscal plans are not required in the academic program proposal, it is helpful to provide the following summary taken from the non-pooled tuition budget:
Fiscal Annual Summary
*Please refer to Appendix D: GISPP 5 Year Budget Plan

12.5. The department or program will not consider students enrolled in the Capstone certificate for departmental financial aid.
Capstone certificate students cannot receive federal financial aid.

12.6. Students enrolled in Capstone certificate programs are NOT eligible for teaching assistant (TA), research assistant (RA), project assistant (PA) nor graduate fellowship support. Programs must disclose this program policy to Capstone certificate students in the recommendation of admission letter, program website, program handbook, and program orientation.

12.7. The Capstone certificate program faculty are responsible for seeking appropriate governance approval for significantly altering the Capstone certificate’s curriculum, suspending admissions or discontinuing the certificate program.

12.8. The faculty/staff will check-in with GFEC three years after first student enrollment.

12.9. The faculty/staff will engage in program review five years after implementation and at least once every ten years after that.

12.10. The program faculty/staff will ensure the program is encoded into DARS and will work with the Registrar’s Office DARS liaison to keep approved revisions to the curriculum current.

12.11. The program faculty/staff will ensure the program website and Advance Your Career materials are current and consistent across all locations where information is provided.
Required attachments

☒ Supporting letters/memos
   Provide letters or memos from other academic units that will have overlapping interest. This will include departments/schools/colleges that provide courses for the certificate, share a student audience, represent a closely related area of study, have overlapping faculty, or have program names that are similar.

☒ Assessment plan
   See the Basic Assessment Plan and Template for Capstone Certificates for detail. The Basic Assessment Plan for Capstone Certificates and the Template are posted at http://apir.wisc.edu/certificates.htm

Programs supported using non-pooled tuition must attach:
   ☒ Core Criteria Checklist
   ☒ Additional Requirements Checklist
   See the current “Non-pooled Program Requirements Process” document posted at http://apir.wisc.edu/academicplanning.htm
ASSESSMENT PLAN
ADVANCED GIS CAPSTONE CERTIFICATE

Capstone Certificate Program Name: Advanced GIS Capstone Certificate

Faculty Director Name, Contact information, Title:
Program oversight has been delegated to an oversight committee, rather than an individual faculty
director. The GIS Professional Programs Oversight Committee consists of four rotating members and 2
ex-officio members (GISPP Director and Manager).

Current Oversight Committee Members:
• Lisa Naughton, Geography Department Chair/ GISPP Oversight Committee Chair
• Joe Mason, Curriculum Committee Chair
• Jack Williams, Finance Committee Chair
• Qunying Huang, GIS Faculty Representative

GISPP Staff:
• Ian Muehlenhaus, GISPP Director
• Brittney Markle, GISPP Manager

Primary Program Contact Name, Contact information, Title:
Ian Muehlenhaus, muehlenhaus@wisc.edu, GISPP Director
Brittney Markle, bmarkle@wisc.edu, GISPP Manager

Date this Assessment Plan was adopted by the program faculty:

Student Learning Goals (What)
Students will:

1. Become grounded in the conceptual and methodological underpinnings of advanced GIS
technology in order to make informed use of complex GIS applications in real world problem
solving.
2. Acquire advanced technological skills needed in applying GIS towards a wide variety of
disciplines while gaining experience with common commercial and open-source GIS software.
Curriculum Map *(Where)*

<table>
<thead>
<tr>
<th>Capstone Certificate Program Courses</th>
<th>Become grounded in the conceptual underpinnings of advanced GIS technology in order to make informed use of complex GIS applications in real world problem solving.</th>
<th>Acquire advanced technological skills needed in applying GIS towards a wide variety of disciplines while gaining experience with common commercial and open-source GIS software.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 378: Geocomputing <em>(elective)</em></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 574: Spatial Databases <em>(elective)</em></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 572: Graphic Design in Cartography <em>(elective)</em></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 575: Interactive Cartography &amp; Geovisualization <em>(elective)</em></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 576: Spatial Web &amp; Mobile Programming <em>(elective)</em></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GEOG 579: GIS &amp; Spatial Analysis <em>(elective)</em></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Assessment Planning *(How)*

<table>
<thead>
<tr>
<th>Assessment Planning <em>(How)</em></th>
<th>For each learning goal, indicate how you plan to assess whether or not students are meeting the expectation, as well as when each learning goal will be assessed. Keep in mind that each academic degree program is expected to engage in at least one assessment activity per year and assessment activities, in total, must include one direct assessment method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method for assessing learning <em>(at least one direct method required)</em></td>
<td><strong>Direct:</strong> Rubrics will be implemented in all course assessments to evaluate learning goal achievement.</td>
</tr>
</tbody>
</table>
|                          | **Indirect:** 1) Every semester a course evaluation survey will be deployed for all courses to gain insight into the student’s experience in the course, perceptions of instruction, and improvements that could be incorporated into the curriculum.  
|                          | 2) Every semester DCS will deploy an exit survey to completing students to gain insight into the student perceptions of learning, career expectations, and improvements that could be incorporated into the curriculum and program. |
| Timetable for assessment activity *(at least one activity each year; all goals reviewed in a 3-year cycle)* | Direct and indirect methods will be assessed on an annual basis and reviewed in a 3-year cycle for effectiveness. |
Assessment Review and Reporting (So What)

1. **Who is responsible for assessment?**

   GISPP staff is responsible for direct and indirect assessment.

2. **What is the plan for review of the assessment information?**

   Direct assessment will be completed every year by reviewing course rubrics. Indirect assessment will be evaluated yearly via student evaluations. DCS will also conduct a program exit survey and these results will be assessed annually. All of these assessments will be reviewed in a three-year cycle for effectiveness.

3. **What is the plan for production of annual summary report?**

   A report will be comprised of relevant data (described above), charts/graphs with explanations, and recommendations for future changes.

   It will be presented in a PDF document with an executive summary listing:
   - The strengths of the program
   - Possible curriculum changes
   - Recommended changes/action items to implement over the next year.

4. **How will recommendations be implemented?**

   The GISPP Oversight Committee will agree by consensus, or if a vote is called, by simple majority, regarding the changes to implement. The Oversight Committee will meet at least twice per year, or more often as necessary.

Use this form in conjunction with the “Basic Assessment Plan for Capstone Certificates“ guidelines.

For information on Capstone certificates see: [http://apir.wisc.edu/certificates.htm](http://apir.wisc.edu/certificates.htm)

For information on assessment see [http://provost.wisc.edu/assessment/](http://provost.wisc.edu/assessment/)
APPENDIX A. CORE CRITERIA CHECKLIST
FOR ACADEMIC PROGRAMS WITH NON-POOLED TUITION

1. New and Additional Student Enrollments to Support Program Costs
   ☒ The program must bring in NEW and ADDITIONAL students. Overall enrollment in all other school/college programs must not be eroded. The program cannot compete with or draw students away from existing programs that support the central tuition pool.

   ☒ Faculty/staff must plan for sufficient enrollments to have enough tuition to cover instructional, direct student support costs, and any other fixed or required costs. Experience shows that enrollments of at least 30 students are necessary to have enough tuition to meet direct program costs.

   ☒ School/college Budget Officers must be involved in planning and must approve plans and budgets for these programs before the program is submitted to the school/college APC for academic approval.

2. Designed for Non-Traditional Students
   ☒ Has an applied, practice-oriented curriculum, or integrates practice with theory

   ☒ Is offered in a modality that allows non-traditional audiences to attend (evening, weekend, online, intensive, or some combination)

   ☒ Has demonstrated a workforce demand for the program graduates

   ☒ Has defined learning goals that are oriented to market considerations

   ☒ Has a clearly defined curriculum that is “self-contained”, meaning that program students are confined only to courses from the approved, prescribed curriculum

   ☒ Has a clearly defined (often lockstep) curriculum with few options or electives that follows a predictable timeline for offerings and completion

3. Distinctly Identifiable Program (Code) With Governance Approval
   ☒ The program must be distinctly identifiable in the student record system, either as a degree/major or as an option of a degree/major, or as a Capstone certificate.

   ☒ The program must develop a proposal for the academic approval process, during which it must demonstrate that the school/college Dean and Budget Officer are aware and supportive of the program being run on a non-pooled tuition model.
APPENDIX B. ADDITIONAL REQUIREMENTS CHECKLIST
FOR ACADEMIC PROGRAMS WITH NON-POOLED TUITION

Use this checklist in conjunction with the Core Criteria Checklist

If core criteria are met, the program must adhere to the additional requirements below.

Note: Not all new programs are suited for the non-pooled program requirements. New programs that seek to take advantage of a wide range of course and curricular/program offerings on campus and are not market-oriented should be developed under traditional (101) pooled tuition funding models.

1. Fiscal Requirements:

☐ School/college budget officer has approved the budget and fiscal plan.

☐ School/college dean and budget officer are committed to assuming fiscal responsibility for costs not covered by non-pooled tuition to the program. The school/college will back up the budget with a commitment to cover any costs not met from tuition from other sources.

☒ The program structure fits within standard academic administrative structures and allocates expenses of the program so that the program does not create additional burdens on traditional/101 program resources or student services such as advising, ESL, Registrar’s Office, Bursar’s Office, Graduate School and other support services.

☒ Programs have two options for tuition. One option is to charge standard graduate tuition according to the UW-Madison tuition schedule. This includes standard rates for WI resident, MN, and non-resident students and any compulsory fees that apply. Or, for fully online programs, they have the option of charging all students one of tuition tiers (Appendix D). Although not currently allowed, it is potentially possible in the future the tiered tuition may be available to face-to-face programs.

Because students who have graduate assistantships receive tuition waivers, some non-pooled tuition graduate degree programs choose to prohibit students from accepting a graduate assistantship (RA/TA/PA). If a program allows their students to take graduate assistantships they it must forgo the tuition revenue. To ensure full receipt of non-pooled tuition and to counter challenges from students, the program must adhere to the following:

☒ The program faculty/staff must disclose this program policy to students in the recommendation of admission letter, program website, program handbook, and program orientation.

☒ Please see Appendix E for links and Appendix F for a sample of a specific non-pooled program template for a recommendation of admission letter and a general template for a program handbook. The program faculty/staff must provide details on this and any other program policies the program handbook in at least the following areas: satisfactory
progress (good standing) requirements, any ways to return to good standing, and a program grievance process if done does not already exist.

2. Requirements for International Students:

☒ Programs may not admit students who need ESL services without building sufficient ESL support into their fiscal model, and having an explicit MOU with the ESL provider about funding to support the ESL services.

☒ Graduate degree/major programs must use Graduate School standards for English Proficiency. Capstone certificates should be designed so that admission requirements ensure that ESL support is not needed.

☒ If the program is NOT completely online and admits international students, the program is responsible for honoring federal visa regulations related but not limited to: length of stay requirements for visa requests, online course restrictions for visa holders, and waiting for federal program approval (up to a year) if the program represents a new degree type or capstone certificate previously not offered at UW-Madison.

3. Requirements for Program/Course Enrollment:

☒ Non-pooled tuition program students can only be enrolled in one program at a time; enrollment in a second major, named option, certificate program, or courses beyond the prescribed program curriculum is not permitted. Non-compliance with this requirement will jeopardize the receipt of tuition for a non-pooled program. Regular audits will be conducted to ensure these requirements are met.

☒ To ensure full receipt of non-pooled program tuition and to counter challenges from students who want to be dually enrolled, the program must adhere to the following:

☒ The program must provide information to students about prohibitions on concurrent program enrollment and out-of-program course enrollment. Programs must note this in recruiting materials, in recommendations of admission, on the program website, program handbook, and program orientation.

☒ Please see Appendix E for links and Appendix F for language for a specific non-pooled program template for a recommendation of admission letter and a general template for a program handbook. The program faculty/staff must provide details on this and any other program policies in the program handbook in at least following areas: satisfactory
progress (good standing) requirements, ways to return to good standing, and a program grievance process if one does not already exist.

☒ The program communicates to students each semester prior to course enrollment the expectation that students can enroll only in program courses and not in courses outside the approved, prescribed curriculum.

☒ For students who enroll in the non-pooled program and then decide they want to pursue traditional/101 programs that allow dual enrollment, the program must help the student transfer to a different program(s) that allow such activity.
September 28, 2017

TO: Sarah Mangelsdorf, Provost
FROM: Diana Hess, Dean

RE: Renaming of MS major in Rehabilitation Psychology

I am writing to request a change in the name of the MS major in “Rehabilitation Psychology” to “Rehabilitation Counseling.” We ask that this be implemented as soon as possible for all new students. Current students will be allowed to choose between the Rehabilitation Psychology major and Rehabilitation Counseling major.

The MS major, currently titled Rehabilitation Psychology, has always focused on the preparation of rehabilitation counselors. Accreditation for this degree is moving from the Council on Rehabilitation Education (CORE) to the Council on Accreditation of Counseling and Related Educational Programs (CACREP). Almost all other rehabilitation counseling programs use the title Rehabilitation Counseling. Because of this, the department of Rehabilitation Psychology and Special Education requests to rename the MS major in Rehabilitation Psychology to Rehabilitation Counseling. This name change will align the degree offered with new accreditation standards, allowing graduating students to continue to be placed in rehabilitation counseling positions. The request to change the name of the MS major to Rehabilitation Counseling was approved by the School of Education Academic Planning Council on September 20, 2017.

cc: Jocelyn Milner, Associate Vice Chancellor
Marty Gustafson, Assistant Dean, Graduate School
David Rosenthal, Rehabilitation Psychology and Special Education
Fong Chan, Chair, Rehabilitation Psychology and Special Education
Carolyn Kelley, Senior Associate Dean, School of Education
Proposal to Change the Title of the M.S. Degree Major in Rehabilitation Psychology to Rehabilitation Counseling

The Rehabilitation Psychology Program Area faculty, propose the following motion to the Department of Rehabilitation Psychology and Special Education:

To change the title of the M.S. degree major in Rehabilitation Psychology to Rehabilitation Counseling and to empower the chair of the Department of Rehabilitation Psychology and Special Education to pursue the title change for the major through the necessary School of Education and University channels.

This proposal follows an earlier one to change the title of the Ph.D. major in Rehabilitation Psychology to Rehabilitation Counselor Education, which is moving through university channels.

Background

The background for this proposal is virtually identical to the earlier proposal to change the title of the Ph.D. major to Rehabilitation Counselor Education, but that background is repeated here so that this proposal can stand alone.

Efforts to establish the M.S. major in rehabilitation counseling (currently titled Rehabilitation Psychology) and the Ph.D. major in rehabilitation counselor education (also currently titled Rehabilitation Psychology) were initiated in 1961. At that time, Kenneth Wilcox came to the Department of Education in the School of Education at UW-Madison, funded by a federal planning grant, to develop a graduate academic program in rehabilitation counseling, and George Wright joined the faculty soon after in 1962. From the very beginning, the M.S. major was designed to prepare rehabilitation counselors to provide counseling and other rehabilitation services to people with all types of disabilities in public and private rehabilitation agencies and programs, and the Ph.D. major was designed to prepare rehabilitation counselor educators to assume faculty positions in university programs preparing rehabilitation counselors and closely related professionals. The first graduates of the Ph.D. program were produced in 1965, with the first master’s degree graduates a year or two before, and the initial focus of the M.S. and Ph.D. majors has continued to the present time, with the Ph.D. major producing rehabilitation counselor educators and M.S. major producing practicing rehabilitation counselors.

The titles of the M.S. major in rehabilitation counseling and the Ph.D. major in rehabilitation counselor education have gone through a number of iterations over the years.

Prior to 1964, the graduate majors at both degree levels were officially titled Education, as was also true of the teacher education, counseling and guidance, and special education majors which were also part of the Department of Education.
Beginning in 1964, after the teacher education program left the Department of Education to become the Department of Curriculum and Instruction, the rehabilitation counseling/rehabilitation counselor education majors, along with special education and counseling and guidance, were titled Counseling and Behavioral Studies, which was also the new name of the department.

Beginning in 1968, after the counseling and guidance program left to become the Department of Counseling and Guidance (later changed to Counseling Psychology), the graduate majors in both special education and rehabilitation counseling/rehabilitation counselor education were titled as Studies in Behavioral Disabilities, which was also the name of the newly established department.

Finally, beginning in 1986, the titles of the graduate majors were changed to the current Rehabilitation Psychology in the renamed Department of Rehabilitation Psychology and Special Education, with Special Education having separately titled majors.

Three primary factors played a role in the 1986 selection of rehabilitation psychology as the title of the major. First, “rehabilitation psychology” seemed more descriptive of the content of the major at all three degree levels than “studies in behavioral disabilities,” as it denoted the study of behavior (the definition of psychology) as applied to people with all types of disabilities, not just behavioral disabilities, and to the services provided to them in rehabilitation settings by rehabilitation counselors and related professionals. Second, at that time there was no licensure of rehabilitation counseling professionals at either the master’s or Ph.D. degree levels in Wisconsin and many other states, so a number of Ph.D. students were interested in the possibility of licensure as psychologists, which could be facilitated by the rehabilitation psychology title for the major (licensure is no longer an issue, as both Ph.D. and master’s level rehabilitation counselors can now be licensed as professional counselors in Wisconsin and elsewhere). Finally, there was a move at the time to establish a joint doctoral program with counseling psychology and to seek accreditation through the American Psychological Association (APA). However, that effort died because of the unwillingness of faculty in rehabilitation psychology to make the necessary changes in curriculum that would be required by APA, as those changes would have detracted from the rehabilitation counselor education focus of the curriculum, so counseling psychology then pursued APA accreditation independently, which was achieved.

Throughout these changes in titles, beginning in the early 1960s and continuing to the present time, the M.S. major has prepared rehabilitation counselors to work with people with all types of disabilities in public and private rehabilitation agencies and programs, while the Ph.D. major has continued to prepare rehabilitation counselor educators for faculty positions in university programs in rehabilitation counseling and closely related majors.

Rationale for the Title Change for the M.S. Degree Major

The proposed M.S. degree title of Rehabilitation Counseling is clearly descriptive of the focus and content of the major. As noted above, throughout the more than 50-year history of the M.S. major, the focus has been on the preparation of practicing professionals in rehabilitation
counseling. M.S. degree graduates of our program meet the educational requirement for the national Certified Rehabilitation Counselor (CRC) credential, as well as the State of Wisconsin Licensed Professional Counselor (LPC) credential. Master’s degree programs in rehabilitation counseling are currently accredited in about 100 universities in the U.S., including our M.S. degree program at UW-Madison, by the Council on Rehabilitation Education (CORE), which was established in 1975 and is recognized by the Council for Higher Education Accreditation to accredit graduate programs in rehabilitation counseling. The major in nearly all CORE-accredited graduate programs is specifically titled as Rehabilitation Counseling. Also, our graduate program at UW-Madison has always been ranked either first or second among all graduate programs in rehabilitation counseling by *U.S. News & World Report*, and is currently tied for the top ranking.

In addition, to clearly describing the focus of the major, there are two current changes in the profession that necessitate a change in the title of the major to Rehabilitation Counseling to be initiated at this time. First, our accrediting body, CORE, is merging with the Council on Accreditation of Counseling and Related Educational Programs (CACREP), effective July 1, 2017, and the current title of our major will no longer be acceptable when our accreditation will be up for renewal in 2018-19. Second, the State of Wisconsin Board, which licenses rehabilitation counselors through the Licensed Professional Counselor (LPC) credential, is implementing new curriculum standards for the educational requirement for the license, effective September 1, 2018, and the current title of the major will no longer be acceptable.

In summary, the proposed title of Rehabilitation Counseling is clearly descriptive of the content and focus of the major at the M.S. degree level, and changes in program accreditation and certification and licensure of graduates to practice the profession necessitate this proposed change in title.

All of our current M.S. degree students are aware of our pursuit of the new title for the major, and they understand and accept the rationale for pursuing this change. In addition, we have publicized the likely change to potential applicants to the program, so that they will know of the likely change before deciding to enter the major.

Finally, less than 50% of the current curriculum content currently required for the M.S. degree will change with the initiation of the new title.

**Proposed Implementation**

It is critical to change the title of the M.S. degree major as soon as possible in order to accommodate the changes in standards for graduate program accreditation and for the certification and licensing of graduates to practice the profession. Thus, we request that the change to the Rehabilitation Counseling title be initiated as soon as possible. In addition, we request that the title of Rehabilitation Psychology also be retained until September 2018, with current students able to opt for the new title until the August 2018 graduation date. Any continuing M.S. degree students who would wish to graduate with the rehabilitation psychology major after August 2018 would be switched to a committee degree.
October 23, 2017

William Karpus, Dean
Graduate School
University of Wisconsin - Madison

Dear Bill,

At the October 18, 2017 meeting of the College of Engineering Academic Planning Council, the following three new named option programs were recommended for approval:

- Master of Science: Materials Science and Engineering: Nanomaterials and Nanoengineering, Dept. of Materials Sciences & Engineering
- Master of Science: Mechanical Engineering: Computer Modeling & Simulation in Mechanical Engineering, Dept. of Mechanical Engineering

The proposals are attached.

We are excited about the prospects for increasing our enrollment of terminal Masters students, given the targeted, accelerated nature of the proposed options. In addition, we have created these with efficiency in mind and we envision common administrative and advising staff support to help us achieve these goals. We are now requesting approval from the Graduate Faculty Executive Committee.

Thank you for considering this request.

Sincerely,

James P. Blanchard
Executive Associate Dean
jake.blanchard@wisc.edu
PROPOSAL FORM
Fundamentals of Applied Mechanics

A named option is a formally documented sub-major within an academic major program. Named options serve as a convenient way to distinguish a distinct curriculum or delivery format within a major. A named option is NOT a new degree or major. Authorization by the Board of Regents to deliver an academic program is at the degree/major level.

This form is to be used in concert with the Policy Guidelines for Named Options within Academic Majors. Complete the form and save as a Microsoft Word document.

1. Overview
   1.1. Named Option: Fundamentals of Applied Mechanics
   1.2. Academic Major: Master of Science in Engineering Mechanics
   1.3. Home Department: Dept. of Engineering Physics
   1.4. School/college: Engineering, College of
   1.5. Partner department(s)/units/schools/colleges: none
   1.6. Chair of the Major (name, title, email): Douglass Henderson, Chair of the Department of Engineering Physics, dhlhender@wisc.edu
   1.7. Primary faculty or staff contact for the proposal (name, title, email): Wendy Crone, Professor, wcrone@wisc.edu
   1.8. Primary school/college dean’s office contact (name, title, email): James Blanchard, Executive Associate Dean, jake.blanchard@wisc.edu
   1.9. Briefly describe the type and purpose of the named option.

This will be a non-pooled tuition revenue program for a Master of Science degree in Engineering Mechanics designed to provide a bridge for students with science backgrounds, like physics, who want to pursue engineering. Students may use this as a bridge to a job in engineering industry or to a PhD program in engineering. The program has been designed as a 12-month, course-only, terminal program.

We plan to market this to Wisconsin and Midwest schools (including Wisconsin System schools and four year private colleges) who produce physics majors, particularly the ones who do not have their own graduate degree programs and/or engineering degrees. Although not targeted for international students, admission of international students is possible with a sufficiently high TOEFL score that English as a Second Language courses are not required.

What prints on the diploma: Master of Science-Engineering Mechanics
Named option types are described in the Policy Guidelines for Named Options within Academic Majors: 1. Area of curricular emphasis within the major for undergraduate programs; 2. Honors in the major for undergraduate programs; 3. Area of curricular emphasis within the major for graduate programs; 4. Non-pooled tuition revenue programs; 5. Distance/Online Programs; 6. Off-Campus Location for graduate, professional, or undergraduate programs

1. Area of curricular emphasis within the major for undergraduate programs
2. Honors in the major for undergraduate programs
3. Area of curricular emphasis within the major for graduate programs
4. Non-pooled tuition revenue programs
5. Distance/Online Programs
6. Off-Campus Location for graduate, professional, or undergraduate programs

2. Approval Implementation and Expectations for Review

2.1. School/College Approval Date: 10/17/2017
2.2. GFEC Approval Date (graduate level named options only): 11/10/2017
2.3. UAPC Approval Date: 11/16/2017
2.4. Expected first term of student enrollment (typically the first fall after UAPC approval): Summer 2018.
2.5. Year of three year progress report to GFEC (3 years after first student enrollment; graduate level named options only): 2021
2.6. Year of first program review (5 years after first student enrollment): 2023
2.7. Are all academic programs in the home department up to date for program review? Yes APIR will provide a list of programs and most recent review date if needed. If no, program reviews need to be completed before a new proposal is advanced at campus level (GFEC and UAPC). Please provide and information related to plans for completion of program reviews:
   All programs were reviewed in 2011-2012.

3. Background/Rationale

3.1. How does the named option relate to the major and to other named options in the major, if relevant?

The Department of Engineering Physics offers the following degree programs: PhD and MS in Engineering Mechanics, PhD and MS in Nuclear Engineering and Engineering Physics, BS in Engineering Mechanics, BS in Nuclear Engineering, BS in Engineering Physics. The proposed Masters of Science in Engineering Mechanics with a named option in Fundamentals of Applied Mechanics (MS-EM-Fundamentals of Applied Mechanics) is most closely related to the MS in Engineering Mechanics which has both a thesis track and coursework-only track. The MS program is designed for students with a BS in engineering and many of the students pursuing the MS degree continue on for the PhD program.

This Master of Science-Engineering Mechanics-Fundamentals of Applied Mechanics is designed for students with a science background who want to transition to engineering. The named option has some coursework overlap with both the existing BS in Engineering Mechanics and the MS in Engineering Mechanics.

3.2. What is the purpose of the named option? How does the named option contribute to the mission of the sponsoring unit?

The target audience is primarily physics and other science undergraduate majors who wish to transition to engineering. The 12 month program would enable the MS-EM-Fundamentals of Applied Mechanics graduates to enter the engineering workforce directly after the master’s
degree. The named option contributes to the mission of the Department of Engineering Physics by increasing the number of master-level graduate students, improving access to graduate degrees in Engineering Mechanics, and serving an education need in the state, region, and world.

3.3. What is the evidence that there is a student demand for the named option?

Students completing a BS in science are often looking to continue their education in order to acquire a more application oriented career path and better opportunities in the workforce. For these students, a PhD in their field (e.g. Physics) is an inappropriate choice, however they may not have the background coursework to transition to a traditional engineering graduate program that assumes completion of certain undergraduate courses in engineering. These students can sometimes successfully navigate the transition by taking classes as a Special Student or jumping directly into a traditional engineering graduate degree, but they may lack appropriate advising as a Special Student and they may struggle with the accelerated transition to engineering graduate courses that is expected upon entry into a traditional engineering graduate program. Having observed the mixed success of Physics undergraduates entering our existing MS degree program, we have designed this named option in such a way that the students have a tight enough focus so they can achieve understanding of the undergraduate background necessary to succeed in graduate level courses in engineering mechanics.

There is potential for substantial demand for the MS-EM-Fundamentals of Applied Mechanics named option given that of the 34% of physics bachelor’s that go directly to the workforce, 36% of those work in engineering positions [1]. Additionally of the 54% of physics bachelors who go on to graduate school, 20% of those pursue engineering graduate degrees [2]. From these data we can estimate that roughly 23% of physics bachelor’s students demonstrate an interest in engineering. About 7,400 bachelor’s physics students graduate in the US each year [3], thus there is the potential for ~1,700 physics students interested in engineering annually in U.S. Given that the upper Midwest population is about 7% of the U.S., we can extrapolate that roughly 120 physics bachelor’s students are interested in engineering annually in the upper Midwest. With a goal of attracting 10% of this population, we would enroll about 12 students per year. It may also be the case that other physics students are interested in making this transition to engineering but are unable to do so with the current options available to them. Thus, there may be an additional unmet need that we may be able to tap into with our marketing.

4. Curriculum

4.1. Delivery modality:
   Face-to-face
   Distance-delivered programs are those programs in which 50% or more of the required courses may be taken as distance-delivered courses. If the option is intended to provide a way to distinguish between students in a face-to-face or an online/distance delivered program, the provide information on how the distance program is developed and supported in 10.1.

4.2. Provide a complete list of named option requirements.

Students are required to complete 30 credits of course work in Engineering Mechanics, 15 credits of which are at the graduate level.

Program requirements should provide content that leads to the completion of major learning goals. See section 5 Assessment.

4.3. ☒ Attach a full curriculum including all required and elective courses.
4.4. ☐ For undergraduate named options, attach a four year roadmap.
   Named options for undergraduate majors will have requirements totaling 120 credits and students should be able to complete the degree/major within four academic years.

4.5. ☒ For graduate named options, attach a chart outlining minimum degree requirements and elements for satisfactory progress.
   Master’s level programs will include at least 30 credits of requirements. Doctoral level programs will include at least 51 credits of requirements.

Checklist for Verification of Curricular Policy Requirements *
You will have an opportunity to provide explanation and rationale for any Curricular Policy Requirements that have not been affirmed in the text box that follows the check list, below.

☒ Courses are offered on a regular basis.
☒ Courses have enrollment capacity for students in the named option.
☒ All courses required for the named option are fully approved.

☒ Units must maintain Named Option requirements so that they are up-to-date; all curriculum changes must be approved through the appropriate school/college academic planning council (APC) or curriculum committee. The school/college APC or curriculum committee will notify the Office of the Registrar and the Graduate School (graduate level named options only) about approved curricular changes to the named option. Typically, any changes in requirements will be effective no sooner than the fall semester after approval.

*Provide explanation and rationale for any Curricular Policy Requirements that have not been affirmed.
Click here to enter text.

5. Assessment

5.1. ☒ Attach a program assessment plan when submitting this proposal.
Assessment plans for a named option should be integrated with the assessment plan for the major. See the Basic Assessment Plan for instruction and accompanying template. The Basic Assessment Plan and Template are minimum expectations for this information. Programs that have developed plans that exceed what is specified in the basic plan may provide that information.

5.2. Provide a summary of the program assessment plan, including learning goals for the major and any additional learning goals that are specific for the named option, key methods and assessment approaches, and how assessment information will be reviewed and acted on.

The assessment plan for the named option follows that of the other programs in the major.

Learning Goals:
1. Demonstrate a strong understanding of mathematical, scientific, and engineering principles in the field
2. Demonstrate an ability to formulate, analyze, and independently solve advanced engineering problems
3. Apply the relevant scientific and technological advancements, techniques, and engineering tools to address these problems

Method for assessing learning:
The faculty advisor will collect their advisees’ academic progress toward learning goals annually and compare with relationship chart between learning goals and the courses for assessment.

The rubric for Assessment of Graduate Learning Goals will be completed for each student by two faculty who have interacted with the student as an instructor in each semester of the program. These forms are collected for the major and evaluated together by the graduate studies committee.

Plan for review of the assessment information:
The chair of the graduate studies committee will provide assessment updates, keep track of the assessment timeline, and remind the faculty to collect performance data for assessment. The chair of the graduate studies committee or designated committee member will compile and perform initial analysis on all student learning assessment data. Assessment data will be forwarded to the graduate studies committee for evaluation and further dissemination.

The assessment summary should highlight how the named option is included in the overall assessment plan for the major. The named option must adhere to all learning goals for the major and may also have additional learning goals that are specific for the named option.

6. Overlap and Related Programs
6.1. Specify any other degree/majors, named options, or certificates that may not be earned in combination with this named option.

Students must be enrolled solely in the MS-EM- Fundamentals of Applied Mechanics named option. Students will not be permitted to earn more than one master’s degree from the Engineering Mechanics Program.
Overlap restrictions must be managed at the program level as part of the advising process. When proposing a named option that has the same name as an existing degree/major certificate or doctoral minor at the same level, the program will be required to put in place processes to ensure that students do not enroll in both programs with the same name. If the program faculty choose to limit any other overlap with other degree/majors, named options, or certificates a list must be specified in the proposal and the program faculty/staff will be responsible for monitoring and enforcing overlap limits.

7. Admissions & Enrollment

7.1. For graduate programs proposing a named option with admissions requirements that are distinct from the major with no named option, explain the admissions criteria and process.

The same admissions criteria will be used for both the named option and the major, with the exception that the named option will require a TOEFL score of 100 or higher. Students with significant prior coursework in mathematics and a high math aptitude will be sought irrespective of overall GPA.

Although we anticipate the primary interest would be from students with undergraduate science majors, some undergraduate engineering majors in areas well outside mechanics may be admitted on a case-by-case basis. Students with a B.S. in Engineering Mechanics, Mechanical Engineering, or a similar degree would be guided toward the existing M.S. program rather than the MS-EM-Fundamentals of Applied Mechanics program.

7.2. What is the projected annual enrollment in the named option?
Initially a maximum of 10, with the expectation that the option enrollment will grow to approximately 20 students per year.

7.3. What is the maximum enrollment (using existing instructional and student resources)? 20

7.4. What are the contingency plans for supporting enrollments higher than the stated maximum enrollment?
The first 10 students can be supported with current capacity (other than the need for additional administrative support) given current enrollment trends. All students who have registered for the courses listed in the curriculum have been accommodated in the past three semesters. At/near an enrollment of 20, we would expect to need additional sections of some courses or more frequency of offering. At that point, we would support additional graders, TAs, and/or faculty associates using revenue from this program.

Checklist for Verification of Admission Policy Requirements for Undergraduate Named Options*
You will have an opportunity to provide explanation and rationale for any Admission Policy Requirements that have not been affirmed in the text box that follows the checklist.

☐ Named option admission requirements are consistent with admission requirements for the major with no named option, if the major has any admission requirements beyond admission to the University. Admission limits should be related to interest or aptitude for the content and not based solely on a high GPA cutoff.

☐ The named option will be declared and canceled using the e-Declaration process in the student information system.

☐ Undergraduates will not be advised to declare or remain enrolled in a named option if it will extend their time to graduation. Undergraduate students are to be discouraged from
earning more than one named option that represents an area of curricular emphasis within the major.

*Provide explanation and rationale for any Admission Policy Requirements that have not been affirmed in the above checklist.
Type explanations for Admission Policy Requirements not affirmed here.

8. Advising
8.1. List name(s) of major and named option advisor(s) with title and departmental affiliation(s).

Major: Engineering Mechanics
Faculty: Matthew Allen, Riccardo Bonazza, Wendy Crone, Roderick Lakes, Jacob Notbohm, Ramathasan Thevamaran

8.2. Describe how there will be sufficient advising and academic support for all students in the major (both the existing major’s students and the new students that will be served by the named option).

The Engineering Mechanics Program within the Department of Engineering Physics has 6 core faculty and 1 additional faculty member beginning Fall 2018. They will provide advising, along with assistance from two academic staff members: Lee DeBaillie (Program Director, Accelerated Master’s Programs, College of Engineering) and another individual to be hired for support of named options in the College. The COE staff also plan to provide graduate student services support.

8.3. ☒ Confirm that major and named option advisor(s) have been consulted and reviewed this proposal.

9. Governance & Faculty
9.1. ☒ The named option must be governed by the same department or academic unit that oversees the major. Any sub-committee governing the named option must report to the faculty governance committee for the major.
9.1.1. If a sub-committee governs the named option, describe procedures including how faculty are identified and provisions for transitions in the committee.

9.2. List core faculty and staff with title and departmental affiliation(s).

Faculty: Matthew Allen, Riccardo Bonazza, Wendy Crone, Roderick Lakes, Jacob Notbohm, Ramathasan Thevamaran
Department of Engineering Physics

10. Fiscal Structure and Ongoing Commitment
10.1. Provide an overview of plans for funding the named option including but not limited to program administration, instructional/curricular delivery, technology needs, and program assessment.
All expenses will be covered by program revenue. Since the program is delivered in a face-to-face format, the costs related to delivery and technology are minimal and difficult to separately quantify. Assessment will be addressed within the Department of Engineering Physics using the same processes to be employed for existing majors.

10.2. How will the named option impact staffing needs beyond the immediate program? How are those needs being met?

We envision using revenue to support additional graders and TAs that may be required to assist with individual courses experiencing larger enrollments. As staffing needs grow to support enrollment, tuition revenue will be used to fund that staff expansion. The College of Engineering has added two full time staff members to assist with admissions, advising and administration of named options programs. These positions are shared across a number of named options programs, so the cost to each individual program will be modest.

If there is no change in staffing, please describe how the duties of current employees will evolve to support this named option.

10.3. For named options supported using non-pooled tuition, provide a fiscal annual summary including planned enrollment, estimated paid tuition, instructional costs, and estimated excess tuition available for reinvestment in keeping with the separate guidelines for non-pooled programs. See attached.

10.4. For graduate programs supported using pooled tuition, provide a plan for how new graduate students will be funded.

N/A

**Required attachments**

- ☒ Cover letter from the Dean of the school/college that will be the home of the named option
  
  When a proposal for a new named option is forwarded for approval, it will have a cover letter to the provost from the supporting dean.

- ☐ Supporting letters/memos
  
  Proposals must be accompanied by letters or memos submitted by the chair or director of other academic units that have overlapping interest. These notes may comment on shared resources, competition for students or other ways in which the programs will interact surrounding the named option. This will include departments/schools/colleges, share a student audience, represent a closely related area of study, have overlapping faculty, or have program names that are similar.

- ☒ Full curriculum including all required and elective courses

- ☐ For undergraduate named options, attach a four year roadmap.

- ☒ For graduate named options, attach a chart outlining minimum degree requirements and elements for satisfactory progress.

- ☒ Assessment plan

Named options supported using non-pooled tuition must attach:
Core Criteria Checklist
Additional Requirements Checklist
See the current Non-pooled Program Requirements Process document posted at https://kb.wisc.edu/vespa/page.php?id=59300
**Proposed Curriculum for UW Master of Science Degree Program**

**Department of Engineering Physics**

Degree: Master of Science  
Major: Engineering Mechanics  
Option: Fundamentals of Applied Mechanics

**Credits Requirement: 30**  
Of the 30 credits counted towards the degree, at least 15 must be at the graduate level.

**Summer Session 3-6 Credits**

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<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
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<tbody>
<tr>
<td>EMA 303</td>
<td>3cr</td>
<td>Mechanics of Materials [on line]</td>
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</table>

Recommended prerequisite (taken as needed, but strongly recommended):  
EMA 202 (3cr)  
Dynamics [on line]

**Fall Semester 14 Credits**

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<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>EMA 307</td>
<td>1cr</td>
<td>Mechanics of Materials Lab</td>
</tr>
<tr>
<td>EMA 506</td>
<td>3cr</td>
<td>Adv Mechanics of Materials</td>
</tr>
<tr>
<td>EMA 542</td>
<td>3cr</td>
<td>Adv Dynamics</td>
</tr>
<tr>
<td>EP 547</td>
<td>3cr Grad</td>
<td>Eng Analysis I</td>
</tr>
<tr>
<td>EMA 601</td>
<td>1cr</td>
<td>Mechanics Seminar</td>
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Choose 1 of the following:  
EMA 405 3cr  
Prac Finite Elements  
EMA 605 3cr  
Intro to Finite Elements

**Spring Semester 13 Credits**

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<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
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<tbody>
<tr>
<td>EP 548</td>
<td>3cr Grad</td>
<td>Eng Analysis II</td>
</tr>
<tr>
<td>EMA 601</td>
<td>1cr</td>
<td>Mechanics Seminar</td>
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</table>

Choose 3 of the following (at least 1 of 3 must be either EMA 705, 622, 642):  
EMA 508 3cr Grad  
Composites  
EMA 519 3cr Grad  
Fracture Mechanics  
EMA 570 3cr Grad  
Experimental Mechanics  
EMA 611 3cr Grad  
Adv Mech Testing of Materials  
EMA 622 3cr Grad  
Mech of Continua  
EMA 642 3cr Grad  
Satellite Dynamics  
EMA 705 3cr Grad  
Adv Topics in Finite Elements

**TOTAL = 30 cr; Grad = 15 cr**

Note: EMA 202 is a recommended prerequisite, but it does not count toward the Graduate School's 30 credit minimum.
**Engineering Mechanics**  
**MINIMUM DEGREE REQUIREMENTS & SATISFACTORY PROGRESS**

*Schools/Colleges, Departments and Programs may set more rigorous expectations and requirements than the Graduate School*

- If describing multiple degree plans at the same level (M.A. and M.S.) or multiple named options and tracks within a plan, indicate requirements for all plan variations.
- Consult the Graduate School Degree Requirements chart at [https://kb.wisc.edu/images/group156/36437/GraduateSchoolMinimumDegreeRequirementsandSatisfactoryProgress.docx](https://kb.wisc.edu/images/group156/36437/GraduateSchoolMinimumDegreeRequirementsandSatisfactoryProgress.docx) to ensure program compliance with Graduate School degree requirements.

- If the program policy aligns with Graduate School degree requirements, please reiterate the policy in your program’s degree requirement chart – do not simply provide “Follow Graduate School Policy”.
- Programs are responsible for monitoring more restrictive requirements.

<table>
<thead>
<tr>
<th>Master’s Degrees:</th>
<th>Master of Fine Arts Degree:</th>
<th>Doctoral Degrees:</th>
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<tbody>
<tr>
<td>M.S.</td>
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<td>Ph.D.</td>
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</table>

**Minimum Graduate Degree Credit Requirement**

- **M.S.** – 30 credits

**Minimum Graduate Residence Credit Requirement**

- **16 credits**

**Minimum Graduate Coursework (50%) Requirement**

- **15 credits from:** any EMA course 600-level and above or from EMA 508, 518, 519, 522, 523, 540, 541, 570 or any course defined as graduate level in Math, Physics, Computer Science, or any other engineering department, except EPD.

  **Fundamentals of Applied Mechanics Option** – 15 credits must include EP 547, EP 548; 9 of 15 credits may be chosen from EMA 508, 519, 570, 611, 622, 642, 705; at least 3 of these credits must be chosen from EMA 705, 622, 642

- **Prior Coursework Requirements:** Graduate Work from Other Institutions

  *With program approval, students are allowed to count no more than 6 credits of graduate*

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<th>Minimum Graduate Degree Credit Requirement</th>
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<tbody>
<tr>
<td><strong>Ph.D.</strong> – 51 credits</td>
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<th>Minimum Graduate Residence Credit Requirement</th>
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<tbody>
<tr>
<td><strong>Ph.D.</strong> – 32 credits</td>
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<td><strong>Ph.D.</strong> – 32 credits</td>
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<tr>
<th>Minimum Graduate Coursework (50%) Requirement</th>
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<tr>
<td>26 credits from:** any EMA course 600-level and above or from EMA 508, 518, 519, 522, 523, 540, 541, 570 or any course defined as graduate level in Math, Physics, Computer Science, or any other engineering department, except EPD.**</td>
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<tr>
<th>Prior Coursework Requirements: Graduate Work from Other Institutions</th>
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</table>
course work from other institutions toward the Minimum Graduate Degree Credit Requirement and the Minimum Graduate Course Work (50%) Requirement. Course work earned five or more years prior to admission to a master’s degree or earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

**Prior Coursework Requirements: UW-Madison Undergraduate**

Prior Coursework Requirements: UW-Madison University Special

Prior Coursework Requirement: UW-Madison Undergraduate

Prior Coursework Requirement: UW-Madison University Special

With program approval, students are allowed to count up to 15 credits of courses numbered 300 or above taken as a UW-Madison special student toward the Minimum Graduate Degree Credit Requirement, and the Minimum Graduate Residence Credit Requirement. With program approval and payment of the difference in tuition (between special and graduate tuition), students are allowed to count up to 15 credits of courses numbered 700 or above taken as a UW-Madison Special student toward the Minimum Graduate Course Work (50%) Requirement. Course work earned five or more years prior to admission to a master’s degree or earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

**Fundamentals of Applied Mechanics Option – No transfer credits are allowed.**

**Fundamentals of Applied Mechanics Option –**

With program approval, students are allowed to count up to 7 credits of course work from the following list of courses: EP 547, EP 548; EMA 303, 307, 405, 506, 508, 519, 542, 570, 605, 611, 622, 642, 705. These may be counted toward the Minimum Graduate Degree Credit Requirement as applicable. No credits may be counted toward the minimum graduate residence credit requirement. Course work earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

**Prior Coursework Requirement: UW-Madison University Special**

With program approval and payment of the difference in tuition (between special and graduate tuition), students are allowed to count up to 15 credits of course work numbered 300 or above taken as a UW-Madison special student toward the Minimum Graduate Residence Credit Requirement, and the Minimum Graduate Degree Credit Requirement. With program approval and payment of the difference in tuition (between special and graduate tuition), students are allowed to count up to 15 credits of courses numbered 700 or above taken as a UW-Madison Special student toward the Minimum Graduate Course Work (50%) Requirement. Course work earned five or more years prior to admission to a master’s degree or earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.
or above taken as a UW-Madison special student toward the Minimum Graduate Residence Credit Requirement, and the Minimum Graduate Degree Credit Requirement.

With program approval and payment of the difference in tuition (between special and graduate tuition), students are allowed to count up to 15 credits of courses numbered 700 or above taken as a UW-Madison Special student toward the Minimum Graduate Course Work (50%) Requirement. Course work earned five or more years prior to admission to a master’s degree or earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

*Fundamentals of Applied Mechanics Option –* With program approval and payment of the difference in tuition (between special and graduate tuition), students are allowed to count up to 15 credits of course work from the following list of courses: EP 547, EP 548; EMA 303, 307, 405, 506, 508, 519, 542, 570, 605, 611, 622, 642, 705. These may be counted toward the Minimum Graduate Residence Credit Requirement, and the Minimum Graduate Degree Credit Requirement as applicable. Course work earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

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<tr>
<th>Credits per Term Allowed</th>
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<td>15 credits</td>
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**Program-Specific Courses Required**

At least 15 credits of EMA courses in the 500 level or above; at least 6 of these 15 credits being in 700 level or above EMA courses; combined EMA course content of the student’s undergraduate and graduate program of study must include at least 24 credits of 500 level or above mechanics course work.

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<thead>
<tr>
<th>Program-Specific Courses Required</th>
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<tr>
<td></td>
<td>The candidate is required to complete at least 2 EMA courses numbered 600 or above and an additional 4 courses numbered 700 level or above. The 700 level courses must include at least 1 EMA course, while the remainder may be from EMA or the list found in the student handbook.</td>
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</table>
M.S. with thesis: a maximum of 12 credits of EMA 790 may be granted for the thesis.

Without thesis: a maximum of 12 credits of EMA 690 may be counted toward the M.S. requirements

**Fundamentals of Applied Mechanics Option**
- Program of study must include: EMA 303, EMA 307, EMA 506, EMA 542, EP 547, EP 548 and two semesters of seminar registration; 3 credits chosen from EMA 405 and 605; 9 credits may be chosen from EMA 508, 519, 570, 611, 622, 642, 705

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<thead>
<tr>
<th>Doctoral Minor/Breadth Requirements</th>
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<tr>
<td>Technical minor: 10 credits in either a single department or multiple departments as approved by the advisor</td>
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<tr>
<th>Overall Graduate GPA Requirement</th>
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<tr>
<td>3.00 GPA required.</td>
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<th>Other Grade Requirements</th>
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<tbody>
<tr>
<td>Courses in which grades of BC, C, or below are received cannot be counted toward the M.S. degree except as follows:</td>
</tr>
<tr>
<td>1) Credits of C will be allowed provided they are balanced by twice as many credits of A or by four times as many credits of AB.</td>
</tr>
<tr>
<td>2) Credits of BC will be allowed provided they are balanced by twice as many credits of AB or by an equal number of credits of A.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Grade Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses in which grades of BC, C, or below are received cannot be counted toward the graduate degree except as follows:</td>
</tr>
<tr>
<td>1) Credits of C will be allowed provided they are balanced by twice as many credits of A or by four times as many credits of AB.</td>
</tr>
<tr>
<td>2) Credits of BC will be allowed provided they are balanced by twice as many credits of AB or by an equal number of credits of A.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Probation Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>A semester GPA below 3.0 will result in the student being placed on academic probation. If a semester GPA of 3.0 is not attained during the subsequent semester of full time enrollment (or 12 credits of enrollment if enrolled part-time)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Probation Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>A semester GPA below 3.0 will result in the student being placed on academic probation. If a semester GPA of 3.0 is not attained during the subsequent semester of full time enrollment (or 12 credits of enrollment if enrolled part-time)</td>
</tr>
</tbody>
</table>
the student may be dismissed from the program or allowed to continue for 1 additional semester based on advisor appeal to the Graduate School.

_Fundamentals of Applied Mechanics Option_ – A grade of B or better must be earned in EMA 303 in order to continue in the program. A semester GPA below 3.0 will result in the student being placed on academic probation. If a semester GPA of 3.0 is not attained during the subsequent semester of full time enrollment (or 12 credits of enrollment if enrolled part-time) the student may be dismissed from the program or allowed to continue for 1 additional semester based on advisor appeal to the Graduate School.

<table>
<thead>
<tr>
<th>Advisor / Committee</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Students are required to meet with his or her advisor prior to registration every semester.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Advisor / Committee</th>
</tr>
</thead>
<tbody>
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<td>All Students are required to meet with his or her advisor prior to registration every semester.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessments and Examinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students who complete a thesis must defend it orally in front of a committee of three faculty.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessments and Examinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph.D. qualifying examination</td>
</tr>
<tr>
<td>After acceptance of the student’s Doctoral Plan of Study, the student must take an oral preliminary examination.</td>
</tr>
<tr>
<td>Final oral examination is required at the end of the thesis work.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students with a B.S. degree in engineering mechanics or equivalent are typically expected to complete the master of science in three semesters. Students with non-EM backgrounds will typically be permitted four semesters to complete their master’s degree if more than 27 credits are required.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Ph.D. qualifying examination should be first taken no later than completion of the M.S. requirements, or the beginning of the fourth semester of graduate study, whichever comes first. Students entering the program with a master’s degree in EMA, EP or NE from another institution, and taking the qualifying exam in that same major, must take the exam by the beginning of their third semester.</td>
</tr>
</tbody>
</table>
Fundamentals of Applied Mechanics Option –
Students are expected to complete the degree
program in one calendar year, i.e. 12 months
(summer session, plus two semesters). One
additional semester is permitted to complete
requirements on an as needed basis.

Students must submit the doctoral plan of study
one month before the end of the semester
following the one in which the qualifying exam
is passed.

Candidates are expected to pass the Ph.D.
preliminary examination no later than the end
of the third year of graduate study, or by the
end of the second regular semester following
the one in which the Ph.D. qualifying
examination was passed, whichever is later.

An oral examination on the findings of the Ph.D.
research is required at the end of the thesis
work. The candidate must apply for a warrant
from the Graduate School through the Student
Services office at least 3 weeks prior to the
exam.

Language Requirements
No language requirements.

Language Requirements
No language requirements.
Masters of Science Assessment Plan

Identifying Information
School/College: College of Engineering
Graduate Degree/Major Program Name: Engineering Mechanics - Fundamentals of Applied Mechanics
Graduate Degree Level (M.S., M.A., Ph.D., DMA, etc.): M.S.
Faculty Director Contact/Title: Carl Sovinec, Chair of the Graduate Studies Committee
Primary Contact Information: csovinec@wisc.edu

Student Learning Goals (What)
Assessment of graduate-level learning goals is one of the many ways in which our campus ensures the integrity of its degrees and the quality of the student experience. List the graduate student learning goals for this academic degree program below.

1. Demonstrate a strong understanding of mathematical, scientific, and engineering principles in the field
2. Demonstrate an ability to formulate, analyze, and independently solve advanced engineering problems
3. Apply the relevant scientific and technological advancements, techniques, and engineering tools to address these problems

Plan for Assessing Each Student Learning Goal
For each of the degree major/program student learning goals, indicate how the program plans to assess whether or not students are meeting the expectation, as well as when each learning goal will be assessed. Keep in mind that each academic degree program is expected to engage in at least one assessment activity per year and assessment activities, in total, must include one direct assessment method. While programs do not need to assess each learning goal every year, all learning goals must be assessed within a period of three years.

<table>
<thead>
<tr>
<th>Assessment Planning (How)</th>
<th>Method for assessing learning (at least one direct method required)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All learning goals</td>
<td>1. All graduating M.S. students will fill in a survey form to answer a series of questions pertaining to all of the learning goals such as if the student feels comfortable in problem solving, information searching, evaluation information, and communicating or making presentations related to Engineering Mechanics. Data from these self-reported measures will be compiled bi-annually and applied to the annual reports on specific learning goals (indirect measure).</td>
</tr>
</tbody>
</table>
| All learning goals        | 1. The list of all the courses taken by a M.S. student will be checked to make sure these learning goals are addressed in the courses taken according to the Curriculum Mapping Worksheet. The grades of these courses will be analyzed.  
2. Feedback from the course instructor may be requested to evaluate the student outcome for a course with less satisfactory grade.  
3. The course list in the Curriculum Mapping Worksheet will be reviewed and updated every three years. Specifically, the course content will be checked and see if the corresponding learning outcomes can be sufficiently addressed by the content. If not, the check list will be updated accordingly. |
Timetable for assessment activity (at least one activity each year; all goals reviewed in a 3-year cycle): All the goals will be assessed annually and the faculty advisor will provide a summary on the assessment results annually. Also provide answers to the following questions as part of your assessment plan.

1. **Who is responsible for assessment?** (identify an individual or team who will coordinate the implementation of the plan on an annual basis):

The chair of the graduate studies committee will provide assessment updates, keep track of the assessment timeline, and remind the faculty to collect performance data for assessment. The chair of the graduate studies committee or designated committee member will compile and perform initial analysis on all student learning assessment data. Assessment data will be forwarded to the graduate studies committee for evaluation and further dissemination.

2. **What is the plan for review of the assessment information?** (typically during an annual meeting of the program faculty and staff; note that at this meeting the program may want to review enrollment information, course progression, degree completion, and other structural features of the student experience in addition to the evidence about student learning):

Annually, the graduate studies committee will review the assessment information and compile a summary report to be reviewed by all faculty during a department faculty meeting held early in the Fall of the academic year.

3. **What is the plan for the production of an annual summary report?** (the annual summary report includes the materials that form the basis of discussion at the annual meeting of the program faculty and staff, along with any recommendations made after considering the student learning assessment information presented):

After reviewing the assessment summary and comments from the department meeting, the graduate studies committee will decide which (if any) items are actionable and provide a report of those plans, along with the initial assessment summary, to the Provost office by November 1st.

4. **How will recommendations be implemented?** (explain the general process by which recommendations will be implemented):

Any actionable items will be discussed during the subsequent graduate studies committee meeting. If changes being made require a vote of the faculty, the item will be brought forward in the next department meeting. If approved, changes will be implemented the following Fall semester or thereafter.

**Graduate Degree Program Curriculum Mapping Worksheet (Where)**

This worksheet, or similar document, **must be included** with the submission of the program’s assessment plan.

- **Learning Goals** – Enter the academic degree program learning goals identified in the assessment plan on the top row of the following chart. (If the learning goals have been submitted to the Office of the Provost, a pre-populated template is available; contact regina.lowery@wisc.edu) Feel free to add columns if the academic degree/major program has more than five learning goals.
- **Degree/Major Program Courses/Experiences** – List all degree requirements (in some cases co-curricular experiences may also be included). Feel free to add rows as needed.
- Indicate with a check (X) where the course or learning experience contributes to each of the learning goals. Courses may contribute to multiple learning goals.

**Curriculum Map (Where)**
Enter program-level learning goals and check (X) which course or experience contributes to which learning goal.

<table>
<thead>
<tr>
<th>Degree Program Required Courses or Experiences</th>
<th>Learning Goal #1</th>
<th>Learning Goal #2</th>
<th>Learning Goal #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMA 303</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMA 307</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>EMA 506</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>EMA 542</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>EP 547</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>EP 548</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>EMA 601 Seminar</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>EMA 405</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>EMA 605</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>EMA 611</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>EMA 570</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>EMA 622</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>EMA 519</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>EMA 705</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>EMA 642</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>EMA 508</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

_Minimally, all of the courses/experiences required to complete the major degree program should be listed. Optionally, elective courses may be included in addition to the required courses._
In the first year, this program will only enroll 5-10 students. Hence, impact on existing programs will be minimal and the instructional costs will be minimal. The first 10 students can be supported with current capacity (other than the need for additional administrative support) given current enrollment trends. All students who have requested to register for the courses listed in the curriculum have been accommodated in the past three semesters.

At/near an enrollment of 20, we would expect to need additional sections of some courses or more frequency of offering. At that point, we would support additional graders, TAs, and/or faculty associates using revenue from this program. If at any time this program requires the addition of course sections to handle the load, the new sections will be supported entirely by revenue from this program. However, this is not anticipated and the extra load will be handled by the addition of graders and TAs.

Beyond the instructional needs, there will be a need for administrative staff to help with many aspects of this program and others being currently proposed. These staff members will work across all COE named options.

In addition, the Department will provide partial salary support for a faculty member assigned to developing, maturing, and maintaining the program.

<table>
<thead>
<tr>
<th>Summary Budget</th>
<th>Year 1</th>
<th>Year 2</th>
<th>On-going</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enrollment</td>
<td>5</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Average Tuition/Student/Year</td>
<td>$20,000</td>
<td>$20,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>Gross Revenue</td>
<td>$100,000</td>
<td>$200,000</td>
<td>$400,000</td>
</tr>
<tr>
<td><strong>Expenses</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University Assessment (10%)</td>
<td>$10,000</td>
<td>$20,000</td>
<td>$40,000</td>
</tr>
<tr>
<td>Engineering College (20%)*</td>
<td>$20,000</td>
<td>$40,000</td>
<td>$80,000</td>
</tr>
<tr>
<td>Additional TA Support</td>
<td>$5,000</td>
<td>$10,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>Faculty Support</td>
<td>$5,000</td>
<td>$10,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>Total Expenses</td>
<td>$40,000</td>
<td>$80,000</td>
<td>$160,000</td>
</tr>
<tr>
<td><strong>Net Revenue</strong></td>
<td>$60,000</td>
<td>$120,000</td>
<td>$240,000</td>
</tr>
</tbody>
</table>

*Estimated. Includes centralized administration, student services, marketing and recruitment.
APPENDIX A. CORE CRITERIA CHECKLIST
FOR ACADEMIC PROGRAMS WITH NON-POOLED TUITION

1. New and Additional Student Enrollments to Support Program Costs
   ☒ The program must bring in NEW and ADDITIONAL students. Overall enrollment in all other school/college programs must not be eroded. The program cannot compete with or draw students away from existing programs that support the central tuition pool.
   ☒ Faculty/staff must plan for sufficient enrollments to have enough tuition to cover instructional, direct student support costs, and any other fixed or required costs. Experience shows that enrollments of at least 30 students are necessary to have enough tuition to meet direct program costs.
   ☒ School/college Budget Officers must be involved in planning and must approve plans and budgets for these programs before the program is submitted to the school/college APC for academic approval.

2. Designed for Non-Traditional Students
   ☒ Has an applied, practice-oriented curriculum, or integrates practice with theory
   ☒ Is offered in a modality that allows non-traditional audiences to attend (evening, weekend, online, intensive, or some combination)
   ☒ Has demonstrated a workforce demand for the program graduates
   ☒ Has defined learning goals that are oriented to market considerations
   ☒ Has a clearly defined curriculum that is “self-contained”, meaning that program students are confined only to courses from the approved, prescribed curriculum
   ☒ Has a clearly defined (often lockstep) curriculum with few options or electives that follows a predictable timeline for offerings and completion

3. Distinctly Identifiable Program (Code) With Governance Approval
   ☒ The program must be distinctly identifiable in the student record system, either as a degree/major or as an option of a degree/major, or as a Capstone certificate.
   ☒ The program must develop a proposal for the academic approval process, during which it must demonstrate that the school/college Dean and Budget Officer are aware and supportive of the program being run on a non-pooled tuition model.
APPENDIX B. ADDITIONAL REQUIREMENTS CHECKLIST
FOR ACADEMIC PROGRAMS WITH NON-POOLED TUITION

Use this checklist in conjunction with the Core Criteria Checklist

If core criteria are met, the program must adhere to the additional requirements below.

Note: Not all new programs are suited for the non-pooled program requirements. New programs that seek to take advantage of a wide range of course and curricular/program offerings on campus and are not market-oriented should be developed under traditional (101) pooled tuition funding models.

1. Fiscal Requirements:
   - School/college budget officer has approved the budget and fiscal plan.
   - School/college dean and budget officer are committed to assuming fiscal responsibility for costs not covered by non-pooled tuition to the program. The school/college will back up the budget with a commitment to cover any costs not met from tuition from other sources.
   - The program structure fits within standard academic administrative structures and allocates expenses of the program so that the program does not create additional burdens on traditional/101 program resources or student services such as advising, ESL, Registrar’s Office, Bursar’s Office, Graduate School and other support services.
   - Programs have two options for tuition. One option is to charge standard graduate tuition according to the UW-Madison tuition schedule. This includes standard rates for WI resident, MN, and non-resident students and any compulsory fees that apply. Or, for fully online programs, they have the option of charging all students one of tuition tiers (Appendix D). Although not currently allowed, it is potentially possible in the future the tiered tuition may be available to face-to-face programs.
   - Because students who have graduate assistantships receive tuition waivers, some non-pooled tuition graduate degree programs choose to prohibit students from accepting a graduate assistantship (RA/TA/PA). If a program allows their students to take graduate assistantships they it must forgo the tuition revenue. To ensure full receipt of non-pooled tuition and to counter challenges from students, the program must adhere to the following:
     - The program faculty/staff must disclose this program policy to students in the recommendation of admission letter, program website, program handbook, and program orientation.
     - Please see Appendix E for links and Appendix F for a sample of a specific non-pooled program template for a recommendation of admission letter and a general template for a program handbook. The program faculty/staff must provide details on this and any other program policies the program handbook in at least the following areas: satisfactory progress (good standing) requirements, any ways to return to good standing, and a program grievance process if done does not already exist.
2. Requirements for International Students:

- Programs may not admit students who need ESL services without building sufficient ESL support into their fiscal model, and having an explicit MOU with the ESL provider about funding to support the ESL services.
- Graduate degree/major programs must use Graduate School standards for English Proficiency. Capstone certificates should be designed so that admission requirements ensure that ESL support is not needed.
- If the program is NOT completely online and admits international students, the program is responsible for honoring federal visa regulations related but not limited to: length of stay requirements for visa requests, online course restrictions for visa holders, and waiting for federal program approval (up to a year) if the program represents a new degree type or capstone certificate previously not offered at UW-Madison.

3. Requirements for Program/Course Enrollment:

- Non-pooled tuition program students can only be enrolled in one program at a time; enrollment in a second major, named option, certificate program, or courses beyond the prescribed program curriculum is not permitted. Non-compliance with this requirement will jeopardize the receipt of tuition for a non-pooled program. Regular audits will be conducted to ensure these requirements are met.
- To ensure full receipt of non-pooled program tuition and to counter challenges from students who want to be dually enrolled, the program must adhere to the following:
  - The program must provide information to students about prohibitions on concurrent program enrollment and out-of-program course enrollment. Programs must note this in recruiting materials, in recommendations of admission, on the program website, program handbook, and program orientation.
  - Please see Appendix E for links and Appendix F for language for a specific non-pooled program template for a recommendation of admission letter and a general template for a program handbook. The program faculty/staff must provide details on this and any other program policies in the program handbook in at least following areas: satisfactory progress (good standing) requirements, ways to return to good standing, and a program grievance process if one does not already exist.
  - The program communicates to students each semester prior to course enrollment the expectation that students can enroll only in program courses and not in courses outside the approved, prescribed curriculum.
  - For students who enroll in the non-pooled program and then decide they want to pursue traditional/101 programs that allow dual enrollment, the program must help the student transfer to a different program(s) that allow such activity.
October 23, 2017

William Karpus, Dean
Graduate School
University of Wisconsin - Madison

Dear Bill,

At the October 18, 2017 meeting of the College of Engineering Academic Planning Council, the following three new named option programs were recommended for approval:

- Master of Science: Materials Science and Engineering: Nanomaterials and Nanoengineering, Dept. of Materials Sciences & Engineering
- Master of Science: Mechanical Engineering: Computer Modeling & Simulation in Mechanical Engineering, Dept. of Mechanical Engineering

The proposals are attached.

We are excited about the prospects for increasing our enrollment of terminal Masters students, given the targeted, accelerated nature of the proposed options. In addition, we have created these with efficiency in mind and we envision common administrative and advising staff support to help us achieve these goals. We are now requesting approval from the Graduate Faculty Executive Committee.

Thank you for considering this request.

Sincerely,

James P. Blanchard
Executive Associate Dean
jake.blanchard@wisc.edu
A named option is a formally documented sub-major within an academic major program. Named options serve as a convenient way to distinguish a distinct curriculum or delivery format within a major. A named option is NOT a new degree or major. Authorization by the Board of Regents to deliver an academic program is at the degree/major level.

This form is to be used in concert with the Policy Guidelines for Named Options within Academic Majors. Complete the form and save as a Microsoft Word document.

1. Overview
   1.1. Named Option: Modeling and Simulation in Mechanical Engineering
   1.2. Academic Major: Mechanical Engineering
   1.3. Home Department: Mechanical Engineering
   1.4. School/college: College of Engineering
   1.5. Partner department(s)/units/schools/colleges: none
   1.6. Chair of the Major (name, title, email): Jaal Ghandhi, Chair, jaal.ghandhi@wisc.edu
   1.7. Primary faculty or staff contact for the proposal (name, title, email): Dan Negrut, Mead Witter Foundation Professor, negrut@wisc.edu
   1.8. Primary school/college dean’s office contact (name, title, email): James Blanchard, Executive Associate Dean, jake.blanchard@wisc.edu
   1.9. Briefly describe the type and purpose of the named option.

   This academic proposal is for a non-pooled tuition revenue program for a Master of Science degree in Mechanical Engineering. A new named option, Modeling and Simulation in Mechanical Engineering, is proposed with specialization in modeling aspects that facilitate the computer simulation of processes associated with the field of Mechanical Engineering. Within this broad field, the instructional process will emphasize several disciplines: engineering design, energy conversion and generation, biomechanics, and manufacturing. The program will provide a fast paced progression through a pool of courses with a stated objective of endowing the student with: (1) computational engineering literacy; and, (2) a strong modeling and simulation skillset. Combined, (1) and (2) are highly marketable, increasingly relied upon in industry, and provide a solid foundation for a subsequent advanced degree. This approach will allow us to recruit from a broader audience interested in terminal Masters degrees and thus increase our graduate enrollment. The program has been designed as a 12-month, course-only, terminal program.
   What prints on the diploma: Master of Science-Mechanical Engineering.
   What prints on the transcript: Master of Science-Mechanical Engineering, Named Option: Modeling and Simulation in Mechanical Engineering

   Named option types are described in the Policy Guidelines for Named Options within Academic Majors: 1. Area of curricular emphasis within the major for undergraduate programs; 2. Honors in the major for undergraduate programs; 3. Area of curricular emphasis within the major for
1. Graduate programs
2. Non-pooled tuition revenue programs
3. Distance/Online Programs
4. Off-Campus Location for graduate, professional, or undergraduate programs

1. Date form completed: 9/15/2016

2. Approval Implementation and Expectations for Review
   2.1. School/College Approval Date: 10/17/2017
   2.2. GFEC Approval Date (graduate level named options only): 11/10/2017
   2.3. UAPC Approval Date: 11/16/2017
   2.4. Expected first term of student enrollment (typically the first fall after UAPC approval): Fall 2018
   2.5. Year of three year progress report to GFEC (3 years after first student enrollment; graduate level named options only): 2021
   2.6. Year of first program review (5 years after first student enrollment): 2023
   2.7. Are all academic programs in the home department up to date for program review? Yes.

   Updates for several program reviews have been provided separately.

   APIR will provide a list of programs and most recent review date if needed.

   If no, program reviews need to be completed before a new proposal is advanced at campus level (GFEC and UAPC). Please provide and information related to plans for completion of program reviews:

   3. Background/Rationale
      3.1. How does the named option relate to the major and to other named options in the major, if relevant?

      Modeling and Simulation in Mechanical Engineering is one of the major sub-disciplines of Mechanical Engineering. Hence, it is complementary to our research-focused programs, but has a more practical focus (given the accelerated timetable and lack of a thesis).

      3.2. What is the purpose of the named option? How does the named option contribute to the mission of the sponsoring unit?

      The purpose of the named option is to provide a master of science – Mechanical Engineering program that is course-based and accelerated (students should finish in one calendar year). The named option contributes synergistically to the mission of the Department of Mechanical Engineering by increasing the number of master-level graduate students and enhancing the reputation of the Department and UW-Madison internationally.

      3.3. What is the evidence that there is a student demand for the named option?

      There is a lot of interest in using computer modeling and simulation in Mechanical Engineering and beyond. There are two compulsory courses in this program – ME459 “Computing Concepts for Applications in Engineering”, and ME759 “High Performance Computing for Applications in Engineering”. The former will be offered for the first time in Fall 2018 (currently in course proposal system). The second has seen a steady increase in student participation – from 7 students in 2008 to 131 students in 2017. Additionally, the online Master of Engineering in Data Analytics degree program started its inaugural term with a strong enrollment of 18 students. The interest in the area of using computers to process data and run simulations is growing. This course will provide a formal process that can lead students to a level of proficiency qualifying them for good jobs in an economy that turns increasingly digital.

   4. Curriculum
      4.1. Delivery modality:

      Face-to-face

      Distance-delivered programs are those programs in which 50% or more of the required courses may be taken as distance-delivered courses. If the option is intended to provide a way to distinguish between students in a face-to-face or an online/distance delivered program, the provide...
information on how the distance program is developed and supported in 10.1.

4.2. Provide a complete list of named option requirements.
Students are required to complete 30 credits of course works in Modeling and Simulation in Mechanical Engineering.

Program requirements should provide content that leads to the completion of major learning goals. See section 5 Assessment.

4.3. ☒ Attach a full curriculum including all required and elective courses.
4.4. ☐ For undergraduate named options, attach a four year roadmap.

Named options for undergraduate majors will have requirements totaling 120 credits and students should be able to complete the degree/major within four academic years.

4.5. ☒ For graduate named options, attach a chart outlining minimum degree requirements and elements for satisfactory progress.

Master’s level programs will include at least 30 credits of requirements. Doctoral level programs will include at least 51 credits of requirements.

Checklist for Verification of Curricular Policy Requirements *
You will have an opportunity to provide explanation and rationale for any Curricular Policy Requirements that have not been affirmed in the text box that follows the check list, below.

☒ Courses are offered on a regular basis.
☒ Courses have enrollment capacity for students in the named option.
☒ All courses required for the named option are fully approved. (ME459 is in the approval process)
☒ Units must maintain Named Option requirements so that they are up-to-date; all curriculum changes must be approved through the appropriate school/college academic planning council (APC) or curriculum committee. The school/college APC or curriculum committee will notify the Office of the Registrar and the Graduate School (graduate level named options only) about approved curricular changes to the named option. Typically, any changes in requirements will be effective no sooner than the fall semester after approval.

*Provide explanation and rationale for any Curricular Policy Requirements that have not been affirmed.

Provide explanation for Curricular Policy Requirements that have not been affirmed here.

5. Assessment

5.1. ☒ Attach a program assessment plan when submitting this proposal.

Assessment plans for a named option should be integrated with the assessment plan for the major. See the Basic Assessment Plan for instruction and accompanying template. The Basic Assessment Plan and Template are minimum expectations for this information. Programs that have developed plans that exceed what is specified in the basic plan may provide that information.

5.2. Provide a summary of the program assessment plan, including learning goals for the major and any additional learning goals that are specific for the named option, key methods and assessment approaches, and how assessment information will be reviewed and acted on.

Student Learning Goals:
1. Demonstrate a strong understanding of mathematical, scientific, and engineering principles in the field
2. Demonstrate an ability to formulate, analyze, and independently solve advanced engineering problems
3. Apply the relevant scientific and technological advancements, techniques, and engineering tools to address these problems
4. Recognize and apply principles of ethical and professional conduct
Method for assessing learning:
The student's faculty advisor will review the student's course work performance and complete the College's learning goals checklist before the end of the final semester.

Plan for review of the assessment information:
The graduate committee will review the assessment data, and report to the department faculty at a faculty meeting once a year and report the program assessment results — both the data summary and any recommendations -- to the Dean's Office. The Dean's Office will present all program assessment reports to the College Academic Planning Council (APC).

The assessment summary should highlight how the named option is included in the overall assessment plan for the major. The named option must adhere to all learning goals for the major and may also have additional learning goals that are specific for the named option.

6. Overlap and Related Programs
6.1. Specify any other degree/majors, named options, or certificates that may not be earned in combination with this named option.
Students will not be permitted to earn more than one named option offered by the College of Engineering. Students will also not be allowed to earn this named option and the related MS degree (MS ME) with no option.

Overlap restrictions must be managed at the program level as part of the advising process. When proposing a named option that has the same name as an existing degree/major certificate or doctoral minor at the same level, the program will be required to put in place processes to ensure that students do not enroll in both programs with the same name. If the program faculty choose to limit any other overlap with other degree/majors, named options, or certificates a list must be specified in the proposal and the program faculty/staff will be responsible for monitoring and enforcing overlap limits.

7. Admissions & Enrollment
7.1. For graduate programs proposing a named option with admissions requirements that are distinct from the major with no named option, explain the admissions criteria and process.
The same admissions criteria and committee will be used for both the named option and the major. The named option will admit students that meet the minimum English language proficiency requirements of the graduate school, but will not allow lower scores. Essentially, no students will be admitted that may require ESL courses, as the accelerated course load does not offer room for additional courses.

7.2. What is the projected annual enrollment in the named option? Initially 10, with the expectation that the option enrollment will grow to at most 30 students per year.
7.3. What is the maximum enrollment (using existing instructional and student resources)? 30
7.4. What are the contingency plans for supporting enrollments higher than the stated maximum enrollment? The bottleneck can be access to the computation hardware asset used in ME459 and ME759, the only mandatory courses in the program. However, we are confident we can alleviate this type of resource-access pressure by using program revenue funds to increase the FTE support for system administration for the computational asset.

Checklist for Verification of Admission Policy Requirements for Undergraduate Named Options*
You will have an opportunity to provide explanation and rationale for any Admission Policy Requirements that have not been affirmed in the text box that follows the checklist.
Named option admission requirements are consistent with admission requirements for the major with no named option, if the major has any admission requirements beyond admission to the University. Admission limits should be related to interest or aptitude for the content and not based solely on a high GPA cutoff.

☐ The named option will be declared and canceled using the e-Declaration process in the student information system.

☐ Undergraduates will not be advised to declare or remain enrolled in a named option if it will extend their time to graduation. Undergraduate students are to be discouraged from earning more than one named option that represents an area of curricular emphasis within the major.

*Provide explanation and rationale for any Admission Policy Requirements that have not been affirmed in the above checklist.
Type explanations for Admission Policy Requirements not affirmed here.

8. Advising
8.1. List name(s) of major and named option advisor(s) with title and departmental affiliation(s).
Major: Mechanical Engineering
Named option advisor(s):
ME Faculty: Dan Negrut, Jaal Ghandhi, Chris Rutland, Shiva Rudraraju, Wenxiao Pan, and Benjamin Peherstorfer

8.2. Describe how there will be sufficient advising and academic support for all students in the major (both the existing major’s students and the new students that will be served by the named option).
The Modeling and Simulation in Mechanical Engineering program has six faculty who will serve as faculty advisors, providing assistance for course selection and career direction. Given that this is a coursework-based program, the advising load is not expected to be high. Additionally, the students will have access to revenue-supported graduate student services coordinators and a college named option program director. College-level career advising services are also available.

8.3. ☒ Confirm that major and named option advisor(s) have been consulted and reviewed this proposal.

9. Governance & Faculty
9.1. ☒ The named option must be governed by the same department or academic unit that oversees the major. Any sub-committee governing the named option must report to the faculty governance committee for the major.

9.1.1. If a sub-committee governs the named option, describe procedures including how faculty are identified and provisions for transitions in the committee.

9.2. List core faculty and staff with title and departmental affiliation(s).
Core faculty: Dan Negrut, Jaal Ghandhi, Chris Rutland, Shiva Rudraraju, Wenxiao Pan, and Benjamin Peherstorfer
Department of Mechanical Engineering

10. Fiscal Structure and Ongoing Commitment
10.1. Provide an overview of plans for funding the named option including but not limited to program administration, instructional/curricular delivery, technology needs, and program assessment.
All expenses will be covered by program revenue. Since the program is delivered in a face-to-face format, the costs related to delivery and technology are minimal and difficult to quantify.
Assessment will be addressed within Mechanical Engineering using the same processes to be employed for existing majors. These processes are being developed now.

10.2. How will the named option impact staffing needs beyond the immediate program? How are those needs being met?

The College of Engineering has added two full time staff members to assist with admissions and administration of named options programs. These positions are shared across a number of named options, so the costs to each individual program will be minimal. Additional TAs and graders may be required to assist with individual courses. In some cases, new courses will be created and those costs will be borne by that program. This will require sufficient enrollment to justify the costs and will not occur within the first year. As staffing needs grow to support enrollment, tuition revenue will be used to fund that staff expansion.

_If there is no change in staffing, please describe how the duties of current employees will evolve to support this named option._

10.3. For named options supported using non-pooled tuition, provide a fiscal annual summary including planned enrollment, estimated paid tuition, instructional costs, and estimated excess tuition available for reinvestment in keeping with the separate guidelines for non-pooled programs.

See attached.

10.4. For graduate programs supported using pooled tuition, provide a plan for how new graduate students will be funded.

N/A

Required attachments

- ☒ Cover letter from the Dean of the school/college that will be the home of the named option
  _When a proposal for a new named option is forwarded for approval, it will have a cover letter to the provost from the supporting dean._
- □ Supporting letters/memos

Proposals must be accompanied by letters or memos submitted by the chair or director of other academic units that have overlapping interest. These notes may comment on shared resources, competition for students or other ways in which the programs will interact surrounding the named option. This will include departments/schools/colleges, share a student audience, represent a closely related area of study, have overlapping faculty, or have program names that are similar.

- ☒ Full curriculum including all required and elective courses
- □ For undergraduate named options, attach a four year roadmap.
- ☒ For graduate named options, attach a chart outlining minimum degree requirements and elements for satisfactory progress.
- ☐ Assessment plan

Named options supported using non-pooled tuition must attach:

- ☒ Core Criteria Checklist
- ☒ Additional Requirements Checklist

Proosed Curriculum
Department of Mechanical Engineering Masters of Science Option:
Modeling and Simulation in Mechanical Engineering

Note: modeling and simulation are valuable tools in a variety of engineering applications; as a result, this curriculum is more prescriptive with respect to modeling and simulation, and more flexible with respect to potential engineering applications.

1) Credits required for graduation: 30

2) Progress towards graduation sequence: (Fall → Spring → Summer progression)
   Fall Semester: 12 Credits
   Spring Semester: 12 Credits
   Summer Session: 6 Credits

3) Required courses and rules:
   • There is no thesis or independent study
   • Students must take the following two required courses:

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Number</th>
<th>Cr.</th>
<th>Grad</th>
<th>Instructor</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computing Concepts for Applications in Mechanical Engineering</td>
<td>ME459</td>
<td>3</td>
<td>Y</td>
<td>Dan Negrut</td>
<td>In approval process</td>
</tr>
<tr>
<td>High Performance Computing for Applications in Engineering</td>
<td>ME759</td>
<td>3</td>
<td>Y</td>
<td>Dan Negrut</td>
<td></td>
</tr>
</tbody>
</table>

   • Students must take four courses from the list below, three of the four courses must possess the graduate attribute (“Grad” below)
   • There will be six faculty advisors for this named option. With guidance and approval from their assigned faculty advisor, students may select twelve additional course credits from the Department of Mechanical Engineering. Courses from other engineering departments are allowed where career interests cross discipline boundaries.

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Number</th>
<th>Cr.</th>
<th>Grad</th>
<th>Instructor</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate Vibrations</td>
<td>ME440</td>
<td>3</td>
<td></td>
<td>Melih Eriten, Shiva Rudraraju</td>
<td></td>
</tr>
<tr>
<td>Intro to Computational Dynamics</td>
<td>ME451</td>
<td>3</td>
<td></td>
<td>Dan Negrut</td>
<td></td>
</tr>
<tr>
<td>Applied Thermal/Structural Finite Element Analysis</td>
<td>ME460</td>
<td>3</td>
<td>X</td>
<td>Andrew Mikkelson</td>
<td></td>
</tr>
<tr>
<td>Introduction to Design Optimization</td>
<td>ME548</td>
<td>3</td>
<td>X</td>
<td>Suresh</td>
<td>In development</td>
</tr>
<tr>
<td>Intro to Computational Geometry</td>
<td>ME558</td>
<td>3</td>
<td>X</td>
<td>Vadim Shapiro</td>
<td></td>
</tr>
<tr>
<td>Heat Transfer</td>
<td>ME564</td>
<td>3</td>
<td>X</td>
<td>Greg Nellis</td>
<td></td>
</tr>
<tr>
<td>Computational Fluid Dynamics</td>
<td>ME573</td>
<td>3</td>
<td>X</td>
<td>Mario Trujillo</td>
<td></td>
</tr>
<tr>
<td>Medical image Based Modeling</td>
<td>ME601</td>
<td>3</td>
<td></td>
<td>Alejandro Roldan</td>
<td></td>
</tr>
<tr>
<td>Digital Design and Fabrication</td>
<td>ME601</td>
<td>3</td>
<td></td>
<td>Xiaoqing Qian</td>
<td></td>
</tr>
<tr>
<td>Introduction to scientific computing for computational and</td>
<td>ME601</td>
<td>3</td>
<td></td>
<td>Wenxiao Pan, Ben Peherstorfer, Tom Krupenkin</td>
<td></td>
</tr>
<tr>
<td>Course Title</td>
<td>Code</td>
<td>Credits</td>
<td>Instructor(s)</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>------</td>
<td>---------</td>
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<tr>
<td>data-driven science and engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numerical methods for Multiscale and Stochastic Modeling and Inference</td>
<td>ME601</td>
<td>3</td>
<td>Wenxiao Pan, Ben Peherstorfer, Tom Krupenkin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finite Element Method for Biomechanics</td>
<td>ME603</td>
<td>3</td>
<td>Corinne Henak</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finite Element Analysis</td>
<td>ME605</td>
<td>3</td>
<td>X Shiva Rudraraju</td>
<td>In development</td>
<td></td>
</tr>
<tr>
<td>Advanced Finite Element Analysis</td>
<td>ME705</td>
<td>3</td>
<td>X Shiva Rudraraju</td>
<td>In development</td>
<td></td>
</tr>
<tr>
<td>Advanced Robotics</td>
<td>ME739</td>
<td>3</td>
<td>X Mike Zinn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Optimization Methods</td>
<td>ME748</td>
<td>3</td>
<td>X Suresh</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Computational Dynamics</td>
<td>ME751</td>
<td>3</td>
<td>X Dan Negrut</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Heat Transfer I-Conduction</td>
<td>ME764</td>
<td>3</td>
<td>X Greg Nellis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-Phase Flow Theory and Computation</td>
<td>ME964</td>
<td>3</td>
<td>X Mario Trujillo</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Mechanical Engineering MINIMUM DEGREE REQUIREMENTS & SATISFACTORY PROGRESS

*Schools/Colleges, Departments and Programs may set more rigorous expectations and requirements than the Graduate School*

- If describing multiple degree plans at the same level (M.A. and M.S.) or multiple named options and tracks within a plan, indicate requirements for all plan variations.
- Please note that “Example” in the chart provides an example of policy – but is not necessarily reflective of Graduate School’s policy. For the actual Graduate School policies, you may consult the Graduate School Degree Requirements chart at [http://grad.wisc.edu/catalog/degreq_criteria.htm](http://grad.wisc.edu/catalog/degreq_criteria.htm) to ensure program compliance with Graduate School degree requirements.
- If the program policy aligns with Graduate School degree requirements, please reiterate the policy in your program’s degree requirement chart – do not simply provide “Follow Graduate School Policy”.
- Programs are responsible for monitoring more restrictive requirements.

<table>
<thead>
<tr>
<th>Master’s Degrees:</th>
<th>MS in Mechanical Engineering, Option: Modeling and Simulation in ME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Graduate Degree Credit Requirement</td>
<td>30 credits</td>
</tr>
<tr>
<td>Minimum Graduate Residence Credit Requirement</td>
<td>16 credits</td>
</tr>
<tr>
<td>Minimum Graduate Coursework (50%) Requirement</td>
<td>At least 50% of credits applied toward the graduate degree credit requirement must be completed in graduate-level coursework.</td>
</tr>
</tbody>
</table>

**Prior Coursework Requirements:**

- **Graduate Work from Other Institutions**
  
  With program approval, students are allowed to count no more than 9 credits of graduate coursework from other institutions. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

- **UW-Madison Undergraduate**
  
  No credits from a UW-Madison undergraduate degree are allowed to count toward the degree.

- **UW-Madison University Special**
  
  With program approval and payment of the difference in tuition (between special and graduate tuition), students are allowed to count no more than 9 credits of course work numbered 300 or above taken as a UW-Madison University Special students. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

**Credits per Term Allowed:** 15 credits

**Program-Specific Courses Required:**

- ME759: High Performance Computing in ME
<table>
<thead>
<tr>
<th><strong>Overall Graduate GPA Requirement</strong></th>
<th>3.00</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Other Grade Requirements</strong></td>
<td><em>The Graduate School requires an average grade of B or better in all coursework (300 or above, not including research credits) taken as a graduate student unless conditions for probationary status require higher grades. Grades of Incomplete are considered to be unsatisfactory if they are not removed during the next enrolled semester.</em></td>
</tr>
<tr>
<td><strong>Probation Policy</strong></td>
<td><em>The Graduate School regularly reviews the record of any student who earned grades of BC, C, D, F, or Incomplete in a graduate course (300 or above), or grade of U in research credits. This review could result in academic probation with a hold on future enrollment or in being suspended from the Graduate School.</em></td>
</tr>
<tr>
<td><strong>Advisor / Committee</strong></td>
<td><em>Every graduate student is required to have an advisor. To ensure that students are making satisfactory progress toward a degree, the Graduate School expects them to meet with their advisor on a regular basis.</em></td>
</tr>
<tr>
<td><strong>Assessments and Examinations</strong></td>
<td><em>No formal examination required.</em></td>
</tr>
<tr>
<td><strong>Time Constraints</strong></td>
<td><em>Master’s degree students who have been absent for five or more consecutive years lose all credits that they have earned before their absence. Individual programs may count the coursework students completed prior to their absence for meeting program requirements; that coursework may not count toward Graduate School credit requirements.</em></td>
</tr>
<tr>
<td><strong>Language Requirements</strong></td>
<td><em>Contact the program for information on any language requirements.</em></td>
</tr>
</tbody>
</table>
Assessment Plan – M.S. Degree Programs in the College of Engineering

Whether program personnel decide to paste information into this template or to utilize a pre-existing document, all bolded items must be included and clearly labeled.

Identifying Information
School/College: College of Engineering
Graduate Degree/Major Program Name: Master of Science, Option: Modeling and Simulation in Mechanical Engineering
Graduate Degree Level (M.S., M.A., Ph.D., DMA, etc.): M.S.
Faculty Director Contact/Title: Dan Negrut, Mead Witter Foundation Professor
Primary Contact Information: negrut@wisc.edu (608) 772-0914

Student Learning Goals (What)
Assessment of graduate-level learning goals is one of the many ways in which our campus ensures the integrity of its degrees and the quality of the student experience. List the graduate student learning goals for this academic degree program below. Feel free to add rows if the academic degree program has more than five learning goals.
The student learning goals that have been submitted for your academic degree/major program can be found on the Inside Assessment website (https://provost.wisc.edu/inside-assessment/).

1. Demonstrate a strong understanding of mathematical, scientific, and engineering principles in the field
2. Demonstrate an ability to formulate, analyze, and independently solve advanced engineering problems
3. Apply the relevant scientific and technological advancements, techniques, and engineering tools to address these problems
4. Recognize and apply principles of ethical and professional conduct

Plan for Assessing Each Student Learning Goal
For each of the degree major/program student learning goals, indicate how the program plans to assess whether or not students are meeting the expectation, as well as when each learning goal will be assessed. Keep in mind that each academic degree program is expected to engage in at least one assessment activity per year and assessment activities, in total, must include one direct assessment method. While programs do not need to assess each learning goal every year, all learning goals must be assessed within a period of three years.
<table>
<thead>
<tr>
<th>Assessment Planning (How)</th>
<th>Learning Goal #1</th>
<th>Learning Goal #2</th>
<th>Learning Goal #3</th>
<th>Learning Goal #4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method for assessing learning (at least one direct method required)</td>
<td>The student's faculty advisor will review the student’s course work performance and complete the College's learning goals checklist before the end of the final semester.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timetable for assessment activity (at least one activity each year; all goals reviewed in a 3-year cycle)</td>
<td></td>
<td></td>
<td>All learning goals will be evaluated annually.</td>
<td></td>
</tr>
</tbody>
</table>

*For examples of direct and indirect methods of assessment, see: [http://provost.wisc.edu/assessment/doing-assessment.htm](http://provost.wisc.edu/assessment/doing-assessment.htm). You may elect to copy and paste this table multiple times if your program has more than five learning goals.

Also provide answers to the following questions as part of your assessment plan.

1. **Who is responsible for assessment?** (identify an individual or team who will coordinate the implementation of the plan on an annual basis):
   The department graduate program coordinator (staff) will remind all faculty members serving as faculty advisors to complete the learning goals checklist at the end of the semester in which the degree program is completed. The student's faculty advisor is responsible for completing the learning goals checklist and submitting it to the department graduate committee chair. The graduate committee chair will compile and summarize the department's learning goals assessment data on an annual basis.

2. **What is the plan for review of the assessment information?** (typically during an annual meeting of the program faculty and staff; note that at this meeting the program may want to review enrollment information, course progression, degree completion, and other structural features of the student experience in addition to the evidence about student learning):
   The graduate committee chair will lead a discussion and review of the assessment data at a faculty meeting once a year and report the program assessment results – both the data summary and any recommendations -- to the Dean's Office. The Dean's Office will present all program assessment reports to the College Academic Planning Council (APC).

3. **What is the plan for production of an annual summary report?** (the annual summary report includes the materials that form the basis of discussion at the annual meeting of the program faculty and staff, along with any recommendations made after considering the student learning assessment information presented):
The Dean's Office will compile an annual College-wide summary report consisting of the individual reports from each CoE graduate program and a brief statement of any additional recommendations provided by the CoE APC.

4. **How will recommendations be implemented?** (explain the general process by which recommendations will be implemented):
   The annual College-wide summary report, including any APC recommendations, will be shared with each department.

**Graduate Degree Program Curriculum Mapping Worksheet (Where)**

This worksheet, or similar document, **must be included** with the submission of the program’s assessment plan.

- **Learning Goals** – Enter the academic degree program learning goals identified in the assessment plan on the top row of the following chart. (If the learning goals have been submitted to the Office of the Provost, a pre-populated template is available; contact regina.lowery@wisc.edu) Feel free to add columns if the academic degree/major program has more than five learning goals.

- **Degree/Major Program Courses/Experiences** – List all degree requirements (in some cases co-curricular experiences may also be included). Feel free to add rows as needed.

- Indicate with a check (X) where the course or learning experience contributes to each of the learning goals. Courses may contribute to multiple learning goals.

<table>
<thead>
<tr>
<th>Curriculum Map (Where)</th>
<th>Enter program-level learning goals and check (X) which course or experience contributes to which learning goal.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Degree Program Required Courses or Experiences</strong></td>
<td><strong>Learning Goal #1</strong></td>
</tr>
<tr>
<td>ME459</td>
<td>X</td>
</tr>
<tr>
<td>ME759</td>
<td>X</td>
</tr>
</tbody>
</table>

*Add additional rows as needed to capture all requirements.

Minimally, all of the courses/experiences required to complete the major degree program should be listed. Optionally, elective courses may be included in addition to the required courses.
BUDGET

Master of Science in Mechanical Engineering
Modeling and Simulation in Mechanical Engineering Option

In the first year, this program will likely enroll up to around 10 students. Hence, impact on existing programs will be minimal and the instructional costs will be minimal.

As the program grows, we anticipate needing to add additional staff time, faculty time and teaching assistants. If at any time this program requires the addition of course sections to handle the load, instructional staff for the new sections will be supported by revenue from this program. However, this is not anticipated, and the extra load will be handled by the addition of TAs as needed.

Beyond the instructional needs, the College of Engineering will provide centralized staff support for administration, student services, and program marketing and evaluation.

Summary Budget

<table>
<thead>
<tr>
<th>Summary Budget</th>
<th>Year 1</th>
<th>Year 2</th>
<th>On-going</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enrollment</td>
<td>10</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Average Tuition/Student/Year</td>
<td>$20,000</td>
<td>$20,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>Gross Revenue</td>
<td>$200,000</td>
<td>$400,000</td>
<td>$600,000</td>
</tr>
<tr>
<td><strong>Expenses</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University Assessment (10%)</td>
<td>$20,000</td>
<td>$40,000</td>
<td>$60,000</td>
</tr>
<tr>
<td>Engineering College (20%)*</td>
<td>$40,000</td>
<td>$80,000</td>
<td>$120,000</td>
</tr>
<tr>
<td>Additional TA Support</td>
<td>$10,000</td>
<td>$20,000</td>
<td>$30,000</td>
</tr>
<tr>
<td>Department Staff Support</td>
<td>$10,000</td>
<td>$20,000</td>
<td>$30,000</td>
</tr>
<tr>
<td>Faculty Support</td>
<td>$25,000</td>
<td>$30,000</td>
<td>$35,000</td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td>$105,000</td>
<td>$190,000</td>
<td>$275,000</td>
</tr>
<tr>
<td><strong>Net Revenue</strong></td>
<td>$95,000</td>
<td>$210,000</td>
<td>$325,000</td>
</tr>
</tbody>
</table>

*Estimated. Includes centralized administration, student services, marketing and recruitment.

Faculty support: includes one month of salary for Negrut Summer course
APPENDIX A. CORE CRITERIA CHECKLIST
FOR ACADEMIC PROGRAMS WITH NON-POOLED TUITION

1. New and Additional Student Enrollments to Support Program Costs
   ☑ The program must bring in NEW and ADDITIONAL students. Overall enrollment in all other
   school/college programs must not be eroded. The program cannot compete with or draw
   students away from existing programs that support the central tuition pool.
   ☑ Faculty/staff must plan for sufficient enrollments to have enough tuition to cover instructional,
   direct student support costs, and any other fixed or required costs. Experience shows that
   enrollments of at least 30 students are necessary to have enough tuition to meet direct program
   costs.
   ☑ School/college Budget Officers must be involved in planning and must approve plans and
   budgets for these programs before the program is submitted to the school/college APC for
   academic approval.

2. Designed for Non-Traditional Students
   ☑ Has an applied, practice-oriented curriculum, or integrates practice with theory
   ☑ Is offered in a modality that allows non-traditional audiences to attend (evening, weekend,
     online, intensive, or some combination)
   ☑ Has demonstrated a workforce demand for the program graduates
   ☑ Has defined learning goals that are oriented to market considerations
   ☑ Has a clearly defined curriculum that is “self-contained”, meaning that program students are
     confined only to courses from the approved, prescribed curriculum
   ☑ Has a clearly defined (often lockstep) curriculum with few options or electives that follows a
     predictable timeline for offerings and completion

3. Distinctly Identifiable Program (Code) With Governance Approval
   ☑ The program must be distinctly identifiable in the student record system, either as a
     degree/major or as an option of a degree/major, or as a Capstone certificate.
   ☑ The program must develop a proposal for the academic approval process, during which it must
     demonstrate that the school/college Dean and Budget Officer are aware and supportive of the
     program being run on a non-pooled tuition model.
APPENDIX B. ADDITIONAL REQUIREMENTS CHECKLIST
FOR ACADEMIC PROGRAMS WITH NON-POOLED TUITION

Use this checklist in conjunction with the Core Criteria Checklist

If core criteria are met, the program must adhere to the additional requirements below.
Note: Not all new programs are suited for the non-pooled program requirements. New programs that seek to take advantage of a wide range of course and curricular/program offerings on campus and are not market-oriented should be developed under traditional (101) pooled tuition funding models.

1. Fiscal Requirements:
   - School/college budget officer has approved the budget and fiscal plan.
   - School/college dean and budget officer are committed to assuming fiscal responsibility for costs not covered by non-pooled tuition to the program. The school/college will back up the budget with a commitment to cover any costs not met from tuition from other sources.
   - The program structure fits within standard academic administrative structures and allocates expenses of the program so that the program does not create additional burdens on traditional/101 program resources or student services such as advising, ESL, Registrar’s Office, Bursar’s Office, Graduate School and other support services.
   - Programs have two options for tuition. One option is to charge standard graduate tuition according to the UW-Madison tuition schedule. This includes standard rates for WI resident, MN, and non-resident students and any compulsory fees that apply. Or, for fully online programs, they have the option of charging all students one of tuition tiers (Appendix D). Although not currently allowed, it is potentially possible in the future the tiered tuition may be available to face-to-face programs.
   - Because students who have graduate assistantships receive tuition waivers, some non-pooled tuition graduate degree programs choose to prohibit students from accepting a graduate assistantship (RA/TA/PA). If a program allows their students to take graduate assistantships they it must forgo the tuition revenue. To ensure full receipt of non-pooled tuition and to counter challenges from students, the program must adhere to the following:
     - The program faculty/staff must disclose this program policy to students in the recommendation of admission letter, program website, program handbook, and program orientation.
     - Please see Appendix E for links and Appendix F for a sample of a specific non-pooled program template for a recommendation of admission letter and a general template for a program handbook. The program faculty/staff must provide details on this and any other program policies the program handbook in at least the following areas: satisfactory progress (good standing) requirements, any ways to return to good standing, and a program grievance process if done does not already exist.

2. Requirements for International Students:
Programs may not admit students who need ESL services without building sufficient ESL support into their fiscal model, and having an explicit MOU with the ESL provider about funding to support the ESL services.

Graduate degree/major programs must use Graduate School standards for English Proficiency. Capstone certificates should be designed so that admission requirements ensure that ESL support is not needed.

If the program is NOT completely online and admits international students, the program is responsible for honoring federal visa regulations related but not limited to: length of stay requirements for visa requests, online course restrictions for visa holders, and waiting for federal program approval (up to a year) if the program represents a new degree type or capstone certificate previously not offered at UW-Madison.

3. Requirements for Program/Course Enrollment:
   - Non-pooled tuition program students can only be enrolled in one program at a time; enrollment in a second major, named option, certificate program, or courses beyond the prescribed program curriculum is not permitted. Non-compliance with this requirement will jeopardize the receipt of tuition for a non-pooled program. Regular audits will be conducted to ensure these requirements are met.
   - To ensure full receipt of non-pooled program tuition and to counter challenges from students who want to be dually enrolled, the program must adhere to the following:
     - The program must provide information to students about prohibitions on concurrent program enrollment and out-of-program course enrollment. Programs must note this in recruiting materials, in recommendations of admission, on the program website, program handbook, and program orientation.
     - Please see Appendix E for links and Appendix F for language for a specific non-pooled program template for a recommendation of admission letter and a general template for a program handbook. The program faculty/staff must provide details on this and any other program policies in the program handbook in at least following areas: satisfactory progress (good standing) requirements, ways to return to good standing, and a program grievance process if one does not already exist.
     - The program communicates to students each semester prior to course enrollment the expectation that students can enroll only in program courses and not in courses outside the approved, prescribed curriculum.
     - For students who enroll in the non-pooled program and then decide they want to pursue traditional/101 programs that allow dual enrollment, the program must help the student transfer to a different program(s) that allow such activity.
October 23, 2017

William Karpus, Dean
Graduate School
University of Wisconsin - Madison

Dear Bill,

At the October 18, 2017 meeting of the College of Engineering Academic Planning Council, the following three new named option programs were recommended for approval:


• Master of Science: Materials Science and Engineering: Nanomaterials and Nanoengineering, Dept. of Materials Sciences & Engineering

• Master of Science: Mechanical Engineering: Computer Modeling & Simulation in Mechanical Engineering, Dept. of Mechanical Engineering

The proposals are attached.

We are excited about the prospects for increasing our enrollment of terminal Masters students, given the targeted, accelerated nature of the proposed options. In addition, we have created these with efficiency in mind and we envision common administrative and advising staff support to help us achieve these goals. We are now requesting approval from the Graduate Faculty Executive Committee.

Thank you for considering this request.

Sincerely,

[Signature]

James P. Blanchard
Executive Associate Dean
jake.blanchard@wisc.edu
PROPOSAL FORM
Nanomaterials and Nanoengineering

A named option is a formally documented sub-major within an academic major program. Named options serve as a convenient way to distinguish a distinct curriculum or delivery format within a major. A named option is NOT a new degree or major. Authorization by the Board of Regents to deliver an academic program is at the degree/major level.

This form is to be used in concert with the Policy Guidelines for Named Options within Academic Majors. Complete the form and save as a Microsoft Word document.

1. Overview
   1.1. Named Option: Nanomaterials and Nanoengineering
   1.2. Academic Major: M.S. Materials Science and Engineering
   1.3. Home Department: Materials Science and Engineering
   1.4. School/college: Engineering, College of
   1.5. Partner department(s)/units/schools/colleges: none
   1.6. Chair of the Major (name, title, email): Paul Voyles, Chair, chair@mse.wisc.edu
   1.7. Primary faculty or staff contact for the proposal (name, title, email): Xudong Wang, Associate Chair for Graduate Studies, acgs@mse.wisc.edu
   1.8. Primary school/college dean’s office contact (name, title, email): James Blanchard, Executive Associate Dean, jake.blanchard@wisc.edu
   1.9. Briefly describe the type and purpose of the named option.
       This will be a non-pooled tuition revenue program for a Master of Science degree in Materials Science and Engineering. The option will provide more specificity to the credential and will thus be more attractive to students interested in studying nanomaterials and nanoengineering, a sub-discipline of Materials Science and Engineering. This approach will allow us to recruit from a broader audience interested in terminal Masters degrees and thus increase our graduate enrollment. The program has been designed as a 12-month, course-only, terminal program. What prints on the diploma: Master of Science-Materials Science and Engineering
       What prints on the transcript: Master of Science-Materials Science and Engineering, Named Option: Nanomaterials and Nanoengineering

   Named option types are described in the Policy Guidelines for Named Options within Academic Majors: 1. Area of curricular emphasis within the major for undergraduate programs; 2. Honors in the major for undergraduate programs; 3. Area of curricular emphasis within the major for graduate programs; 4. Non-pooled tuition revenue programs; 5. Distance/Online Programs; 6. Off-Campus Location for graduate, professional, or undergraduate programs

1.10. Date form completed: 9/26/2017
2. Approval Implementation and Expectations for Review

2.1. School/College Approval Date: 10/17/2017

2.2. GFEC Approval Date (graduate level named options only): 11/10/2017

2.3. UAPC Approval Date: 11/16/2017

2.4. Expected first term of student enrollment (typically the first fall after UAPC approval): Summer 2018

2.5. Year of three year progress report to GFEC (3 years after first student enrollment; graduate level named options only): 2021

2.6. Year of first program review (5 years after first student enrollment): 2023

2.7. Are all academic programs in the home department up to date for program review? Yes

APIR will provide a list of programs and most recent review date if needed.

If no, program reviews need to be completed before a new proposal is advanced at campus level (GFEC and UAPC). Please provide and information related to plans for completion of program reviews:

Type an explanation here. (1000 word limit)

3. Background/Rationale

3.1. How does the named option relate to the major and to other named options in the major, if relevant?

Nanomaterials and Nanoengineering is one of the major sub-disciplines of Materials Science and Engineering. Currently, the department of Materials Science and Engineering offers PhD and MS in Materials Science and Engineering, both of which require research experience and thesis work. The named option in Nanomaterials and Nanoengineering is complementary to our research-focused programs, but has a more course-oriented focus (given the accelerated timetable and lack of a thesis). There is no other named option offered by the College of Engineering in the area of nanoscale materials. Hence, this option is not expected to compete for students with other option programs.

3.2. What is the purpose of the named option? How does the named option contribute to the mission of the sponsoring unit?

The purpose of the named option is to provide a master of science – Materials Science and Engineering program that is course-based and accelerated (students should finish in one calendar year). It targets undergraduate students who want to obtain advanced knowledge in the fast-growing nanotechnology field. This 12-month course-oriented program will help students with relevant undergraduate degree to build a comprehensive fundamental and applied knowledge base for nanomaterials processing, characterization, and nanodevice development. It will enable Materials Science and Engineering students to enter the nano-engineering workforce directly after the Master's degree. The named option contributes significantly to the mission of the Department of Materials Science and Engineering by increasing the number of master-level graduate students, serving the national and international education needs of advanced nanotechnology, and enhancing the reputation of the Department and UW-Madison internationally.

3.3. What is the evidence that there is a student demand for the named option?

Nanomaterials and nanoengineering are are part of a rapidly expanding industrial segment. According the NSF-funded National Nanotechnology Initiative, up to 1 million jobs in nanotechnology are expected to be available in the US. The Materials Science and Engineering Department cannot currently accommodate all of the qualified students interested in advance
study in nanotechnology in our research-based Masters and doctoral programs. Examination of our graduate applicant pool from last year easily identified 10 students who would be well-served by this new program.

4. **Curriculum**

4.1. **Delivery modality:**

   - **Face-to-face**

   *Distance-delivered programs are those programs in which 50% or more of the required courses may be taken as distance-delivered courses. If the option is intended to provide a way to distinguish between students in a face-to-face or an online/distance delivered program, the provide information on how the distance program is developed and supported in 10.1.*

4.2. Provide a complete list of named option requirements.

   Students are required to complete 30 credits of coursework in Nanomaterials and Nanoengineering

   *Program requirements should provide content that leads to the completion of major learning goals. See section 5 Assessment.*

4.3. ☒ Attach a full curriculum including all required and elective courses.

4.4. ☐ For undergraduate named options, attach a four year roadmap.

   *Named options for undergraduate majors will have requirements totaling 120 credits and students should be able to complete the degree/major within four academic years.*

4.5. ☒ For graduate named options, attach a chart outlining minimum degree requirements and elements for satisfactory progress.

   *Master’s level programs will include at least 30 credits of requirements. Doctoral level programs will include at least 51 credits of requirements.*

**Checklist for Verification of Curricular Policy Requirements** *

You will have an opportunity to provide explanation and rationale for any Curricular Policy Requirements that have not been affirmed in the text box that follows the check list, below.

- ☒ Courses are offered on a regular basis.
- ☒ Courses have enrollment capacity for students in the named option.
- ☒ All courses required for the named option are fully approved.

- ☒ Units must maintain Named Option requirements so that they are up-to-date; all curriculum changes must be approved through the appropriate school/college academic planning council (APC) or curriculum committee. The school/college APC or curriculum committee will notify the Office of the Registrar and the Graduate School (graduate level named options only) about approved curricular changes to the named option. Typically, any changes in requirements will be effective no sooner than the fall semester after approval.

*Provide explanation and rationale for any Curricular Policy Requirements that have not been affirmed.

Provide explanation for Curricular Policy Requirements that have not been affirmed here.
5. **Assessment**

5.1. **☒** Attach a program assessment plan when submitting this proposal. 

*Assessment plans for a named option should be integrated with the assessment plan for the major. See the Basic Assessment Plan for instruction and accompanying template. The Basic Assessment Plan and Template are minimum expectations for this information. Programs that have developed plans that exceed what is specified in the basic plan may provide that information.*

5.2. Provide a summary of the program assessment plan, including learning goals for the major and any additional learning goals that are specific for the named option, key methods and assessment approaches, and how assessment information will be reviewed and acted on.

1. Demonstrate a strong understanding of mathematical, scientific, and engineering principles in the field
2. Demonstrate an ability to formulate, analyze, and independently solve advanced engineering problems
3. Demonstrate creative, independent problem solving skills
4. Apply the relevant scientific and technological advancements, techniques, and engineering tools to address these problems
5. Recognize and apply principles of ethical and professional conduct

Method for assessing learning:
The student's academic advisor will collect their advisees’ course work performance, i.e. the exam scores. Corresponding exam questions, if applicable, will be requested from the instructor as a direct measure for achieving the program learning goals. If term paper is required for specific course, the paper topic, scores and feedbacks from the instructor will be collected as the assessment measure. The student's academic advisor will then complete the College's learning goals checklist before the end of the semester in which the research/project/independent study was completed.

Plan for review of the assessment information:
The Associate Chair for Graduate Studies will provide assessment updates, lead the discussion and review the assessment data at a faculty meeting once a year and report the program assessment results – both the data summary and any recommendations -- to the Dean's Office. The Dean's Office will present all program assessment reports to the College Academic Planning Council (APC).

*The assessment summary should highlight how the named option is included in the overall assessment plan for the major. The named option must adhere to all learning goals for the major and may also have additional learning goals that are specific for the named option.*

6. **Overlap and Related Programs**

6.1. Specify any other degree/majors, named options, or certificates that may not be earned in combination with this named option.

Students will not be permitted to earn any other named option offered by MS&E. Students will also not be allowed to earn this named option and the related MS degree (MS MS&E) with no option.

*Overlap restrictions must be managed at the program level as part of the advising process. When proposing a named option that has the same name as an existing degree/major certificate*
or doctoral minor at the same level, the program will be required to put in place processes to ensure that students do not enroll in both programs with the same name. If the program faculty choose to limit any other overlap with other degree/majors, named options, or certificates a list must be specified in the proposal and the program faculty/staff will be responsible for monitoring and enforcing overlap limits.

7. Admissions & Enrollment

7.1. For graduate programs proposing a named option with admissions requirements that are distinct from the major with no named option, explain the admissions criteria and process. The same admissions criteria will be used for both the named option and the major, with the exception of English language proficiency. The named option will admit students that meet the minimum English language proficiency requirements of the graduate school, but will not allow lower scores. Essentially, no students will be admitted that may require ESL courses, as the additional course load is problematic and summer entry will not allow for ESL enrollment. The Materials Science and Engineering Department will make the final decision on all admissions to the option.

7.2. What is the projected annual enrollment in the named option? Initially 5 in this option, with the expectation that the option enrollment will grow to approximately 20 students per year.

7.3. What is the maximum enrollment (using existing instructional and student resources)? 20

7.4. What are the contingency plans for supporting enrollments higher than the stated maximum enrollment? The first 10 students can be supported with current capacity (other than the need for additional administrative support) and beyond that additional TA’s will be hired to support the additional students. At some point, we would need to add additional sections to some courses and, at that point, we would support additional faculty associates using revenue from this program. It is difficult to predict the enrollment that might trigger this, but one could imagine it being on the order of 40 students for this option.

Checklist for Verification of Admission Policy Requirements for Undergraduate Named Options*
You will have an opportunity to provide explanation and rationale for any Admission Policy Requirements that have not been affirmed in the text box that follows the checklist.

☑ Named option admission requirements are consistent with admission requirements for the major with no named option, if the major has any admission requirements beyond admission to the University. Admission limits should be related to interest or aptitude for the content and not based solely on a high GPA cutoff.

☐ The named option will be declared and canceled using the e-Declaration process in the student information system.

☐ Undergraduates will not be advised to declare or remain enrolled in a named option if it will extend their time to graduation. Undergraduate students are to be discouraged from earning more than one named option that represents an area of curricular emphasis within the major.

*Provide explanation and rationale for any Admission Policy Requirements that have not been affirmed in the above checklist.
Type explanations for Admission Policy Requirements not affirmed here.

8. Advising

8.1. List name(s) of major and named option advisor(s) with title and departmental affiliation(s).
Major: Materials Science and Engineering
Named option advisors: Padma Gopalan, Jason Kawasaki, Max Lagally, Xudong Wang

8.2. Describe how there will be sufficient advising and academic support for all students in the major (both the existing major’s students and the new students that will be served by the named option).

The Materials Science and Engineering department has 15.25 FTE faculty. A rotating subset of those faculty assigned to the Graduate Affairs departmental subcommittee, typically including the Associate Chair for Graduate Studies and three other faculty will provide advising. As the program grows, the Graduate Affairs committee roster will grow to maintain an approximately constant advising burden on faculty.

8.3. ☒ Confirm that major and named option advisor(s) have been consulted and reviewed this proposal.

9. Governance & Faculty

9.1. ☒ The named option must be governed by the same department or academic unit that oversees the major. Any sub-committee governing the named option must report to the faculty governance committee for the major.

9.1.1. If a sub-committee governs the named option, describe procedures including how faculty are identified and provisions for transitions in the committee.

N/A

9.2. List core faculty and staff with title and departmental affiliation(s).

Michael Arnold, Professor, MS&E
Susan Babcock, Professor, MS&E
Chang-Beom Eom, Professor, MS&E
Paul Evans, Professor, MS&E
Padma Gopalan, Professor, MS&E
Jiamian Hu, Assistant Professor, MS&E
Jason Kawasaki, Assistant Professor, MS&E
Sindo Kou, Professor, MS&E
Max Lagally, Professor, MS&E
Roderick Lakes, Professor, MS&E and Engineering Physics
Dane Morgan, Professor, MS&E
John Perepezko, Professor, MS&E
Donald Stone, Professor, MS&E
Izabela Szlufarska, Professor, MS&E
Paul Voyles, Professor, MS&E
Xudong Wang, Professor, MS&E

10. Fiscal Structure and Ongoing Commitment

10.1. Provide an overview of plans for funding the named option including but not limited to program administration, instructional/curricular delivery, technology needs, and program assessment.

All expenses will be covered by program revenue. Since the program is delivered in a face-to-face format, the differential costs related to delivery and technology are minimal and difficult to quantify. Assessment will be addressed within Materials Science and Engineering using the same processes to be employed for existing majors. These processes are being developed now.

10.2. How will the named option impact staffing needs beyond the immediate program? How are those needs being met?
The College of Engineering has added two full time staff members to assist with admissions and administration of named option programs. These are shared across several named options, so the costs to each individual program will be modest. Additional TAs and graders may be required to assist with individual courses. In some cases, new courses will be created and those costs will be born by the program. This will require sufficient enrollment to justify the costs and will not occur within the first few years. As staffing needs grow to support enrollment, tuition revenue will be used to fund that staff expansion.

*If there is no change in staffing, please describe how the duties of current employees will evolve to support this named option.*

10.3. For named options supported using non-pooled tuition, provide a fiscal annual summary including planned enrollment, estimated paid tuition, instructional costs, and estimated excess tuition available for reinvestment in keeping with the separate guidelines for non-pooled programs.
See attached

10.4. For graduate programs supported using pooled tuition, provide a plan for how new graduate students will be funded.
N/A

**Required attachments**

☐ Cover letter from the Dean of the school/college that will be the home of the named option

*When a proposal for a new named option is forwarded for approval, it will have a cover letter to the provost from the supporting dean.*

☐ Supporting letters/memos

*Proposals must be accompanied by letters or memos submitted by the chair or director of other academic units that have overlapping interest. These notes may comment on shared resources, competition for students or other ways in which the programs will interact surrounding the named option. This will include departments/schools/colleges, share a student audience, represent a closely related area of study, have overlapping faculty, or have program names that are similar.*

☒ Full curriculum including all required and elective courses

☐ For undergraduate named options, attach a four year roadmap.

☒ For graduate named options, attach a chart outlining minimum degree requirements and elements for satisfactory progress.

☒ Assessment plan

Named options supported using non-pooled tuition must attach:

☒ Core Criteria Checklist

☒ Additional Requirements Checklist

*See the current Non-pooled Program Requirements Process document posted at https://kb.wisc.edu/vesta/page.php?id=59300*
Curriculum for UW Master of Science Degree Program
Department of Materials Science and Engineering

Credits Requirement: 30

Suggested Course Credit Allocation:

- Summer Session 4 Credits
- Fall Semester 13 Credits
- Spring Semester 13 Credits

Degree/Major: M.S. Materials Science and Engineering

Named Option: Nanomaterials and Nanoengineering
Proposed Curriculum for Department of Materials Science and Engineering

Named Option: Nanomaterials and Nanoengineering

Course Requirements:

- 30 total credits
- MSE 350: Introduction to Materials Science, taken during first semester of enrollment (3 cr).
- MSE 900: Materials Research Seminar in both of the Fall and Spring semesters (1 cr. each, 2 cr. total)
- MSE 553: Nanomaterials and Nanotechnology (3 cr.)
- A minimum of 22 additional credits from the courses listed below.
  - At least 9 credits of the additional coursework must be at the graduate level.
  - At most 6 credits of MSE 601: Independent Study may be taken.

<table>
<thead>
<tr>
<th>Fall course offerings:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MS&amp;E 401 Special Topics (by instructor consent)</td>
<td>1-3 cr.</td>
</tr>
<tr>
<td>MS&amp;E 434 Introduction to Thin-Film Deposition Processes</td>
<td>3 cr.</td>
</tr>
<tr>
<td>MS&amp;E 448 Crystallography and X-Ray Diffraction</td>
<td>3 cr.</td>
</tr>
<tr>
<td>MS&amp;E 456 Electronic, Optical, and Magnetic Properties of Materials</td>
<td>3 cr.</td>
</tr>
<tr>
<td>MS&amp;E 521 Advanced Polymer Materials</td>
<td>3 cr.</td>
</tr>
<tr>
<td>MS&amp;E 530 Thermodynamics of Solids</td>
<td>3 cr.</td>
</tr>
<tr>
<td>MS&amp;E 570 Properties of Solid Surfaces</td>
<td>3 cr.</td>
</tr>
<tr>
<td>MS&amp;E 752 Advanced Materials Science: Phase Transformations</td>
<td>3 cr.</td>
</tr>
<tr>
<td>MS&amp;E 756 Structure and Properties of Advanced Electronic Materials</td>
<td>3 cr.</td>
</tr>
<tr>
<td>MS&amp;E 601 Independent Study</td>
<td>1-3 cr.</td>
</tr>
<tr>
<td>MS&amp;E 803 Special Topics in Materials Science (by instructor consent)</td>
<td>1-3 cr.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring course offerings:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MS&amp;E 401 Special Topics (by instructor consent)</td>
<td>1-3 cr.</td>
</tr>
<tr>
<td>MS&amp;E 421 Polymeric Materials</td>
<td>3 cr.</td>
</tr>
<tr>
<td>MS&amp;E 551 Structure of Materials</td>
<td>3 cr.</td>
</tr>
<tr>
<td>MS&amp;E 553 Nanomaterials and Nanotechnology</td>
<td>3 cr.</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>MS&amp;E 560</td>
<td>Fundamentals of Atomistic Modeling</td>
</tr>
<tr>
<td>MS&amp;E 601</td>
<td>Independent Study</td>
</tr>
<tr>
<td>MS&amp;E 748</td>
<td>Structural Analysis of Materials</td>
</tr>
<tr>
<td>MS&amp;E 760</td>
<td>Molecular Dynamics and Monte Carlo Simulations in Materials Science</td>
</tr>
<tr>
<td>MS&amp;E 803</td>
<td>Special Topics in Materials Science (by instructor consent)</td>
</tr>
</tbody>
</table>

**Summer course offerings:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS&amp;E 350</td>
<td>Introduction to Materials Science</td>
<td>3 cr.</td>
</tr>
<tr>
<td>MS&amp;E 601</td>
<td>Independent Study</td>
<td>1-3 cr.</td>
</tr>
</tbody>
</table>
Example Course Schedules

Example 1: Starting in a Fall semester

Fall semester:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 350: Introduction to Materials Science</td>
<td>3 cr</td>
</tr>
<tr>
<td>MSE 900: Materials Research Seminar</td>
<td>1 cr</td>
</tr>
<tr>
<td>Selected course #1</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #2</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #3</td>
<td>3 cr</td>
</tr>
<tr>
<td><strong>Total credits</strong></td>
<td><strong>13 cr</strong></td>
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</table>

Spring semester:

<table>
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<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 900: Materials Research Seminar</td>
<td>1 cr</td>
</tr>
<tr>
<td>MSE 553: Nanomaterials and Nanotechnology</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #4</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #5</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #6</td>
<td>3 cr</td>
</tr>
<tr>
<td><strong>Total credits</strong></td>
<td><strong>13 cr</strong></td>
</tr>
</tbody>
</table>

Summer term:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 601: Independent Study</td>
<td>4 cr</td>
</tr>
<tr>
<td><strong>Total credits</strong></td>
<td><strong>4 cr</strong></td>
</tr>
</tbody>
</table>

Example 2: Starting in a Summer semester

Summer term:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 350: Introduction to Materials Research</td>
<td>3 cr</td>
</tr>
<tr>
<td>MSE 601: Independent Study</td>
<td>4 cr</td>
</tr>
<tr>
<td><strong>Total credits</strong></td>
<td><strong>7 cr</strong></td>
</tr>
</tbody>
</table>

Fall semester:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 900: Materials Research Seminar</td>
<td>1 cr</td>
</tr>
<tr>
<td>Selected course #1</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #2</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #3</td>
<td>3 cr</td>
</tr>
<tr>
<td><strong>Total credits</strong></td>
<td><strong>10 cr</strong></td>
</tr>
</tbody>
</table>
Spring semester:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 900: Materials Research Seminar</td>
<td>1 cr</td>
</tr>
<tr>
<td>MSE 553: Nanomaterials and Nanotechnology</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #4</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #5</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #6</td>
<td>3 cr</td>
</tr>
<tr>
<td>Total credits</td>
<td>13 cr</td>
</tr>
</tbody>
</table>

Example 3: Continuing UW-Madison MSE undergraduate

Count credits from undergraduate coursework:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 351: Materials Science – Structure and Property Relations in Solids</td>
<td>3 cr</td>
</tr>
<tr>
<td>MSE 330: Thermodynamics of Materials</td>
<td>4 cr</td>
</tr>
<tr>
<td>Total credits</td>
<td>7 cr</td>
</tr>
</tbody>
</table>

Fall semester:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 900: Materials Research Seminar</td>
<td>1 cr</td>
</tr>
<tr>
<td>Selected course #1</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #2</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #3</td>
<td>3 cr</td>
</tr>
<tr>
<td>Total credits</td>
<td>10 cr</td>
</tr>
</tbody>
</table>

Spring semester:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 900: Materials Research Seminar</td>
<td>1 cr</td>
</tr>
<tr>
<td>MSE 553: Nanomaterials and Nanotechnology</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #4</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #5</td>
<td>3 cr</td>
</tr>
<tr>
<td>Selected course #6</td>
<td>3 cr</td>
</tr>
<tr>
<td>Total credits</td>
<td>13 cr</td>
</tr>
</tbody>
</table>
**Materials Science and Engineering**

**MINIMUM DEGREE REQUIREMENTS & SATISFACTORY PROGRESS**

*Schools/Colleges, Departments and Programs may set more rigorous expectations and requirements than the Graduate School*

- If describing multiple degree plans at the same level (M.A. and M.S.) or multiple named options and tracks within a plan, indicate requirements for all plan variations.
- Please note that “Example” in the chart provides an example of policy – but is not necessarily reflective of Graduate School’s policy. For the actual Graduate School policies, you may consult the Graduate School Degree Requirements chart at http://grad.wisc.edu/catalog/degreq_criteria.htm to ensure program compliance with Graduate School degree requirements.
- If the program policy aligns with Graduate School degree requirements, please reiterate the policy in your program’s degree requirement chart – do not simply provide “Follow Graduate School Policy”.
- Programs are responsible for monitoring more restrictive requirements.

| Master's Degrees: Master of Science, Nanomaterials and Nanoengineering Option |
|---|---|
| **Minimum Graduate Degree Credit Requirement** | 30 credits |
| **Minimum Graduate Residence Credit Requirement** | 16 credits |
| **Minimum Graduate Coursework (50%) Requirement** | At least 50% of credits applied towards the graduate degree credit requirement must be in graduate-level coursework |

**Prior Coursework Requirements:**

- **Graduate Work from Other Institutions**
- **UW-Madison Undergraduate**
- **UW-Madison University Special**

- With program approval, students are allowed to count graduate coursework from other institutions toward the minimum graduate degree credit requirement and the minimum graduate coursework (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. Course work earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

- With program approval and payment of the difference in tuition (between Special and graduate tuition), students are allowed to count

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*Please note that “Example” in the chart provides an example of policy – but is not necessarily reflective of Graduate School’s policy. For the actual Graduate School policies, you may consult the Graduate School Degree Requirements chart at http://grad.wisc.edu/catalog/degreq_criteria.htm to ensure program compliance with Graduate School degree requirements.*
up to 15 credits of coursework numbered 300 or above taken as a UW–Madison Special student toward the minimum graduate residence credit requirement and, the minimum graduate degree credit requirement; if that coursework is numbered 700 or above it may be used to satisfy, and the minimum graduate coursework (50%) requirement.

<table>
<thead>
<tr>
<th>Credits per Term Allowed</th>
<th>15 credits allowed per semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program-Specific Courses Required</td>
<td>No</td>
</tr>
<tr>
<td>Overall Graduate GPA Requirement</td>
<td>3.00</td>
</tr>
<tr>
<td>Other Grade Requirements</td>
<td>The Graduate School requires an average grade of B or better in all coursework (300 or above, not including research credits) taken as a graduate student unless conditions for probationary status require higher grades. Grades of Incomplete are considered to be unsatisfactory if they are not removed during the next enrolled semester.</td>
</tr>
<tr>
<td>Probation Policy</td>
<td>Probation Policy</td>
</tr>
<tr>
<td>Advisor / Committee</td>
<td>Every graduate student is required to have an advisor. An advisor is a faculty member from the major department responsible for providing advice regarding graduate studies. In many cases, an advisor is assigned to incoming students. To ensure that students are making satisfactory progress toward a degree, the Graduate School expects them to meet with their advisor on a regular basis.</td>
</tr>
<tr>
<td>Assessments and Examinations</td>
<td>No formal examination required.</td>
</tr>
<tr>
<td>Time Constraints</td>
<td>Master's degree students who have been absent for five or more consecutive years lose all credits that they have earned before their absence. Individual programs may count the coursework students completed prior to their absence for meeting program requirements; that coursework may not count toward Graduate School credit requirements.</td>
</tr>
<tr>
<td>Language Requirements</td>
<td>No language requirements.</td>
</tr>
</tbody>
</table>
Assessment Plan – M.S. Degree Programs in the College of Engineering

Whether program personnel decide to paste information into this template or to utilize a pre-existing document, all bolded items must be included and clearly labeled.

Identifying Information
School/College: College of Engineering
Graduate Degree/Major Program Name: Materials Science and Engineering, Option: Nanomaterials and Nanoengineering
Graduate Degree Level (M.S., M.A., Ph.D., DMA, etc.): M.S.
Faculty Director Contact/Title: Xudong Wang, Associate Chair for Graduate Study
Primary Contact Information: acgs@mse.wisc.edu; 608-890-2667

Student Learning Outcomes (What)
Assessment of graduate-level learning outcomes is one of the many ways in which our campus ensures the integrity of its degrees and the quality of the student experience. List the graduate student learning outcomes for this academic degree program below. Feel free to add rows if the academic degree program has more than five learning outcomes. The student learning outcomes that have been submitted for your academic degree/major program can be found in the Guide.

Student Learning Outcomes

1. Demonstrate a strong understanding of mathematical, scientific, and engineering principles in the field.
2. Demonstrate an ability to formulate, analyze, and solve advanced engineering problems.
3. Demonstrate creative, independent problem solving skills.
4. Apply the latest scientific and technological advancements, advanced techniques, and modern engineering tools to these problems.
5. Recognize and apply principles of ethical and professional conduct.

Plan for Assessing Each Student Learning Outcome
For each of the degree major/program student learning outcomes, indicate how the program plans to assess whether or not students are meeting the expectation, as well as when each learning outcome will be assessed. Keep in mind that each academic degree program is expected to engage in at least one assessment activity per year and assessment activities, in total, must include one direct assessment method. While programs do not need to assess each learning outcome every year, all learning outcomes must be assessed within a period of three years.

<table>
<thead>
<tr>
<th>Assessment Planning (How)</th>
<th>Learning Outcome #1</th>
<th>Learning Outcome #2</th>
<th>Learning Outcome #3</th>
<th>Learning Outcome #4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method for assessing learning (at least one direct method required)</td>
<td>The student’s academic advisor will collect their advisees’ course work performance and complete the College's learning goals checklist before the end of the semester in which the degree is completed.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Timetable for assessment activity (at least one activity each year; all outcomes reviewed in a 3-year cycle) | Annually  
Data collected at the end of every semester (via the learning goals checklist) will be compiled in aggregate form and reviewed annually. |

*For examples of direct and indirect methods of assessment, see the UW Madison Assessment website*  
You may elect to copy and paste this table multiple times if your program has more than five learning outcomes.

Also provide answers to the following questions as part of your assessment plan.

1. **Who is responsible for assessment?** (identify an individual or team who will coordinate the implementation of the plan on an annual basis):  
The department graduate program coordinator (staff) will remind all faculty members serving as M.S. named option advisors to complete the learning goals checklist at the end of the semester in which the degree is completed. The student's advisor (faculty) is responsible for completing the learning goals checklist and submitting it to the department associate chair for graduate study (ACGS). The ACGS will compile and summarize the department's learning goals assessment data on an annual basis.

2. **What is the plan for review of the assessment information?** (typically during an annual meeting of the program faculty and staff; note that at this meeting the program may want to review enrollment information, course progression, degree completion, and other structural features of the student experience in addition to the evidence about student learning):  
The ACGS will provide assessment updates, lead the discussion and review the assessment date at a faculty meeting once a year and report the program assessment results – both the data summary and any recommendations -- to the Dean's Office. The Dean's Office will present all program assessment reports to the College Academic Planning Council (APC).

3. **What is the plan for production of an annual summary report?** (the annual summary report includes the materials that form the basis of discussion at the annual meeting of the program faculty and staff, along with any recommendations made after considering the student learning assessment information presented):  
The Dean's Office will compile an annual College-wide summary report consisting of the individual reports from each CoE graduate program and a brief statement of any additional recommendations provided by the CoE APC.

4. **How will recommendations be implemented?** (explain the general process by which recommendations will be implemented):  
The annual College-wide summary report, including any APC recommendations, will be shared with each ACGS or graduate program assessment coordinator (GPAC) for implementation in individual programs.
Graduate Degree Program Curriculum Mapping Worksheet *(Where)*

This worksheet, or similar document, must be included with the submission of the program’s assessment plan.

- **Learning Outcomes** – Enter the academic degree program learning outcomes identified in the assessment plan on the top row of the following chart. Feel free to add columns if the academic degree/major program has more than five learning outcomes.
- **Degree/Major Program Courses/Experiences** – List all degree requirements (in some cases co-curricular experiences may also be included). Feel free to add rows as needed.
- Indicate with a check (X) where the course or learning experience contributes to each of the learning outcomes. Courses may contribute to multiple learning outcomes.

<table>
<thead>
<tr>
<th>Curriculum Map <em>(Where)</em></th>
<th>Learning Outcome #1</th>
<th>Learning Outcome #2</th>
<th>Learning Outcome #3</th>
<th>Learning Outcome #4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Degree Program Required Courses or Experiences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M.S. coursework</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research or project experience</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Culminating report and/or presentation</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

*Add additional rows as needed to capture all requirements.

Minimally, all of the courses/experiences required to complete the major degree program should be listed. Optionally, elective courses may be included in addition to the required courses.

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Please email your program’s Assessment Plan Template and Curriculum Map Worksheet to regina.lowery@wisc.edu by July 1, 2016.

For Undergraduate Degree Program Assessment Plan Template, see the UW Madison Assessment website. [https://assessment.provost.wisc.edu](https://assessment.provost.wisc.edu)
Budget

Master of Science in Materials Science and Engineering
Nanomaterials and Nanoengineering Option

In the first year, this program will only enroll approximately 5 students. Hence, impact on existing programs will be minimal and the differential instructional costs will be minimal. As the program grows in enrollment, we anticipate hiring some additional TAs from the revenue generated by this option to ensure that there is no impact on existing programs. We anticipate needing to add additional some staff and faculty fractional appointments to assist administratively and in an advisory capacity. Some administrative activities will be handled centrally by the College of Engineering, but activities like summer instruction will be funded from program revenue.

Summary Budget

<table>
<thead>
<tr>
<th>Summary Budget</th>
<th>Year 1</th>
<th>Year 2</th>
<th>On-going</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Tuition/Student/Year</td>
<td>$27,000</td>
<td>$27,000</td>
<td>$27,000</td>
</tr>
<tr>
<td>Gross Revenue</td>
<td>$135,000</td>
<td>$270,000</td>
<td>$540,000</td>
</tr>
</tbody>
</table>

| **Expenses**   |        |        |          |
| University Assessment (10%) | $13,500 | $27,000 | $54,000 |
| Engineering College (20%)* | $27,000 | $54,000 | $108,000 |
| Additional TA Support | $5,000 | $5,000 | $10,000 |
| Department Staff Support  | $10,000 | $10,000 | $30,000 |
| Faculty Support | $15,000 | $25,000 | $45,000 |
| **Total Expenses** | $70,500 | $121,000 | $247,000 |

| **Net Revenue** | $64,500 | $149,000 | $293,000 |

*Estimated. Includes centralized administration, student services, marketing and recruitment.
APPENDIX A.  CORE CRITERIA CHECKLIST
FOR ACADEMIC PROGRAMS WITH NON-POOLED TUITION

1. New and Additional Student Enrollments to Support Program Costs
   ☑ The program must bring in NEW and ADDITIONAL students. Overall enrollment in all other school/college programs must not be eroded. The program cannot compete with or draw students away from existing programs that support the central tuition pool.
   ☑ Faculty/staff must plan for sufficient enrollments to have enough tuition to cover instructional, direct student support costs, and any other fixed or required costs. Experience shows that enrollments of at least 30 students are necessary to have enough tuition to meet direct program costs.
   ☑ School/college Budget Officers must be involved in planning and must approve plans and budgets for these programs before the program is submitted to the school/college APC for academic approval.

2. Designed for Non-Traditional Students
   ☑ Has an applied, practice-oriented curriculum, or integrates practice with theory
   ☑ Is offered in a modality that allows non-traditional audiences to attend (evening, weekend, online, intensive, or some combination)
   ☑ Has demonstrated a workforce demand for the program graduates
   ☑ Has defined learning goals that are oriented to market considerations
   ☑ Has a clearly defined curriculum that is “self-contained”, meaning that program students are confined only to courses from the approved, prescribed curriculum
   ☑ Has a clearly defined (often lockstep) curriculum with few options or electives that follows a predictable timeline for offerings and completion

3. Distinctly Identifiable Program (Code) With Governance Approval
   ☑ The program must be distinctly identifiable in the student record system, either as a degree/major or as an option of a degree/major, or as a Capstone certificate.
   ☑ The program must develop a proposal for the academic approval process, during which it must demonstrate that the school/college Dean and Budget Officer are aware and supportive of the program being run on a non-pooled tuition model.
APPENDIX B. ADDITIONAL REQUIREMENTS CHECKLIST
FOR ACADEMIC PROGRAMS WITH NON-POOLED TUITION

Use this checklist in conjunction with the Core Criteria Checklist

If core criteria are met, the program must adhere to the additional requirements below.
Note: Not all new programs are suited for the non-pooled program requirements. New programs that seek to take advantage of a wide range of course and curricular/program offerings on campus and are not market-oriented should be developed under traditional (101) pooled tuition funding models.

1. **Fiscal Requirements:**
   - School/college budget officer has approved the budget and fiscal plan.
   - School/college dean and budget officer are committed to assuming fiscal responsibility for costs not covered by non-pooled tuition to the program. The school/college will back up the budget with a commitment to cover any costs not met from tuition from other sources.
   - The program structure fits within standard academic administrative structures and allocates expenses of the program so that the program does not create additional burdens on traditional/101 program resources or student services such as advising, ESL, Registrar’s Office, Bursar’s Office, Graduate School and other support services.
   - Programs have two options for tuition. One option is to charge standard graduate tuition according to the UW-Madison tuition schedule. This includes standard rates for WI resident, MN, and non-resident students and any compulsory fees that apply. Or, for fully online programs, they have the option of charging all students one of tuition tiers (Appendix D). Although not currently allowed, it is potentially possible in the future the tiered tuition may be available to face-to-face programs.
   - Because students who have graduate assistantships receive tuition waivers, some non-pooled tuition graduate degree programs choose to prohibit students from accepting a graduate assistantship (RA/TA/PA). If a program allows their students to take graduate assistantships they it must forgo the tuition revenue. To ensure full receipt of non-pooled tuition and to counter challenges from students, the program must adhere to the following:
     - The program faculty/staff must disclose this program policy to students in the recommendation of admission letter, program website, program handbook, and program orientation.
     - Please see Appendix E for links and Appendix F for a sample of a specific non-pooled program template for a recommendation of admission letter and a general template for a program handbook. The program faculty/staff must provide details on this and any other program policies the program handbook in at least the following areas: satisfactory progress (good standing) requirements, any ways to return to good standing, and a program grievance process if done does not already exist.
2. **Requirements for International Students:**

- Programs may not admit students who need ESL services without building sufficient ESL support into their fiscal model, and having an explicit MOU with the ESL provider about funding to support the ESL services.
- Graduate degree/major programs must use Graduate School standards for English Proficiency. Capstone certificates should be designed so that admission requirements ensure that ESL support is not needed.
- If the program is NOT completely online and admits international students, the program is responsible for honoring federal visa regulations related but not limited to: length of stay requirements for visa requests, online course restrictions for visa holders, and waiting for federal program approval (up to a year) if the program represents a new degree type or capstone certificate previously not offered at UW-Madison.

3. **Requirements for Program/Course Enrollment:**

- Non-pooled tuition program students can only be enrolled in one program at a time; enrollment in a second major, named option, certificate program, or courses beyond the prescribed program curriculum is not permitted. Non-compliance with this requirement will jeopardize the receipt of tuition for a non-pooled program. Regular audits will be conducted to ensure these requirements are met.
- To ensure full receipt of non-pooled program tuition and to counter challenges from students who want to be dually enrolled, the program must adhere to the following:
  - The program must provide information to students about prohibitions on concurrent program enrollment and out-of-program course enrollment. Programs must note this in recruiting materials, in recommendations of admission, on the program website, program handbook, and program orientation.
  - Please see Appendix E for links and Appendix F for language for a specific non-pooled program template for a recommendation of admission letter and a general template for a program handbook. The program faculty/staff must provide details on this and any other program policies in the program handbook in at least following areas: satisfactory progress (good standing) requirements, ways to return to good standing, and a program grievance process if one does not already exist.
  - The program communicates to students each semester prior to course enrollment the expectation that students can enroll only in program courses and not in courses outside the approved, prescribed curriculum.
  - For students who enroll in the non-pooled program and then decide they want to pursue traditional/101 programs that allow dual enrollment, the program must help the student transfer to a different program(s) that allow such activity.
October 23, 2017

TO: Sarah Mangelsdorf, Provost
    William Karpus, Dean, Graduate School

FROM: James P. Blanchard, Executive Associate Dean

RE: Proposed Program Change:
    Master of Engineering in Civil and Environmental Engineering-Envr Engr Option to Master of Science in Civil and Environmental Engineering-Envr Engr Option

At its October 18, 2017 meeting, the College of Engineering Academic Planning Council (APC) unanimously supported the proposed program change of the Master of Engineering in Civil and Environmental Engineering-Environmental Engineering Option to Master of Science in Civil and Environmental Engineering-Environmental Engineering Option.

The proposed program change will align with similar programs at peer institutions. Additional rationale for the program change is included in the attached proposal.

On behalf of the College of Engineering, I accept the recommendation of the APC and support the proposed program change.
Degree Name Change Proposal

Date: October 26, 2017
To: Graduate Faculty Executive Committee
From: David Noyce, Chair, Civil and Environmental Engineering (CEE)
      Michael Doran, Program Academic Director
Re: Proposed change of degree name to “Master of Science”

This proposal is to change the program name:
From: Master of Engineering in Civil and Environmental Engineering – Environmental Engineering Option
To: Master of Science in Civil and Environmental Engineering – Environmental Engineering Option

The reasons for proposing this change are presented. It is intended that the information provided meet the requirements of “Guidelines for Renaming Degrees or Academic Majors” adopted by the UAPC, May 2002.

History of Degree

The degree program was approved in 2015, with the first students admitted to the program for Fall, 2015. From an original group of eight students, the program has grown so that there are now twenty-seven students in the program, with the first group scheduled to graduate in May of 2018. Originally, EPD managed business operations for the degree and CEE managed academics and was the academic home. Since July 1, 2017, both business and academic operations for the degree programs are housed in CEE.

Although conceived by CEE as a MS degree, in part based on the required “Body of Knowledge” developed for MS degrees in environmental engineering by the American Academy of Environmental Engineers (AAEE)\(^1\), it was originally approved by the university as one of several online master of engineering (MEng) degrees to be managed by the College of Engineering’s (COE) Department of Engineering Professional Development (EPD). In general, MEng degree programs tend to be more focused on applied engineering practice rather than on advanced technical comprehension founded on core science as are MS degree programs.

Reasons for Degree Name Change

Several reasons exist that support the name change:

1. The degree requirements are consistent with those of the recently named option program: Master of Science in Civil and Environmental Engineering – Environmental Science and Engineering option. The courses within the online program are taught with the same rigor and advanced technical foundation as those for the on-campus program.
2. Other online master’s degrees within the college of engineering\(^2\), having their academic home in Mechanical Engineering and Electrical and Computer Engineering, use the MS designation for their master’s degrees.
3. The current program students support this change.

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\(^1\) AAEE is the body responsible to ABET, Inc., for the accreditation of environmental engineering degree programs.

\(^2\) Electrical Engineering: Power Engineering, and Mechanical Engineering: Controls
4. Similar programs at other leading universities have the MS designation.
5. The program curriculum was developed to meet the learning goals of MS programs in environmental engineering as prepared by the American Academy of Environmental Engineers and Scientists, the organization within ABET, Inc., that accredits environmental engineering programs.
6. The learning goals for the program align with those of a MS program, as described in “Proposed Graduate Learning Goals for College of Engineering (3/2/16 draft).”
7. The program has received some negative feedback from potential program applicants and employers questioning whether a Master of Engineering program is as rigorous as a Master of Science program, and the potential implications of that for career advancement. This name change may therefore help increase student enrollment in the program, and confidence by employers in providing tuition assistance for their employees in the program.

Timing of Change

This is a fully online program, requiring about three academic years for students to meet graduation requirements. The first students were admitted for the Fall 2015 semester, and this group of students will graduate in the Spring of 2018. It is proposed that the change be in place well in advance of this time so that the first program graduates can receive the MS degree designation. Current students, should they desire, may receive the MEng rather than the MS degree designation, although no students have indicated that they wish the MEng degree designation. Once the change is approved, The Department of Civil and Environmental Engineering will list and market this program as an MS degree, and students joining or re-entering the program following approval of the change will receive an MS degree on graduation. It is requested that approval for the degree name change be granted prior to the start of the Spring 2018 semester.

Similarly Named Degrees and Potential Degree Name Overlap

The Department of Civil and Environmental Engineering offers three master’s degrees in environmental engineering or allied concentration areas.

**Master of Science in Civil and Environmental Engineering**
An “in residence” student may be awarded this degree after completing a course of study in a specialty area. There are numerous specialty areas, including environmental engineering. This program includes a thesis option, as well as an independent research and report option. There is no “course only” option available. Students in the program pay the standard graduate school tuition rates.

**Master of Science in Civil and Environmental Engineering – Environmental Science and Engineering Option**
This “in residence” degree program was recently approved. It is an accelerated “course only” program and does not include a thesis option. Students in this program pay tuition in accordance with a standard fee per semester schedule, having somewhat higher tuition for non-WI/MN residents.

**Master of Engineering in Civil and Environmental Engineering – Environmental Engineering Option**
This is the degree where the name change is requested, with the first three words in the degree name being replaced with “Master of Science.” This degree program is principally distinguished from the other two “in residence” master’s programs (described above) in that the program is offered fully online. Students may meet
program requirements by taking 30 credits of coursework within a prescribed curriculum, or by customization of the program to meet their particular career goals. Customization may include up to six credits of mentored independent study. A thesis option is not available. The program has a “flat rate” tuition model, with current tuition set at $1,300 per credit. The program is clearly separable from the other two programs (above) due to:

1. The program is a totally online program rather than an “in residence” program like the others.
2. The program has a different tuition schedule than the other two programs.
3. The program has a different governance, application and admission process.
4. The program is a named option (unlike the first program above), but excludes “Science and” from the option name (as compared with the second program above), focusing on environmental engineering. Although several environmental science courses are available to students, students cannot focus in their individual program primarily on environmental science as is the case with the second program above.
5. College of Engineering and Department of Civil and Environmental Engineering web pages, and other materials for describing available master’s programs will accentuate the program differences, to minimize the potential for students applying to the wrong program.
6. The online graduate school application drop-down menu, where prospective students choose the program(s) to apply to, currently clearly indicates that the subject program is online (online is in parentheses on the drop-down page). This should be continued to minimize potential confusion to applicants in filling out the application.

Readiness of Students to Adopt Degree Name Change

Students in the program were asked if they supported the proposed change, and overwhelmingly voiced their approval of the change.

Delivery and Tuition Pool Status

The current method of course delivery for the program (fully online), curriculum and learning goals, tuition pool (131-nonpooled) status, and tuition rate ($1,300 per credit for all students) are to remain unchanged.

Current Degree Name Status

Following authorization of the name change by the university, the current degree name will no longer be used for this degree program. Students currently admitted to the program will be offered the choice of the present (Master of Engineering) degree designation on graduation should they choose this name in favor of the proposed new name (Master of Science). As previously stated, students in the program favor the proposed new degree name.
Approvals History

This proposal has been previously approved by:

- The executive committee for the degree program (July 20, 2017) – A copy of meeting minutes is attached (Item 4).

- The faculty of the Department of Civil and Environmental Engineering (September 12, 2017) – A copy of meeting minutes is attached (Item 2).

- The College of Engineering Academic Planning Council (October 18, 2017) – a copy of a supportive memorandum from James P. Blanchard, Executive Assoc. Dean of the College of Engineering dean is attached.
<table>
<thead>
<tr>
<th>Plan Code</th>
<th>Degree Type</th>
<th>Report Transcript Description</th>
<th>Subplan Description</th>
<th>Admitting Status</th>
<th>Budget Model</th>
<th>Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS 175EGR</td>
<td>MS</td>
<td>Civil and Environmental Engineering</td>
<td></td>
<td>A</td>
<td>Non-Pooled</td>
<td>On-Campus Accelerated</td>
</tr>
<tr>
<td>MS 175EGR</td>
<td>MS</td>
<td>Civil and Environmental Engineering</td>
<td>Construction Engr &amp; Mgmt</td>
<td>A</td>
<td>Non-Pooled</td>
<td>On-Campus Accelerated</td>
</tr>
<tr>
<td>ME 175EGR</td>
<td>M Eng</td>
<td>Civil and Environmental Engineering</td>
<td>Environmental Engineering</td>
<td>A</td>
<td>Non-Pooled</td>
<td>Online</td>
</tr>
<tr>
<td>MS 175EGR</td>
<td>MS</td>
<td>Civil and Environmental Engineering</td>
<td>Environmental Science and Engr</td>
<td>A</td>
<td>Non-Pooled</td>
<td>On-Campus Accelerated</td>
</tr>
<tr>
<td>MS 175EGR</td>
<td>MS</td>
<td>Civil and Environmental Engineering</td>
<td>Geological/Geotechnical Engr</td>
<td>A</td>
<td>Non-Pooled</td>
<td>On-Campus Accelerated</td>
</tr>
<tr>
<td>MS 175EGR</td>
<td>MS</td>
<td>Civil and Environmental Engineering</td>
<td>Structural Engineering</td>
<td>A</td>
<td>Non-Pooled</td>
<td>On-Campus Accelerated</td>
</tr>
<tr>
<td>MS 175EGR</td>
<td>MS</td>
<td>Civil and Environmental Engineering</td>
<td>Transportation Engineering</td>
<td>A</td>
<td>Non-Pooled</td>
<td>On-Campus Accelerated</td>
</tr>
<tr>
<td>MS 175EGR</td>
<td>MS</td>
<td>Civil and Environmental Engineering</td>
<td>Water Resources Engineering</td>
<td>A</td>
<td>Non-Pooled</td>
<td>On-Campus Accelerated</td>
</tr>
<tr>
<td>MS 465EGR</td>
<td>MS</td>
<td>Geological Engineering</td>
<td></td>
<td>A</td>
<td></td>
<td>On-Campus</td>
</tr>
</tbody>
</table>
Three-Year Check-In for New Programs – Environmental Conservation MS

The creation and maintenance of graduate programs and certificates represents significant resource commitments by faculty and staff. Given these investments, in 2014 the Graduate Faculty Executive Committee (GFEC) established a “check in” process for newly approved programs and certificates prior to their first formal university review (which occurs in the fifth year.) Through this “check-in,” the GFEC hopes program faculty and staff will assess the implementation of their new program and determine what mechanisms may be needed for sustained student success.

Progress reports will be included on GFEC agendas, and program representatives may be asked to attend GFEC if additional information is requested. In the interest of brevity, please keep responses to 300 words or less.

Program Name
Environmental Conservation

Term of First Enrollments
2014

Check-In Completed By
Janet Silbernagel / Meghan Kautzer

Date Completed
September 27, 2017

Academic Quality and Student Success

1. Provide an update on any changes to the program’s curriculum and learning outcomes. Include a description of the program’s typical course modalities (face-to-face, online, asynchronous discussion, team or individual assignments) and if courses have evolved based on faculty or student feedback.

The EC program is a blended curriculum, including face to face courses on campus during the first 2-semesters, distance (online) courses in semester 3 (with asynchronous and in-person discussion), and MS project placements in semester 4 (32-credits over 4-semesters). There are no changes to our learning outcomes, and our assessment plan was created and approved after the start of the program on 6/28/16. Based on student feedback and more logical sequencing, we moved our Conservation of Biodiversity (ES 951) course to semester 1, to cover this fundamental knowledge early in the program, and ahead of Conservation Planning (ES 972), which we moved to semester 2. With the 4-credit ES 972 in semester 2, we reduced the options for Biol/Ecol and Social Systems to 3 credits each during this term. To fill the space vacated by ES 951 in semester 3, we now require 6 credits of Tools Topics during semester 3 (Appendix #1).
2. Briefly explain the program’s learning outcomes assessment plan and discuss how you are or how you plan to evaluate student learning. Summarize any data collected to date showing evidence of student learning.

Our learning outcomes assessment plan (Appendix #2) includes several methods of assessment. Initially, we developed a curriculum map that is revised as needed based on our methods of assessment. Every year we conduct both exit seminar surveys (completed by EC staff, advisors, faculty, and public attendees of student exit seminars), as well as an evaluative questionnaire to the MS project placement host supervisor (unaffiliated with the program). The exit seminar survey is meant to indirectly assess all five learning outcomes, and the questionnaire includes questions to reveal successes and failures of the students’ learning outcomes, of which we average the scores to produce a program-wide assessment. Every three years, we organize a focus group designed to address one to five of the learning outcomes, focusing the conversation to reveal successes/failures of learning outcome achievements. We invite past graduates of the EC program to participate in this 3-year survey, with an effort to balance in-state/out-of-state representation, as well as age, gender, and cultural diversity. Finally, we continuously evaluate students’ leadership placement reports, their culminating reflection and presentation of their learning as it pertains to learning outcomes. Appendix #3 (attached to this review) summarizes our MS placement host supervisor data from our most recent graduating cohort (August 2017). We are now aggregating all data collected to date for the Environmental Conservation MS in preparation for our 5-year review, which we will begin this fall (2017).

3. The GFEC is interested to learn how departments balance faculty and staff teaching loads and responsibilities between new and existing programs. Discuss how the department or program is achieving balance, and what challenges supporting multiple programs may have created for teaching, student services, advising or funding. Also of interest is information on what if any assets are shared between programs, or additional benefits that have been realized.

As a non-pooled program, EC budgets for all staff time (two FTE, one .5 FTE, one .6 FTE for EC) and the proportion of faculty time dedicated to run the program from 131 tuition revenue. EC has an exceptionally high level of student services through our Professional Programs office with accessible, quality program staff paid with non-pooled revenue. Faculty who teach courses taken by students in the EC program outside of Nelson Institute offerings are compensated through a department offset payment, supported by MOU’s between the EC program and relevant campus units. Staff who teach courses for the program are directly compensated. The program supports 6 Nelson TA’s for Environmental Studies courses dedicated to the program. These TAs provide support for research graduate students directly, and for their advisors who may not have RA support.

One challenge we face is finding enough willing, accessible faculty advisors each year for ~25 professional Masters students.
4. Please describe how your program has ongoing and broad faculty commitment, including governance, to ensure its continued success. If applicable, reflections from faculty and staff can be included here or as an appendix. Also consider if implementation of this program is supporting the Department and/or School/College’s current strategic goals.

The EC program has had an active program committee since before its inception in 2014. The program committee meets at least twice a year to hear updates on program, including enrollment, placements, budget, etc., and to make decisions on curricular changes and new program options. Most program committee members help review applications for admission annually. Many committee members regularly advise students. Several committee members are Academic Staff with Graduate Faculty status (e.g. Faculty Associate) rather than tenured/track faculty. This presents challenges at times, yet also allows for more participation in our program (especially on student advising), which is helpful. The Nelson Institute’s current core values are to promote interdisciplinary scholarship, display a commitment to a liberal arts and professional education, build community partnerships, and act as a catalyst for interdisciplinary collaboration on environmental initiatives, including governmental, private, and non-profit entities. The EC program supports every one of these core values and goals by addressing complex environmental issues through instruction in hard sciences, social sciences and humanities; professional development seminars; engagement with community and global partners throughout instruction; and the culminating placement project with local and international governmental, private, or non-profit host organizations.

Operations and Administration

5. Illustrate how the program has either brought in NEW and ADDITIONAL students (required for non-pooled programs), and/or how overall enrollment in your related programs has remained steady. If unanticipated overlap with existing programs has resulted, discuss steps to mitigate the overlap.

EC experienced steady enrollment over 4 cohorts (25, 21, 26, 25 respectively), compared with declining enrollment in the old Conservation Biology & Sustainable Development (CBSD) program. As of 2014 no new CBSD student were admitted at the Nelson Institute, while the Environment & Resources research MS program has maintained stable enrollment.

**CBSD (MS) total students in program:**
- Fall 2011: 24
- Fall 2012: 18
- Fall 2013: 18
- Fall 2014: 8
- Fall 2015: 2
- Fall 2016: 0

**ER (MS/PhD) total students in program:**
- Fall 2011: 102
- Fall 2012: 117
Fall 2013: 120
Fall 2014: 120
Fall 2015: 104
Fall 2016: 101

E&R has reduced its numbers to a more manageable amount based upon staff capacity, and on the recommendation of an E&R program review committee. There is no unanticipated overlap between these programs. Prospective students expressing interest in research or continuing on to a PhD are directed to programs such as E&R, Botany, Zoology, or Landscape Architecture MS programs.

6. Funding Considerations

a. For traditional/pooled programs – How is the program successfully funding its students?
   • NA

b. For non-pooled programs – Provide a brief summary of projected vs. actual revenues and expenses. Does the program have sufficient enrollment for sustainability? Discuss the current market outlook compared to the original marketing study, and plans to grow or change the program to become sustainable. Since students started in the program in June 2014, the EC budget has stayed in the black. We implemented and use an overlapping cohort Fiscal Year budget and expense tracking system. Beginning in 2016, we budgeted for the 131 assessment (10%), which was charged to the program for the 1st time FY 2017. The program has sustained enrollment around 25 each year (25, 21, 26, 25). As such, the program has sufficient enrollment for sustainability. Our marketing plan has worked and we continue to identify new areas of opportunity based upon trends in our sector. Because our program cohorts overlap every summer (one cohort is in their final semester and one cohort is in their first semester) we have, at times, had to pay expenses in 1-fiscal year that we budget for the following fiscal year. This is not a problem for our program, and we keep strong records of our expenses, but at times this puts our budgets temporarily in the red at the very end of a fiscal year.

7. If the program admits international students, describe how program processes address length of stay visa issues, online course restrictions, and needing ESL services.
   Because the EC program only requires that students be on campus for the first 2-semesters of the program, we had to work on non-standard length visas. Through consultation with ISS and the Graduate School we successfully secured 8-month visas for our students who can only stay in Madison for the first 2-semesters of our program (we also have students who stay in the US for 3-semesters, or all 4-semesters). Good communication with ISS and the Graduate School help us maintain these different visa lengths.
To address online course restrictions (i.e. maximum number of online courses per semester for international students in the US), we added a focused, mandatory weekly in-person discussion section to the spring distance learning term for international students who stay on campus. This discussion session is optional for US students. We offer and pay for ESL services for EC students requiring ESL in the first summer semester. Our summer ESL course is a DCS supported course with conversational English and writing improvements as the focus of their learning goals. ESL support extends into the Fall semester if student requires it (we have MOU’s with the UW-Madison ESL program for fall term).

8. Are there any issues impacting the program’s long-term sustainability? If so, what support would you like to help you succeed?
Yes – faculty advising. We are working to create some sort of career incentives (not just pay) for them. We would like support in identifying what potential career incentives may be for participating faculty advisors.
Environmental Conservation Professional Masters Program

Where Conservation Leadership Begins

<table>
<thead>
<tr>
<th>Begins 2014</th>
<th>Summer Conservation Institute</th>
<th>Fall On-campus intensive</th>
<th>Spring Distance</th>
<th>Summer Leadership Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 mo. program</td>
<td>Envir Cons Leadership -974, 975 (2 cr) Cons Planning -972 (4 cr) Envir Policy - 843 (3 cr) 9 cr</td>
<td>Cons Prof Practice -976 (1 cr) Biology / Ecology (3-6 cr) Social Systems / Sustainability (3-6 cr) 10 cr</td>
<td>Envir Cons Leadshp -979 (3 cr) Cons Bio 951 (3 cr) Tools Topics - 978 (3 cr) 9 cr</td>
<td>Indep Practice -999 (4 cr) 4 cr</td>
</tr>
</tbody>
</table>

Total Cr: 32

Program attractions:
- Built on legacies of Muir, Leopold, & Nelson
- 15 month blended learning curriculum
- Summer Conservation Institute with leading practitioners
- Exclusive course sections and content
- Professional leadership training
- International and regional placement services

Program Costs – For full 15 month program, 32 credits:
In-state tuition & fees = $19,121. MN tuition & fees = $25,575. Out of state and foreign tuition & fees = $40,777.

Target students:
- Early career working professionals looking to advance mobility and leadership opportunities.
- Ideal candidates will have 3 to 5 years of professional experience in conservation or environmental management

Learning Outcomes:
1. Apply the principles of conservation science and sustainability to real world environmental problems
2. Explain the interconnections between environmental conservation and human well-being, and identify social, economic and institutional conditions that favor sustainability
3. Conceptualize, strategize, design, and implement innovative environmental problem-solving techniques
4. Demonstrate competence in core professional skills related to conservation practice, including: written, verbal, and visual communication; conflict resolution; interdisciplinary team building and problem definition; conservation planning; and program evaluation
Environmental Conservation Professional Masters Program

*Where Conservation Leadership Begins*

<table>
<thead>
<tr>
<th>Revised as of 2017</th>
<th>Summer Conservation Institute</th>
<th>Fall On-campus intensive</th>
<th>Spring Distance</th>
<th>Summer Leadership Experience</th>
</tr>
</thead>
</table>
| 15 mo. program    | Envir Cons Leadership - 974, 975 (2 cr)  
                      *Cons Bio 951 (3 cr)*  
                      Envir Policy - 843 (3 cr)  
                      **8 cr** | Cons Prof Practice - 976 (1 cr)  
                      *Cons Planning - 972 (4 cr)*  
                      Biology / Ecology (3 cr)  
                      Social Systems / Sustainability (3 cr)  
                      **11 cr** | Envir Cons Leadshp - 979 (3 cr)  
                      Tools Topics - 978 (6 cr)  
                      **9 cr** | Indep Practice - 999 (4 cr)  
                      **4 cr** |

**Total Cr: 32**

*Italicized courses/credits indicate a change*

**Learning Outcomes:**
1. Apply the principles of conservation science and sustainability to real world environmental problems
2. Explain the interconnections between environmental conservation and human well-being, and identify social, economic and institutional conditions that favor sustainability
3. Conceptualize, strategize, design, and implement innovative environmental problem-solving techniques
4. Demonstrate competence in core professional skills related to conservation practice, including: written, verbal, and visual communication; conflict resolution; interdisciplinary team building and problem definition; conservation planning; and program evaluation
Nelson Institute Assessment Plan:
Environmental Conservation Professional MS Program

MISSION
The mission of the Environmental Conservation professional MS is to train conservation leaders in practical interdisciplinary skills to tackle complex decisions in a changing world.

LEARNING OUTCOMES:
Students complete courses that integrate the study of conservation biology and ecology with social science. They also take a series of courses in professional leadership and specific tools topics. As part of this interdisciplinary training, each student completes an independent leadership experience followed by a placement report. These experiences create EC graduates who can:

1. Apply the principles of conservation science and sustainability to real world environmental problems
2. Explain the interconnections between environmental conservation and human well-being, and identify social, economic and institutional conditions that favor sustainability
3. Conceptualize, strategize, design, and implement innovative environmental problem-solving techniques
4. Demonstrate competence in core professional skills related to conservation practice, including: written, verbal, and visual communication; conflict resolution; interdisciplinary team building and problem definition; conservation planning; and program evaluation
5. Recognize and apply principles of ethical and professional conduct in Environmental Conservation

By meeting these learning goals our students will find and secure leadership and decision-making positions with organizations or agencies related to the field of biodiversity conservation or sustainability leadership.

MEASUREMENT:
In order to assess achievement of the program’s learning outcomes, EC program staff and faculty will select from the following to conduct direct and indirect measurements. Depending on feasibility and utility of measurement, EC Program staff may choose some, but not all measurements to conduct from this list. Results will be used to inform program curriculum, requirements, and processes as they relate to the learning outcomes, as well as the five-year review. Committee feedback will be incorporated
<table>
<thead>
<tr>
<th>Timeframe</th>
<th>Methods of Assessment</th>
<th>Internal Notes/Activities</th>
</tr>
</thead>
</table>
| Once, revised as needed | -Develop **curriculum map** for program, identifying courses that address learning outcomes  
- Revisit curriculum map following other methods of assessment and adjust curriculum as needed in order to achieve learning outcomes | -Currently exists, reflecting 2014-2016 cohort curriculum.  
- Program staff revisit in Fall of every other year, starting Fall 2016. |
| Every other year | -In collaboration with the Nelson Institutes’ Director’s Office & other graduate programs, administer survey (indirect) to recent program graduates every other year.  
- The **exit survey** will serve two purposes, one, to **indirectly assess all five learning outcomes** following completion of the program, and two, to gather additional relevant information from recent alumni (i.e. job placement, program evaluation, etc.) | -Winter 2016 Program staff develop sample survey for EC program  
- Spring 2016 sample survey shared to prompt development of Institute-wide survey (point person TBD)  
- Summer 2016 survey administered to previous year’s cohort. |
| Every other year | -Administer **evaluative questionnaire** (direct) to placement (final project) host supervisors unaffiliated with the program following completion of the final program semester.  
- The questionnaire will include questions that reveal successes/failures of the students’ learning outcomes. In addition to general questions evaluating student performance, questions will be designed to ask host supervisors to assess which of the five learning outcomes were accomplished through the placement experience.  
- Scores will be averaged to produce a program-wide assessment. | -Spring 2016 Program staff revise current host supervisor survey to include assessment questions.  
- Make clear to hosts the distinction between assessment Qs and student grade evaluation. Answers to assessment questions will not be delivered to advisors for grading. |
| Every three years | -Organize **a focus group** (indirect) designed around conversation questions that reveal successes/failures of learning outcome achievements  
- Depending on the context of the group, **one to five of the learning outcomes** may be addressed in this discussion.  
- Past graduate representative of the EC program will be invited to join the discussion via webinar or conference call, to reach a maximum group sample of six. Pending availability, program staff will call upon other alumni with an effort to balance in-state/out-of-state representation, as well as age, gender, & diversity.  
- The discussion will be led by one or two program faculty or staff, in addition to an outside session moderator. Methods of effective focus group discussions will be employed. | -Fall 2016 Program staff present plan & gather feedback for focus group from EC Program Committee.  
- Spring 2017 Program staff develop, plan & deliver focus group. |
| Every three years | -Administer **survey** to attendees of Exit Seminars with checkbox indicators of learning outcomes. | -Summer 2017 Program staff develop survey/ administer in late summer 2017, to exit seminar attendees, 3/student. Program committee members will be encouraged to participate |
| Continuous | -Students’ **leadership placement reports** (direct) are collected & stored by Program staff each year, and may be referred to for evaluation of learning outcomes. |
ADDITIONAL MEASUREMENTS

Nelson Institute Annual Data Report (every year, starting in Summer 2016)

EC program staff will gather information annually to track program and alumni statistics including but not limited to:

- Cohort size
- Funding: scholarship data (external & internal)
- Employment: returnees to pre-program employment, and new job placement
- Program attrition
- Advising
- Demographics: diversity, gender, in-state, out-of-state, intl., age
- Capacity to meet student needs at current population (staff time, course offerings, placement project opportunities)
- Current focus for program improvement
- Capacity for program growth
Q3 - In your initial meetings did the student: - Please indicate the degree to which the student met your expectations.

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Exceeded expectations</th>
<th>Met all expectations</th>
<th>Sometimes met expectations</th>
<th>Did not meet expectations</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduce his/her professional goals and placement ideas?</td>
<td>54.17% 13</td>
<td>41.67% 10</td>
<td>4.17% 1</td>
<td>0.00% 0</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>Did s/he take initiative to organize and lead your meetings?</td>
<td>33.33% 8</td>
<td>58.33% 14</td>
<td>8.33% 2</td>
<td>0.00% 0</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>Was s/he willing to adapt ideas to meet your organization's goals for this placement?</td>
<td>62.50% 15</td>
<td>37.50% 9</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>24</td>
</tr>
</tbody>
</table>

Percentage of students that met or exceeded expectations in initial meetings:

Q3#1: 95.83%
Q3#2: 91.67%
Q3#3: 100%
Q4 - During the student’s placement:  - Please indicate the degree to which the student met/is meeting your expectations.

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Exceeds expectations</th>
<th>Meets all expectations</th>
<th>Sometimes meets expectations</th>
<th>Does not meet expectations</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Was s/he ready to start and focus on placement goals by the agreed upon start date?</td>
<td>62.50%</td>
<td>37.50%</td>
<td>9</td>
<td>0.00%</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Has s/he communicated plans with you in a timely and professional way?</td>
<td>54.17%</td>
<td>25.00%</td>
<td>6</td>
<td>20.83%</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Has s/he been assertive in making decisions and coordinating tasks when appropriate?</td>
<td>58.33%</td>
<td>33.33%</td>
<td>8</td>
<td>8.33%</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Has s/he shared preliminary placement reports/deliverables with you that meet your expectations?</td>
<td>37.50%</td>
<td>50.00%</td>
<td>12</td>
<td>8.33%</td>
<td>2</td>
</tr>
</tbody>
</table>

Percentage of students that met or exceeded expectations during placement:

Q4#1: 100%
Q4#2: 79.17%
Q4#3: 91.67%
Q4#4: 87.5%
Q5 - Finishing and post placement, in your opinion:  - Please indicate the degree to which you expect the student to meet your expectations.

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>%</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Likely to exceed expectations</td>
<td>45.83%</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>Likely to meet all expectations</td>
<td>50.00%</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>Likely to partially meet expectations</td>
<td>4.17%</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Not likely to meet expectations</td>
<td>0.00%</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100%</td>
<td>24</td>
</tr>
</tbody>
</table>

Percentage of students that are likely to meet or exceed expectations in project completion:

Q5: 95.83%
Q6 - Learning Outcomes: The Environmental Conservation program trains graduate student to accomplish the following learning outcomes throughout their coursework and placement experience. Please select from the following any/all of the learning outcomes that this student demonstrated during their leadership experience.

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Applied the principles of conservation science and sustainability to real world environmental problems</td>
<td>21</td>
<td>87.5%</td>
</tr>
<tr>
<td>2</td>
<td>Explained the interconnections between environmental conservation and human well-being, and identified social, economic and institutional conditions that favor sustainability</td>
<td>19</td>
<td>79%</td>
</tr>
<tr>
<td>3</td>
<td>Conceptualized, strategized, designed, and implemented innovative environmental problem-solving techniques</td>
<td>14</td>
<td>58%</td>
</tr>
<tr>
<td>4</td>
<td>Demonstrated competence in core professional skills related to conservation practice, including: written, verbal, and visual communication; conflict resolution; interdisciplinary team building and problem definition; conservation planning; and program evaluation</td>
<td>21</td>
<td>87.5%</td>
</tr>
<tr>
<td>5</td>
<td>Recognized and applied principles of ethical and professional conduct in Environmental Conservation</td>
<td>19</td>
<td>79%</td>
</tr>
</tbody>
</table>

**Average percentage of students that exceeded all learning outcomes:**

Q6: 78.2%
Q7 - Could this student be successful in your organization now?

Absolutely.

Speaking not as supervisor in an organization but as a conservation professional, I feel that she is better prepared for her role in USAID and conservation in general. Having the time to place her country's policy in context with and comparison to other similar countries has provided her with a broader and more inclusive perspective on the options and possibilities and approaches to tiger conservation.

She would need more teacher training on basic pedagogy - student engagement

Yes, she will start a new internship contract for the next six months where her research and writing skills will be of great use for our communications and policy teams.

She is passionate and enthusiastic about her work, which is a characteristic we like to see in our employees. We do feel there is room for growth when it comes to producing deliverables that meet expectations.

Yes, since all the core staff speak English, nevertheless I must highlight the language barrier as an challenge.

Yes, she has an excellent attitude and temperament. She was proactive in undertaking tasks, with limited supervision. She was outgoing, engaging well with staff and stakeholders. Having the ability to speak in Portuguese enabled her to be far more engaged that she could otherwise have been.

Yes, I think so. His summer placement project is exactly what we want to do in the field. Environmental aspect is considered increasingly important in Poverty Reduction and we believe community-based ecotourism would be a good method, especially in our working area. Community-based ecotourism project could not complete in several months. It might take a long time to achieve the goal step by step, and his work is a good start. We think his work is successful and our future work will be based on strategies and results from him. He will still be responsible for this project in the future and make sure everything is on track. Communicating with villagers is not easy because they would think environmental conservation is too far away from them. He has attended community meetings to discuss environment and livelihood with villagers. Through this process, villagers have understood and agreed on that they could protect their unique environment and make money through this. He provides many useful suggestions on designing ecotourism plans like ecological toilet and how to present their traditional -environment-friendly knowledge to the tourists, and he promoted villagers to re-recognize species around the community. He worked with villagers to find traditions and stories that support environmental conservation. He also shared what he learned with Shuguang’s staffs. The land use policy in American, communicating skills, and ideas about environmental conservation are very different and part of these could be used in our community development work.

Yes, absolutely.

Yes

I believe that she would be very successful with the Shaw Nature Reserve and with the Missouri Botanical Garden.

Yes. She has a very good background in natural resources.

During her short stay, she has been well familiar with the goal, mission and projects of our organizations. Besides, she has such friendly behavior that helped her to socialize with our small team in short duration. Likewise, her academic background and professional experience of being involved in conservation program further qualifies her to be a part of our organization.

Yes

If I had the funds to hire her, I would gladly employ her to work for the Timber Wolf Alliance.

Yes, the student show skills and interest in our work given advise or suggestion in different themes.

Yes
Yes, without doubt

Yes

Yes, I think that he would be able to bring very valuable ideas to the different conservation projects of our organization.

If I had a job opening I would hire her! Am actively looking to try to find employment for her in Maine.

Yes, we are currently planning to offer a permanent position to her on successful completion of her degree and the Pathways program.

Yes. He would be able to carry out the camera trapping project by himself and to develop future goals for this project.

**Percentage of students that would be successful in their host organization now:**

Q7: 95.8%
Q8 - Please provide any additional comments that you'd like to share with us here:

She has all the skills I look for in a new employee: ability to work with people of all kinds, critical thinking, communication (oral and written), problem solving, organization, attention to the details without losing the big picture.

She was working in a fishing community in the South of Thailand and had very limited time to immerse herself in the community and understand the full picture of what was going on. Her understanding of the situation in the community was restricted dependent on the few people that could speak English and her interpreter. Despite this she demonstrated remarkable adaptability and gained the trust and appreciation of the community quickly and was welcomed with open arms. I would suggest that for students working in foreign countries where they do not know the language that there be longer time provision to allow for a more indepth comprehension of the conservation context. We were all impressed with how much insight she did manage to achieve but more time would have helped her reach another level - especially in a country as complex as Thailand.

Excellent, productive program developed in a short time frame

She has been a great team member, always open to engage in new topics of research and writing. She communicates effectively and is interested in learning the context in which her tasks are developed.

She was pleasant to work with and we enjoyed getting to know her. We wish her well in her future career pursuits.

His best skill was his ability to adapt himself to new environment and challenges

This is really a valuable opportunity both for the student and is colleague. I think it could be better if there are more chances to share and exchange cases and experiences. It would be interesting and useful if we could know what other people are doing in the world.

She was a delight to have with our organization this summer. She is mature and experienced, so it was as if we had gained another colleague. She also worked well within and across the organizations in our collaborative partnership at Badger Rock. We plan to implement many of the recommendations she has already shared with us about how to improve our partnership. We'll miss her!

Over the course of her placement, she has demonstrated leadership, proven herself capable learning new tasks and skills, and has shown maturity and reliability. Whether working independently on projects or while working with volunteers, I trusted her to fully complete objectives and tasks thoroughly and professionally. She has been a joy to work with and it is my sincere hope that she has learned and grown over her time here at the Nature Reserve. I expect her to go on to be successful in whatever venture awaits her next.

She is doing a very good job on involving many people with her project.

I have found her as a professional, and academically sound person excelling on different qualities. Her quality of time management was outstanding which I think is her best attribute.

She was a diligent worker and very invested in her project, which examined effects of air pollution on tannins in plant foliage. She had a challenging task of connecting a theoretical problem in chemical ecology with real-word topics in conservation and sustainability. She was sometimes slow to communicate requirements of her program with me, and sometimes struggled to draw connections between ecological theories and the broader context of conservation and policy. Language was occasionally a challenge, especially with respect to preparing written materials, but we were able to overcome this challenge with additional investment in mentoring.

She is a very through and hard-working individual. She has great people skills and readily takes on leadership positions. She will do well in any conservation/environmental education organization.

I was extremely impressed with his performance during the course of the internship. He was a self starter and dealt well with a challenging and complex project. From a NGO perspective it would be great to see students come to these placements with stronger Excel, R, databasing and GIS skills. He was able to learn quickly so this is not a comment on him per se but rather a comment on new graduates entering the workforce. If we received an application from a student now that had a strong ability in these areas they would be very appealing to us as an
organization. I hope that we can continue this relationship and work together to improve our ability to help shape the conservation leaders of the future.

She is a well-prepared young adult with an excellent grasp of the issues, skilled in cross-cultural situations, and enthusiastic about her course of study and implementation of solutions.

In addition to being a supportive, innovative, and collaborative team member, he has exceeded all expectations on his project. His work has already made a hugely transformative impact on the organization in furthering our mission. Thank you!

He did a good job during his internship. The field work for his project has been really demanding but he was able to complete it in time and effectively. If something would need to be improve could be his team work skills.

She is a very quick study and knows the issues of community conservation better than most of our staff. She is flexible, has a can do and positive attitude. She will be an asset to any organization.

She is an organized and articulate young professional. Her knowledge of conservation biology and interest in process, budgets and conservation partnership agreements serve her and our agency well in furthering conservation in Wisconsin.

I consider that he did a good job on his placement. To work with camera traps in this area is not easy due to the lack of transportation and difficult terrain; however, he was able to complete all the field work established with great results and efficiency.
To: Graduate Faculty Executive Committee (GFEC)

From: Meyer Jackson, Ph.D.
   Professor of Neuroscience
   Director, Biophysics Graduate Degree Program

Re: Response to the GFEC areas of concern

On behalf of the Biophysics Graduate Degree Program I thank the GFEC for its thorough review. This review raised specific concerns as summarized in the April 24, 2017 letter to me. These concerns are:

- Lower Ph.D. completion rates than a peer institution benchmark
- Lack of community and identification with the program
- Increased use of IDPs
- Bylaws for selection and rotation of steering committee members
- Plan and consequences of NIH training grant nonrenewal

Here are our responses and actions to address these concerns.

Ph.D. completion rates:

While we acknowledge the completion rate for the period covered in this review is below the peer benchmark, we believe it can be explained by a couple anomalous events and is not an overall indicator of the ability of the program to recruit good candidates and mentor a high fraction them through to the Ph.D. In this instance the lower Ph.D. completion rate is primarily due to one unusually large class of students that entered the Biophysics program in 2011 (12 students, well above our average class size of 6.8). This anomaly skewed the statistical analysis. Of those 12 original students, two left the program for personal, non-academic reasons and three left with Masters degrees. Of the three students who left with Masters degrees, two have re-entered graduate school with the goal of receiving their Ph.D.'s suggesting they were not prepared for the demands of graduate school when they first started. The third Masters student has continued in a career that utilizes his science training. The remaining seven students in the cohort have earned their degrees, or will soon earn them. If you examine recent classes, the attrition rate averaged over the past 5 years is 8% (not including the students who just enrolled in fall 2017). Of the two students who left the program over the past 5 years, both remain on the Ph.D. track; one student moved with his faculty advisor (Ronald Raines) to MIT and the other student accepted offers of admission from two different graduate programs at UW-Madison because of a lack of understanding as to how enrollment worked and a failure of the system to inhibit the dual admission. Once in Madison, he ended up deciding to stay with the other program (Chemistry). New graduate application procedures have prevented a student from accepting admissions offers from two different programs and we have increased our communication with students offered admission to more than one program to avoid such confusion in the future. There were two students this past year that had multiple offers from programs on campus; of the two, one decided to join Biophysics and there was no confusion on the part of either student suggesting our communication efforts have had some success.

We remain, as always, committed to recruiting excellent students, including underrepresented students, and building a community feeling amongst program participants. We will be nominating a new admissions committee chair this fall and look forward to implementing new recruiting tools, including some developed as part of the Vanderbilt-Fisk program designed to gauge a student's ability to succeed in graduate school. We have enhanced our level of communication with potential recruits through increased advertising on our website and our Facebook page. Additionally, we continue to send recruiters to conferences around the country including the Biophysical Society Meeting (Meyer Jackson, program
director) and SACNAS (Silvia Cavagnero, faculty trainer, and Neydis Moreno, student) and we have maintained a commitment to programs on campus that seek to enhance diversity recruiting, including the SROP and BOPs.

**Community and Identity:**

We have organized more events with students and faculty to build camaraderie. We inaugurated an annual day-long retreat in which students present their research. The first event was just held Sept 29 and was very successful in bringing together students and faculty for exchanges of ideas and for social interactions. We have greatly increased student participation during recruiting and orientation events, added specific Biophysics seminar events. We recognize that building a community will take time, but we are pleased with the gains from the efforts we have initiated.

**Individual Development Plans (IDPs):**

As a program, we recognize the role an IDP can play in the development of graduate students as they progress through the program. We appreciate the significant resources provided by the campus in the form of trainings and workshops to help students create an IDP. During our program orientation week, we invite assistant dean Alissa Ewer to give a presentation on the importance of creating an IDP and how they can be helpful throughout a graduate career. We regularly disseminate information about IDPs to our students and we have also initiated regular meetings with newer students in the program with our program coordinator, Dr. Allison Lynch. Dr. Lynch completed her Ph.D. training in the lab of a BGDP trainer and brings a background as a graduate student, postdoc, and academic scientist to her position. Additionally, this past summer she completed the Career Development Facilitator training course, a well-established offering open to academics and industry representative, offered by UW-Madison and the Center of Workforce Development. This training establishes Dr. Lynch as an in-house specialist for advising and structuring our graduate training to meet the career objectives of our students.

The meetings with individual students have allowed Dr. Lynch to offer suggestions and advice to students about creating an IDP, forming a committee, and generally use resources they have at their disposal to tailor their graduate training for their individual professional goals. A notable outcome of these meetings with the newer students is that Dr. Lynch is able to direct targeted email announcements to students based on identified areas of interest that might otherwise get ignored in the scope of the many campus wide announcements that get sent out. A specific example is evident in Dr. Lynch’s work with Miranda Mecha to enroll in a science writing summer course that aligns with Miranda’s professional interests. Miranda has continued to pursue professional development activities by signing up for a Delta class this fall and seeking out mentors with the help of Dr. Lynch that can help her define a career path and actively build the foundation pieces. The regular monitoring by advisors and administrators regarding creation and use of an IDP will aid students in discovering and learning about career options that they might otherwise not consider.

**Selection and rotation of Steering Committee members:**

The Steering Committee will discuss and develop formal guidelines for naming and rotating membership on the committee in the 2017-18 year meetings.

**Training Grant Support:**

Your letter requested that we address two questions about the T32 training grant from NIH.

(i) With regard to funding of students currently on the training grant, all six of the current appointments were made based on the funding awarded in the final year of the last competitive period. The appointments will terminate with no further financial obligation, but with a contingency to extend two of the slots pending the outcome of the resubmitted application. The appointments were made with a 6/1/17 - 5/30/18 cycle such that 11 months of the appointments run in the no-cost extension year 7/1/17 -6/30/18. Success of the resubmitted application would mean funding is restored on 7/1/18. The reviews/scores from the resubmitted application should be available going into the recruiting season for fall 2018 admission so that training grant slots (4 anticipated) could be used as recruiting incentives.

(ii) With or without the training grant, the overall plan for recruiting future classes would follow
the budget model that has been in place for many years. The training grant typically allows us to increase the class size by one or two students above our usual target of 6-8 entering students per class. The T32 has been especially valuable in providing accepted students with a recruiting incentive, but it has not been the predominant source of support for incoming students. Indeed, the BGDP has always had a significant fraction of international students (on average about half) and they are not T32 eligible. These students have contributed significantly and had an excellent completion rate. We have put considerable effort into the resubmission and feel cautiously optimistic about receiving a fundable score in the upcoming review. However, regardless of the outcome, we are confident that the program will continue to function at a very high level, and continue to serve our graduate students and campus.

We close by summarizing our extensive efforts to keep our NIH training grant. NIH reviewed our renewal application last fall and provided us with a detailed critique that spelled out a number of concerns. We submitted a revised application in May 2017 that addresses these concerns very thoroughly. These changes were discussed in detail by the Steering Committee and are summarized as follows.

**Foundational Courses:** Although we had recently reviewed and updated our course requirements, the NIH panel faulted our curriculum for not requiring foundational courses. In response we reviewed our courses and selected two that qualify as foundational. Biophysical Chemistry, Biochem 665, focuses on biophysical concepts; Biophysical Spectroscopy, Chem 668 focuses on widely used biophysical techniques. Nearly all Biophysics Program students had elected these courses in the past, and there is unanimous agreement among students and faculty that these courses are foundational. These two courses are now required of all students in the BGDP. In addition, all BGDP students are also required to elect two other biophysics courses from two different columns from the four in our table and take the seminar course Topics in Biophysics for the duration of their enrollment in the BGDP. Taking Biochem 665, Chem 668, two electives, and Chem 872 insures that all our students receive rigorous instruction in the foundations of biophysics, and learn about the current trends in the field.

**Development of presentation Skills:** The Topics in Biophysics seminar, Chem 872, trains students in giving presentations. All students give at least two topical presentations in Chem 872 in which they present papers selected by a faculty member. Chem 872 also provided students with opportunities to present their own research but these opportunities were limited and informal. We have expanded the research presentation component of the course by requiring dissertators to continue to enroll in the course for zero credit. These students will present their research on a regular basis. To provide students with an opportunity to present their research to a larger audience (beyond their cohort of students) the program has instituted a one-day annual retreat in which all junior students present a poster and senior graduate students present their research orally. The inaugural retreat was held Sept 29 and was a resounding success.

**Shared learning experience:** Students supported by the training grant who are not biophysics program students do not have the same learning experience. This difficulty arose because in previous funding cycles we opened up the competition for training grant slots to students who were working in the lab of a Biophysics trainer, but were enrolled in other Ph.D. programs (e.g. Chemistry or Biochemistry or Chemical Engineering). Although these non-BGDP students were required to complete the BGDP course requirements, they rotated with a different cohort of trainers. It was also unfair to require the full BGDP course requirements together with the course requirements from their own program. We thus could not ensure that these students shared the full pedagogical experience of the BGDP students. In recent years the improved success of the Program in recruiting outstanding students has strengthened the pool of BGDP students. Given the exceptionally broad cadre of students we currently can draw on in the BGDP, the Steering Committee decided to end the practice of opening up the competition for slots to non-BGDP students. We will award all slots to BGDP students to ensure that all students supported by the training grant have a shared learning experience including rotations with BGDP trainers, foundational courses, the seminar, and retreat. (This change will be implemented upon successful renewal of the training grant).

**Rotation policy:** Students previously had the option of joining a lab before completing three rotations but this option was almost never exercised. In recognition of the value of rotations as a learning experience, beyond the more pragmatic value of trials of labs for thesis research, all students are now required to complete at least three rotations before selecting a home lab.

**Length of support:** We previously awarded slots for three years and have amended this policy. To maximize the effectiveness of the Training Grant, slots will be awarded for two years, with the second year contingent upon progress in the first. Students will not receive Training Grant support for more than two years. Our first priority will be to award slots to entering students but when slots are unfilled by entering students, slots
Biophysicists committed to the BGDP program. The review just completed insures that all trainers included in this resubmission are active in the Program and participate in recruiting activities. They are Biophysicists and greatly enhance our training program.

Decadal review of the Program in June of 2016. Some of their recommendations echoed some of the Program Assessment and Feedback: The GFEC reviews of all graduate programs and completed an evaluation of research progress. For students awarded a Training Grant slot in their second year the review will include an evaluation of research progress.

Students will only receive Training Grant support in their first three years. For students awarded a Training Grant slot in their second year the review will include an evaluation of research progress.

Trainee Progress: The Program has amended its annual practice of Trainee review. Our policy had been for students to form individual committees of 5 faculty members at the end of their first year, for these committees to meet annually, and to provide a written assessment of the student’s progress. The Steering Committee will now devote an annual meeting at the end of the spring semester to the review of these reports. Poor progress will prompt an inquiry from the Director, which may be followed by a meeting to discuss strategies for addressing the problem.

The Steering Committee will also review progress of students supported by the Training Grant at the end of the spring semester. This will include students at the end of their first year, when expecting research progress is not realistic. This review will therefore focus on coursework. When a student has poor grades, their mentor will be contacted and if the Steering Committee finds progress inadequate support will be terminated after one year. For students awarded a Training Grant slot in their second year the review will include an evaluation of research progress.

Program Assessment and Feedback: The GFEC reviews of all graduate programs and completed a decadal review of the Program in June of 2016. Some of their recommendations echoed some of the concerns in the critique of our T32, namely improving our assessment of student progress and noting that not all trainers are active in the Program. In the same timeframe, the Graduate School has instituted a program wide requirement for assessment plans that meet a consistent format and require annual accountability reporting. The BGDP has an assessment plan on file effective June 2016, and will submit the first annual report in the fall of 2017 according to schedule. The plan is built on a set of seven learning goals, six in the categories of knowledge and skills and the seventh in professional conduct. Assessment activities specific to the BGDP are identified and mapped onto each of the learning goals addressed by the relevant activity. The plan also clearly identifies who will be responsible for each assessment activity and how it is reviewed within the BGDP Steering Committee. Overall, the plan and reporting requirement will provide better visibility of outcomes and of the effectiveness of various measures taken.
Mentoring Trainers: Junior faculty are mentored by their departments. It is a campus policy that departments appoint mentoring committees for new faculty. Mentoring committees meet annually and the chair of the committee submits annual reports to the department chair.

Seminar Series: The Program will sponsor two outside speakers annually. These seminars will be coordinated with the Topics in Biophysics seminar course (Chem 872). The speaker's visit will include a lunch with BGDP students. The outside seminar will enhance the instruction of the selected topic, allowing students to attend a seminar and meet the investigator after studying the relevant papers. The two annual outside seminars will be required of all BGDP students.

Publicizing the Program: The BGDP has noted a modest trend of increases in number and quality of domestic applicants. To publicize further the BGDP has resumed its practice of renting a table at the Graduate Program Fair at the annual meeting of the Biophysical Society. The BGDP is represented by the Director annually at a summer Graduate School Fair connected with the Summer Research Program for undergraduates. The BGDP will continue to send representatives to SACNAS and other venues.

In conclusion, I again thank the GFEC for its recognition of the strengths of the BGDP and hope that the above responses address their concerns.

Sincerely,

Meyer Jackson
Director, BGDP
June 21, 2016

TO: Sarah Mangelsdorf
    Provost

    William Karpus
    Dean of the Graduate School

FROM: Richard J. Straub
    Senior Associate Dean

RE: Department of Biological Systems Engineering Program Review, 2015

The College of Agricultural and Life Sciences Academic Planning Council met on May 20, 2016. During this meeting they reviewed and unanimously approved the review of three programs offered by the Biological Systems Engineering Department – the Bachelor of Science Biological Systems Engineering, and an MS and PhD in Biological Systems Engineering. The self-study was completed in the fall of 2014, the review team’s report was submitted in the fall of 2015, and the departmental response was complete by mid-Spring 2016. Copies of the latter two documents are attached.

The review team found the BSE department to be “high-functioning … with a clear vision for its current and future activities…. high quality research and [is] meeting stakeholder needs.” The undergraduate program is notable in particular for its dramatic growth in recent years and the review team noted the department seems to have reached its maximum capacity given the current instructional and advising resources. The graduate program has remained more stable in size and seems to be appropriate to support both student interest and faculty needs. A discussion of several key recommendations from the review committee follows.

Seek More Unified Facilities
As noted in the review report, BSE is challenged by being spread across four buildings, plus facilities at the West Madison Agricultural Research Station. The college recognizes this challenge and understands that this is a development priority for the department. In the meantime, the college will continue to work with the department to maintain and upgrade existing facilities as funds permit.

Develop Action Plan for Increasing Diversity of Student Body
The review report notes that there is a lack of gender diversity as well as racial and ethnic diversity, particularly in the student population. The college encourages the department to work with Assistant Dean Tom Browne and others on campus to develop a plan to further diversify the student body and to enhance the ability of department faculty and staff to ensure a welcoming environment for all students. Given the department’s commitment to students and the robust interest of students in the program, the department seems well poised to make progress in this area.
Seek Strategic Hires for Instruction & Coordinate with CoE

The rapid expansion of the undergraduate BSE program enrollment, along with a stable-to-shrinking number of faculty presents a challenge for the department, as noted by the review committee. The solutions to this challenge are likely to be multifaceted. The college supports recent efforts by the department to streamline the undergraduate curriculum and to raise the entrance requirements for admission to the bachelor’s degree program. Exploring strategic hiring and coordinating with the College of Engineering on course offerings (as suggested by the review committee) should help as well. CALS efforts to support additional hiring are hampered by the growth that has taken place across most majors in the college, resulting in growing instructional needs college-wide in a time of reduced budgets. In addition, we note that effective communication from the College of Engineering regarding Direct Admission plans and notification timelines for students who do not meet the new “Progression Requirements” will help support BSE, given the frequent migration of students from CoE to BSE.

We are proud of the BSE academic programs and associated student services and pleased to see the growing interest in them among students, along with continued strong interest from employers. The college will continue to work with the department to identify opportunities to support the demand for instruction, services, and facilities appropriate to a world-class university.

Please let me know if you need any further information.

cc: Kathryn VandenBosch  Marty Gustafson  Jocelyn Milner  Doug Reinemann
Introduction

In November 2014, the College of Agricultural and Life Sciences (CALS) appointed an *ad hoc* committee to conduct a program review of the Department of Biological Systems Engineering (BSE). The committee consisted of Steve Ventura (committee chair; Dept. of Soil Science), Ken Genskow (Dept. of Urban and Regional Planning), Pamela Ruegg (Dept. of Dairy Science), and Michael Graham (Graduate Faculty Executive Committee representative; Dept. of Chemical and Biological Engineering).

The charge to the committee from CALS included general questions about fulfilling its mission and six specific issues:

1. What is the standing of the department within its disciplinary base and within the University of Wisconsin? Is it in need of strengthening? If so, what can be done to improve its standing?
2. How well are its degree programs functioning? Are there a sufficient number of students in each program and are the students of high caliber? Is student advising functioning well?
3. Should the department be taking any steps to improve the quality of its educational programs? Are student learning objectives clear? How is learning evaluated and used for program improvement?
4. How effectively does the department satisfy its outreach and research missions and are these recognized strengths of the department? Are resources deployed in a way that satisfies its stakeholders?
5. Is the climate in the department one that encourages productivity and feelings of inclusiveness by staff, students, and faculty?
6. Are there issues concerning the department's functions or interactions within CALS that should be considered as part of the College’s ongoing strategic planning process?

In addition, the Graduate Faculty Executive Committee had specific questions related to graduate education, conveyed through their representative.

The committee reviewed extant documents, particularly the *Department of Biological Systems Engineering Ten-Year Review: Comprehensive Self-Study of Departmental Activities*, interviewed faculty, staff, and both graduate and undergraduate students, and toured facilities during spring of 2015. The self study was a comprehensive and well-prepared document, including extensive descriptions of programs and facilities, faculty activities, responses to previous reviews, and self-identified goals and issues. It is the starting point for our report. We also used review documents from the 2003 review to understand changes in the department over the last decade and adjustments made in response to the previous review.
Based on our observations and interviews, we provide this report about the department, its undergraduate and graduate programs, research and outreach activities, facilities, and recommendations. While not organized to directly address the six issues in the CALS charge to the committee, we believe this report covers all aspects.

Department Overview

BSE is dedicated to “application of engineering principles to agricultural and biological systems.” It is the only engineering department within CALS, and maintains working relations with several College of Engineering (CoE) departments and centers, as well as other campus and federal centers. It is accredited by ABET, the national organization for accreditation in engineering (renewed in 2012 for seven years). The department identifies four broad areas of inquiry and instruction: sustainable production agriculture, bioenergy and bioproducts, rural environmental quality, and food production and bio-processing systems. Activities of the department contribute to all areas of the CALS “Growing the Future” strategic framework of 2014.

Major changes since the 2003 review include movement into new areas of inquiry such as bioenergy and a substantial increase the number of undergraduate majors. In most other respects, the department has been stable and meeting stakeholder interest in research, instruction, and outreach. The shift to biofuels and post-harvest processing of food is essentially a response to stakeholder and student interest, and perception of where jobs for graduates are likely to be.

Administrative structure and function

As of spring 2015, the department comprised a core faculty of 13 (nine professors, one associate professor, and three assistant professors). In addition, Richard Straub serves CALS as Senior Associate Dean and Awad Hanna (primary appointment in Civil and Environmental Engineering) has a 25% appointment in the department. Five other UW professors are affiliate faculty and the department lists five adjunct professors from other (non-UW) organizations. The faculty are supported by an administrative staff of four, three technical staff helping with the machine shop and information technology, and several scientists and research associates.

The department has standing committees for undergraduate and graduate instruction, and committees to support student activities and department social events. Faculty and staff meet twice a month, once for routine department business and second for “issues.” The latter may sometimes be just faculty or executive committee.

Staffing needs and plans are discussed in strategic planning documents developed in summer 2014. Specific faculty needs are identified annually in response to the College’s call for positions. In broad terms, the rapid growth of undergraduate enrollment has put considerable strain on instructional resources, including faculty instructors, advisors, and facilities.
Department climate
Our review team spoke with most of the faculty and a subset of the support staff and researchers. With the exception of almost universal comment about facilities, we encountered very few negative comments. Of course, everyone would like additional resources from the College to support a variety of needs, including workshop equipment and supplies, classroom upgrades, and faculty/staff positions. The department appears to function together very well, with a high degree of collegiality and respect for others activities.

We interviewed small groups of senior faculty and all of the assistant professors individually. Aside from almost universal recognition of facility challenges, as a whole, the faculty have no consistent problems with the structure or function of the department. Additional comments are contained in subsequent sections on instruction, research, and outreach, particularly the challenges associated with significantly expanded undergraduate majors and offering service courses for College of Engineering students. A few did mention ambiguity in the procedure for election of the department chair. This should be reviewed and clarified in writing as needed.

All three pre-tenure faculty are generally satisfied with their circumstances and prospects of successful promotion. A couple mentioned the need for greater clarity in department policies and procedures; these seem to be conveyed primarily by word of mouth rather than through easily searched written documentation. All feel supported by senior faculty, with a good mentoring structure in place.

The administrative staff in the department is uniformly appreciated and respected. Students, other staff, and faculty all complimented them on their abilities and friendly atmosphere they help create in the department. Technical support staff are similarly well liked. However, the time and effort required to maintain equipment and supervise students in the Agricultural Engineering Laboratory was noted as an issue. Some faculty felt this was serious enough to constitute a safety concern. The department is pursuing one potential solution through collaboration with the Department of Soil Science.

The department has no explicit effort to increase diversity within employees or student bodies. As with most STEM fields, it is predominantly white and male. Given campus-wide interest and effort to improve diversity, this is an area for future consideration. The women faculty and staff we interviewed did not feel that there were significant issues of gender-based bias or discrimination, though the circumstances of obtaining this information were quite limiting.

Campus partnerships
The BSE department is tightly interconnected with a variety of activities and entities on campus. BSE faculty have affiliations with the departments of food science and dairy science within CALS, with the civil and environmental engineering department within CoE and with the Wisconsin Energy Institute. The department also has relationships with the USDA Dairy Forage Research Center and Forest Products Laboratory. Several faculty hold joint appointments with the Gaylord Nelson Institute for Environmental Studies. BSE faculty also provide instructional support for courses offered through Engineering Professional Development. EPD director Phil
O’Leary’s tenure home is BSE. Finally, several BSE faculty have an extension component to their appointments.

**External standing**
The BSE department at UW-Madison has substantially fewer faculty (15) than many of its peer departments at land-grant institutions. For example, Iowa, Illinois, Minnesota, Michigan and Purdue have, respectively, 38, 22, 20, 20 and 28 faculty members. Nevertheless, on a per faculty basis, the department is outperforming all but one or two of these departments in publications and citations and is competitive for funding.

**Undergraduate Programs**
The BSE undergraduate program is a significant strength of the Department. In recent years, enrollments have nearly tripled from just over 60 in Fall 2007 to nearly 160 in Spring 2015. Faculty are confident the program could attract even more students, but they feel that current enrollments are straining existing resources. Students completing BSE requirements receive a BS in Biological Systems Engineering, which is an ABET accredited engineering degree. The Department has strong ties to industry and program alumni, and taking advantage of career counseling and job placement support from CALS and from the College of Engineering, all students graduating from the program are finding well-paying jobs in the profession.

**Curricula Overview**
The Department offers students four specialization areas within the BS-BSE, along with the option of customizing their own option area. The four developed specializations are: 1) Machinery Systems Engineering, 2) Natural Resources and Environmental Engineering, 3) Food and Bioprocess Engineering, and 4) Structural Systems Engineering. Similar to degrees granted through the College of Engineering, the BS-BSE degree requires advanced coursework in math, physics, chemistry, thermodynamics, statistics, and applied problem solving. BSE requirements differ from other engineering fields in their additional emphasis on biological sciences and processes. All students complete a two-semester capstone experience, typically a project with design, construction, and evaluation components.

Among current students, approximately one-third pursue Machinery Systems, one-third Natural Resources and Environmental, and one-third Food and Bioprocess Engineering, and a relatively small number are studying Structural Systems.

The Department maintains an updated and easy-to-follow Undergraduate Student Handbook. The Handbook clearly describes the program and desired educational outcomes along with information about each area of specialization, including road maps for completing each specialization within four years. The Handbook also provides helpful information about student life and activities, Department faculty and staff, scholarships and financial aid, and tools for tracking individual progress. A copy of the Handbook is available through the BSE website [http://bse.wisc.edu/Current-Undergraduate-Undergraduate_Student_Handbook.htm].
Student Evaluation
As required by ABET, the undergraduate program follows a rigorous assessment process outlined in the Department’s Undergraduate Program Assessment Manual. The manual includes assessment forms, rubrics for measuring learning outcomes from student coursework and projects, alumni survey forms, and more. Assessment results are summarized in the Department’s 2012 ABET accreditation Self Study Report.

Based on student outcome assessment conducted for the Department’s 2012 ABET accreditation Self Study Report, BSE students are generally meeting or exceeding target performance benchmarks. Highlights include excellence in national student competitions, 3&5-year alumni survey responses indicating achievement of educational outcomes, and high-levels of performance in courses and exams based on instructor evaluations and rubric assessments. In recent years, BSE also increases its admission standards and also changed the curriculum to provide students earlier exposure to engineering design concepts. Both are intended to further improve the quality of student experiences.

Strengths and Weaknesses
Overall, the undergraduate program is an important asset to the Department and CALS, and it comprises a vibrant core of the BSE community. The Department’s undergraduate program benefits from a highly committed faculty and staff, close association with the College of Engineering, a strong sense of camaraderie and community among undergraduate students, and close connections to alumni and industry. Faculty connect well with students and pursue regular program assessment activities to identify opportunities for further improvement. With additional resources, the Department has the potential to grow an even larger undergraduate program, complementary to other CALS programs.

The growth of the undergraduate program over the past decade has also strained the diminishing resources of the Department. With faculty feeling over-extended by teaching needs, some draw upon gift funds to support lab assistants, graders, and additional helpers for managing instructional roles. Faculty also expressed concerns about undergraduate specializations being overly dependent on individual faculty members. They anticipate possible future challenges for specializations due to difficulties replacing faculty who leave the Department or retire. The Department continues to have a faculty advisor for every student, and this will ultimately constrain numbers, though some of the day-to-day information comes from student services staff.

A few faculty noted that they are not well integrated with the College of Engineering. Although BSE and CoE, particularly Civil and Environmental Engineering, rely on each other for pieces of curricula, coordination is informal. A concern was also noted that if CoE raises the GPA in coursework of pre-engineering undergraduates required for admittance to their engineering programs, it may push some marginal students into BSE.
Student Satisfaction

Students interviewed for the review seem to genuinely appreciate the personal experience found in BSE. Several commented on the positive environment toward students, the approachability and accessibility of faculty, and the supportive attitude of staff. The Department has an active student ASABE chapter, and Food Services club. Student cohorts are perceived as small and tight-knit and experience a high degree of interaction with Department faculty, whom they hold in high regard. Most undergraduate students are involved in research projects beyond their classroom requirements.

Students were complimentary of the advising and hands-on instruction provided by the Department. They also appreciate the Student Handbook and its clear details about requirements and course options. Students take advantage of their cross-college situation to access career services, computer resources, and shop and lab facilities in BSE and in the College of Engineering.

Student surveys and exit interviews conducted as part of regular assessment activities are positive toward the Department. Students are complimentary toward the quality of teaching overall, and they feel instructors are student focused, and also mentioned the excellent student services support staff. They feel prepared for work in their degree field upon graduation and are aware of high demand and job placement rates for BSE graduates.

Opportunities and Recommendations

The Department is very aware of their resources, limitations, and opportunities associated with the undergraduate program. As part of their Ten Year Review, following their recent ABET re-accreditation process, BSE identified three priority areas:

1. “Improve the quality of students through attracting best students not most.”
2. “Consider fewer specialty area in the BSE undergraduate program.”
3. “Increase the controls/electronics side of the curriculum.”

The Department has taken steps toward each of these areas.

The review team generally recommends that the college provide instructional resources to support the expanded undergraduate enrollments and support the Department’s efforts to improve their instructional and research facilities.

Graduate Programs

Overview

The BSE graduate program has about 45 students, about 60% PhD and 40% MS. The Ph.D. program has seen steady growth for the past decade. Applications to the program are evaluated by a subcommittee of the GRIC (Graduate Research and Instruction Committee) as well as by individual faculty who are seeking graduate students – the students are admitted to the program to work with a particular professor. The program gets about 50 applicants per year with about a 30% acceptance rate and a high (~70%) yield resulting in about 10-15
students entering the program per year. The department attributes the high yield in part to the one-to-one faculty-student matchup. The department’s major competitors for grad students include Iowa State U., U. of Illinois Urbana-Champaign, Ohio State U., U. California-Davis, Michigan State U. and Texas A&M U.

The growth in applicants and attendees is attributed to increased research activity in the department, especially in energy and biochemical areas. The department is working to improve its graduate student recruiting process, hoping to attract more high quality students who would be competitive for NSF and other prestigious graduate fellowships. Recruitment is through professional conferences, web resources, and word of mouth, and done primarily by individuals within the department.

Curriculum, evaluation and student support
The graduate program has a number of divisions – natural resources (soil and water), farm machinery and structures, energy and power, and food processing systems. Because of this diversity, there is not a set of core courses that all BSE grad students must take aside from a 1 credit seminar BSE 900 that all new students take, which is an introduction to doing research, ethics and presentation skills, and a capstone, BSE 901, in which students give a research presentation to the entire department.

Graduate students are admitted at the MS or PhD level, including students that matriculate with the intention of only completing an MS degree. MS students have two options – a thesis and non-thesis track. Very few have chosen the non-thesis option in recent years. Students intending to continue for a PhD are strongly encouraged to complete a thesis. Applicants are expected to have an undergraduate degree in engineering or closely related field. If the latter, they may be required to complete additional coursework to make up deficiencies.

Whether a student needs to take a PhD qualifying exam is up to the advisor. The preliminary exam is a research proposal that the student must write and defend; this occurs in the third or fourth semester after the student is done with their course requirements. There are very few failures, as students have the opportunity to retake the exam if their performance is poor the first time.

Students are primarily supported on RAs – there is no TA support to speak of for the department. There are a few self-funded students, generally supported by foreign governments or other institutions. Residence time for the PhD is about 5.3 years and for the MS about 2.2 years.

Anecdotally, about 50% of the PhD graduates go to academia and 50% to industry; these numbers come from reporting by advisors. The department just recently began performing an exit interview for the students and has also established a LinkedIn page.

Challenges that Professor Gunasekharan (graduate program chair) has identified with regard to the graduate program include:
• The USDA has a national needs fellowship program, but the fellowships do not cover the entire cost of tuition and stipend, obligating faculty to make up the difference from other sources or support the student at a lower rate. This affects domestic student recruiting and competitiveness with other institutions.
• The graduate student population has much less gender diversity than the undergraduate population and very little diversity with regard to underserved minority populations. The department receives very few applications from this population.
• The department would like to provide graduate students with more international opportunities, specifically mentioning a desire for more resources to enable participation in international technical meetings.

Student experience
The review committee met with five students from several different departmental divisions. Their overall level of satisfaction with the department was high. A number of topics came up in discussion including the following:
• **Career services.** The students were satisfied with the career opportunities available to them. They mentioned a number of resources, including the Engineering Career Services office, career publicity distributed by the Nelson Institute, departmental industry contacts via departmental faculty, and The Writing Center’s walk-in resume clinic.
• **Admissions and funding.** Students have a contract with advisors, renewed every year with an annual appointment letter. Many students are co-advised; more generally the students feel that the faculty seem to get along and they are comfortable talking with faculty other than their advisor(s). The students feel that the faculty are strongly invested in their success.
• **Advising resources.** The students are very happy with graduate advising, commenting that they are happy with the graduate student handbook and with the departmental staff.
• **Department social and intellectual environment.** There is an active student group that holds a monthly lunch meeting at which students give presentations on their research. There is not formal representation of graduate students at faculty meetings. There is also not a regularly scheduled departmental seminar series. Most of the graduate courses that students take are in other departments such as Mechanical Engineering. Most of the BSE courses are at the undergraduate level. Finally, the students noted that the graduate student population is not very diverse though they seemed to recognize some improvement in diversity.

Recommendations
The graduate program in BSE is very healthy. It has stable enrollments and the students are satisfied with their education and with the career opportunities that it affords. Nevertheless, opportunities exist for improvements so the following recommendations are made:
• Build on current marketing efforts to improve both the quality and diversity of the graduate applicant pool.
• Work with CALS and perhaps with other departments within CALS to remove barriers to obtaining important federal grants such as the “National Needs” fellowships mentioned above.
• Invite the graduate student group to send a representative to the open sessions of faculty meetings, as a further mechanism to facilitate communication between faculty and students.
• Consider how it can further enrich the intellectual opportunities available to students through seminars and graduate course offerings.

Research
The research program in the Department of BSE is focused on applied research that is directed toward solving problems relevant to producing and processing food and fiber and to design and implement renewable energy sources. Research projects are often cross-disciplinary and integrate the fields of engineering, agriculture, and biology. Faculty members in this department collaborate with peers in many other departments on campus and successfully contribute to the overall research mission of CALS.

Strengths of the research program
While the overall number of faculty FTE has remained constant since the previous review (2003), the number of research FTE has increased from 5.22 to 6.25. This investment in research faculty has been rewarded by excellent productivity. While the number of faculty in the BSE department is ranked in the bottom half of peer departments, research productivity is excellent and typically ranks in the top quartile. Based on academic analytics, the BSE department is ranked 7th of 33 departments in both publications and citations per faculty member.

Research is funded by a variety of agencies and private companies and is generally aligned with the mission of the department. The department should be commended for the evolution in research priorities that have allowed it to remain relevant and a leader in their discipline. During interviews with faculty members, they expressed enthusiasm and optimism about their individual research efforts and appeared supportive of research conducted by peers.

Weaknesses of the research program
Relative to peer institutions, faculty in the Dept. of BSE have received less grant dollars per faculty member. This issue is likely related to the increased number of students enrolled in the BSE program and the subsequent increase in teaching load, resulting in less time for faculty to spend preparing grant applications. This issue is somewhat minimized by the excellent research productivity of the group. However, the most pressing issue relative to research needs is the inadequate facilities for laboratories of faculty members. Faculty members and their labs are scattered across five buildings and this issue presents problems with departmental cohesiveness, intradepartmental collaboration and recruitment of new faculty members.
Resources and Needs
All faculty members as well as technical staff who participated in interviews expressed concerns about the lack of a suitable facility that includes appropriate space for faculty and graduate student offices and for research laboratories. In some instances, faculty are working in outdated laboratories that do not meet current research needs. The previous review in 2003 included recommendations for locating all faculty offices, laboratories and teaching spaces in a single building. However, since that time, the Phase II building plan for the Agriculture Engineering Laboratory Building has been dropped, as it inadequate to meet all current needs. No fund-raising strategy is currently being pursued, though old and/or inadequate equipment within the facility is being upgraded opportunistically.

Faculty suggest a completely new building is necessary to meet the need. Addressing this issue is a critical need to ensure that the research infrastructure for the department is aligned with current research. Although faculty have adapted to use of facilities in several buildings, this reduces collegiality and collaboration, impedes interaction of faculty and student researchers, and wastes time and energy. It will be difficult for the Department to retain and recruit top faculty and graduate students without addressing this issue.

Recommendations
Consolidation and upgrading of facilities is the biggest need to support research in BSE. The lack of supervision, the condition of aging equipment, and the lack of adequate air circulation and cooling in the Laboratory present a potential safety hazard. These issues in the Laboratory building should be addressed as soon as possible. A long-term plan for a consolidated building should be developed, including a fund-raising strategy, as the campus’s standard operating procedure for new buildings now entails raising at least half the needed funding.

Outreach/Extension
Outreach efforts in BSE are met through a combination of faculty participation in University of Wisconsin Extension as state specialists, and through outreach programs that are primarily delivered by academic staff. Extension and outreach programs are aligned with faculty interests and research efforts. Academic staff with outreach/extension responsibilities are specialized into delivering programs related to farm safety and health, watershed and nutrient management, and energy conservation. Stakeholders include a number of state and federal agencies and professional organizations that address food, fiber and energy needs within the state, national and international audiences. Delivery of outreach/extension programs vary among faculty and include a combination of traditional farm visits, development of websites, presentation at conferences and meetings, development of short courses, and use of distance education modalities.

Strengths of outreach/extension programs
Despite increased student numbers and declining extension headcount, outreach and extension programs remain a priority in the department. The department focuses on performing applied research that is relevant to their stakeholders and facilitating the delivery of effective
outreach/extension programs. These efforts seem to be appreciated by stakeholders, including county extension personnel. Faculty members have been creative in use of distance education and in development of fee based programming.

**Weaknesses of outreach/extension programs**
Through retirements of faculty who had large extension appointments, 4BSE has experienced a considerable reduction in faculty FTE who have extension appointments. In 2003, of 13.65 faculty FTE, there were 4.54 FTE (almost 40%) of faculty who had extension appointments. Currently of 13.4 faculty FTE, there are 2.49 (less than 20%) faculty FTE with formal extension appointments. This reduction of two FTEs, about 50% in extension capacity, has resulted in a narrowing of outreach/extension activities. This will be exacerbated with future retirements of specific faculty members, including areas of specific interest to stakeholders such as farm structures and machinery. Extension needs are also addressed through use of academic staff, however, all of the academic staff who are funded by UWEX also teach or support courses, and the balance of teaching relative to extension/outreach programming needs to be reviewed.

**Resources and Needs**
The greatest need is to maintain sufficient faculty capacity to deliver effective extension/outreach programs that are aligned with the research programs and needs of departmental stakeholders. This issue will grow as more senior faculty with extension appointments contemplate retirement. A plan for how to address future extension/outreach needs while balancing growing teaching needs should be developed.

**Facilities and Infrastructure**
The Department’s research, administration, and instructional activities are spread across five buildings, and challenges associated with facilities and infrastructure were identified in every conversation conducted for this review. All faculty, staff, and students expressed a desire for improved and consolidated facilities. Several noted that the lack of a single common space reduced opportunities for interaction and synergy within the Department and took away from the Department’s overall sense of community. In addition, specific concerns were identified related to comfort and student safety in the Agricultural Engineering Laboratory Building.

Most BSE Departmental activities take place in two Buildings:

- **Agricultural Engineering Building**—460 Henry Mall—serves as the Department’s primary home for administrative and faculty offices. This building also includes instructional spaces, student offices and lounge spaces, and conference rooms. Instructional spaces include two 40-seat classrooms (B25, 101) and the Student Engineering Design Center, connected to the Computer Aided Engineering system in the College of Engineering.

- **Agricultural Engineering Laboratory Building**—540 Elm Drive—houses multiple laboratory, workshop, computer, and instructional spaces. Originally intended to support additional
floors as the need expanded, the building is now considered dated and unable to support the vertical building space once envisioned. The building includes instructional space and five main laboratory spaces:
- Soil and Water Lab
- Milking Research and Instruction Lab
- Machinery Lab
- Environmental Quality Lab
- Machine Shop

Faculty and research activities are also centered in the Enzyme Research Institute, the Wisconsin Energy Institute, and part of the West Madison Agricultural Station. BSE students also have access to computer, lab, and shop facilities in the College of Engineering.

Although BSE facilities are generally well maintained and have benefitted from remodeling grants (e.g., asbestos removal, new cabinets, new roof venting) the primary lab spaces are aging and in need of investment. Needs are most obvious in the Agricultural Engineering Laboratory Building, where multiple faculty, staff, and students commented on the lack of air conditioning and need for wet lab space and various types of updated equipment. Staff are also concerned about their ability to maintain facilities and equipment in the Department.

Importantly, the Department is concerned about a potential student safety risk associated with un-monitored and unapproved after-hours access to the Machine Shop by non-BSE undergraduate students. Without adequate building access monitoring and security protection, students without proper safety training may have access dangerous shop equipment. This problem has been noticed during periods of intensive project deadlines for Engineering and related courses. This issue in particular needs immediate attention from the College.

Overall, BSE faculty, staff, students all feel the quality of the facilities must improve to match the quality of the Department, and to ensure the quality into the future. Although they recognize the ongoing constrained resource environment, the Department believes that a new building would meet most of their current and future needs.

**Recommendations**

Overall, BSE is a high-functioning department with a clear vision for its current and future activities. It is providing high quality research and meeting stakeholder needs. The undergraduate program has grown rapidly in recent years and appears to have reached the limits of instructional and advising capacity within the department. The graduate program is appropriate in size and scope to support student interest and research needs of faculty. This section reiterates a few of the most cogent recommendations noted in previous sections.
The greatest need, consistently expressed by faculty, staff, and students is to resolve the facilities-related challenges. *The Department should work with CALS and UW Foundation on a fund-raising strategy that can result in more unified facilities.*

BSE does not have active efforts at improving diversity within the department, though individuals recognize this as an issue and put in personal effort. Given campus-level resources and initiatives, *the Department should develop an action plan for increasing the numbers of women and under-represented minorities in its student body.* Most people consider the department climate to be quite positive, so this is an asset that could be leveraged to advantage in a diversity plan.

BSE has experienced rapid growth in undergraduate advising and instruction in recent years. Particularly with potential retirements on the horizon, continuing this level of instruction will strain staff and faculty resources, a situation not dissimilar to departments throughout the university. Nevertheless, BSE should *seek strategic hires to bolster and/or replace instructional capacity.* They will also benefit from *effective coordination with the College of Engineering* on pre-engineering and undergraduate courses.

The graduate program in BSE if functioning quite effectively, though *attention to student-faculty intellectual and governance interactions* are recommended. We also note a need to resolve a structural funding issue related to USDA “National Needs Fellowships.”
Response of the Biological Systems Engineering Department to the 2015 Program Review

BSE submitted its 10-year program self-study in October of 2014 and the review team issued its report in November of 2015. We are grateful to the review team for their thoughtful and comprehensive review of our self-study and our program and their constructive suggestions.

The review committee affirmed the direction and goals for the department as established by our faculty. We appreciate that they judged the department as a high-functioning department with a clear vision for its current and future activities and a high degree of collegiality and respect among faculty and staff. The review team suggested that the procedures for electing the department chair be reviewed and clarified. Our executive committee will undertake this task in the coming year.

Undergraduate Program

The committee reported that the undergraduate program is an important asset to the Department and CALS, comprises a vibrant core of the BSE community with a positive environment toward students, approachability and accessibility of faculty, and the supportive attitude of student services staff. Students are complimentary toward the quality of teaching faculty and feel that the faculty are strongly invested in their success. BSE students are generally meeting or exceeding target ABET performance benchmarks and fell well prepared for their career choices.

The committee concurred with our assessment that the growth in our undergraduate student population has put considerable strain on our instructional resources and that with additional resources, the Department has the potential to grow an even larger undergraduate program, complementary to other CALS programs. We have 172 undergraduates enrolled in the program as of the Spring 2016 Semester (60 Machinery Systems, 36 Food & Bioprocess, 32 General or undeclared, 24 Natural Resource and Environment, 20 Structural Systems). This number under-represents the true total, as there are typically a large number of undeclared COE students that transfer into our program. Issues concerning constrains related to faculty advising have been addressed through reassignment of much of the freshman and sophomore pre-advising to our new Student Services Coordinator.

One of the primary recommendations was that BSE should seek strategic hires to bolster and/or replace instructional capacity. The review team recommends that the college provide instructional resources to support the expanded undergraduate enrollments and support the Department’s efforts to improve their instructional and research facilities. We have addressed this with a 2016 faculty position request in the Machinery Systems area (currently at 60 students in this option). Our second priority is for additional faculty to support our food engineering area (currently at 36 students).
The committee also recommended that **BSE will benefit from effective coordination with the College of Engineering on pre-engineering and undergraduate courses.** We are in constant communication with COE on developments in their curriculum and course offerings that present challenges and opportunities as part of the continuous review and evolution of our curriculum. Of particular note are changes in the technical writing offerings and introductory engineering courses (questionable future status of InterEgr 102 and InterEgr 397, redesign of InterEgr 160 to InterEgr 110 and InterEgr 170).

**Graduate Instruction and Research**

The review team indicated that the graduate program in BSE is very healthy and is functioning quite effectively with stable enrollments, and that students are satisfied with their education and career opportunities. Our research program was judged to be of high quality, meeting stakeholder needs, highly collaborative with other departments and successfully contributing to the overall research mission of CALS. The review team noted that BSE faculty receive less grant dollars per faculty member than some of our peer departments; likely related to the high teaching load, an issue that is somewhat minimized by the excellent research productivity of the group. The department was commended for the evolution in research priorities that have allowed it to remain relevant and a leader in their discipline. The most pressing issue relative to research needs was identifies as inadequate facilities for laboratories of faculty members.

The review team recommended increased **Attention to student/faculty intellectual and governance interactions**, with specific suggestions for further enriching the intellectual opportunities available to students through seminars and graduate course offerings and invite the graduate student group to send a representative to the open sessions of faculty meetings. BSE requires all graduate students to take two seminar classes: BSE 900 and BSE 901. BSE 900 seminar class introduces students various resources available on campus for their intellectual and research pursuits (e.g., CALS Statistical Consulting service, DELTA program, Writing Center, etc.). In BSE 901 graduating students present their research. To their seminars presentations all students, staff and faculty re invited. This has provided a good forum for graduate students to interact and intellectually engage with the rest of the department. We have a provision to include a graduate student representative to serves on the BSE Graduate Instruction and Research Committee.

The review committee recommended that **the Department should develop an action plan for increasing the numbers of women and under-represented minorities in its student body.** We recognize this common need in all of our sister departments and are in discussion with our peers to identify best practices for recruiting and retaining women and minorities into STEM fields. The percentage of female graduate students has been steadily increasing to the current 32%. Our undergraduate population is 27% female and 12% minority: We will implement the suggestion to build on our current marketing efforts to improve both the quality and diversity of the graduate applicant pool.

**Outreach/Extension Programs**

BSE has experienced a considerable reduction in faculty FTE who have extension appointments (2.49), has resulted in a narrowing of outreach/extension activities. The review team noted that all of the academic staff who are funded by UWEX also teach or support courses and that the balance of teaching, relative to extension/outreach programming should be reviewed. The
Academic Staff in BSE funded by UWEX include:

- John Panuska (%100 Extension Funding) teaches a 2 credit course BSE 201 Land Surveying fundamentals;
- Scott Sanford (25% UWEX funding) has previously taught a 2 credit short course on Energy Management,
- Cheryl Skjolaas (100% UWEX Center for Ag Safety and Health funding) teaches a 1 credit short course on Agricultural Safety and Health.

Of the faculty with extension appointments:

- David Kammel (80% UWEX 20% Research) teaches a 2 credit short course in Dairy Livestock Housing,
- Brian Luck (70% UWEX 30% research) does not teach or assist in any courses,
- Douglas Reinemann (51% UWEX, 24% teaching, 25% research) teaches a 3 credit course in renewable Energy systems,
- Rebecca Larson (50% Extension, 40% Research, 10% Teaching) teaches approximately 1/3 of a 3 credit course in nutrient management.

The greatest need identified was to maintain sufficient faculty capacity to deliver effective extension/outreach programs that are aligned with the research programs and needs of departmental stakeholders. The review team recommended a plan to address future extension/outreach needs, while balancing growing teaching needs, should be developed.

The short course offerings have traditionally been considered part of the Extension mission. The surveying course is primarily a service course with the majority of students from degree programs other than BSE. (We are considering discontinuing this course?) We have respected the T/R/E splits of our faculty and intend to do so in the future. We look forward to guidance from CALS and UWEX regarding the appropriate teaching activities for faculty with extension appointments, how 101 teaching and research percentages should be handled, and new policies regarding short course instruction. The realities of future Extension budgets for Specialists makes it particularly difficult to maintain, much less regain, faculty specialist positions. We have managed to fund a number of extension/outreach program staff from soft funds generated by gifts and grants and program revenue. We will continue to explore these opportunities as well as other creative responses to restructuring of the UWEX network in response to budget challenges.

Facilities

The review team reinforced our facilities concerns about facilities and noted that consolidation and upgrading of facilities is the biggest need to support research in BSE. Faculty members and their labs are scattered across five buildings and this presents problems with departmental cohesiveness, intradepartmental collaboration and retention and recruitment of top faculty and graduate students. Needs are most obvious in the Agricultural Engineering Laboratory Building with needs for additional wet lab space and updated research equipment were identified. Importantly, the Department is concerned about a potential student safety risk associated with use of the outdated Machine Shop for instructional purposes. The lack of adequate supervision, the condition of aging equipment, and the lack of adequate air circulation and cooling in the
Laboratory present a potential safety hazard. Without adequate building access monitoring and security protection, students without proper safety training may have access dangerous equipment. This issue in particular needs immediate attention from the College and should be addressed as soon as possible. The review team indicated that a long-term plan for a consolidated building should be developed, and recommended that the Department should work with CALS and UW Foundation on a fund-raising strategy that can result in more unified facilities.

The major impediment to the effort to unify facilities is the projected cost of a new building ($90M) and the requirement of a 50% contribution from private sources. In addition, the footprint of a building to meet our needs is unlikely to fit on the current footprint making location of a new building challenging. We continue to explore creative options for addressing our space needs. The shop/lab facility and staff at our sister departments provide a vital and valuable contribution to both the teaching and research mission. Our near-term goals are to address the immediate safety concerns in our lab building and to improve this instructional space to keep pace with our peer departments.

We have identified several industrial stakeholders that are ready and willing to facilitate fundraising activities. This effort is being coordinated with a position refill (shop manager retirement in January 2015) and redefinition of this position to meet the future needs of the department. We have developed a PD and hope to fill this position by the summer of 2016. We would like to involve this new staff person in the development of ideas for space and facilities upgrades and anticipate launching our development campaign in the Fall of 2016. We have concerns about the type and level of support that is available from our current Foundation officer to facilitate this process.
This visualization was created by the Graduate School. Questions should be directed to Peter Kinsley, peter.kinsley@wisc.edu.
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Students with an Appointment of 33% or Higher

This visualization was created by the Graduate School. Questions should be directed to Peter Kinsley, peter.kinsley@wisc.edu.
PhD Time-to-Degree Metrics, Peer Comparison

Select UW-Madison Program
Biological Systems Engineering

Select Time-to-Degree Metric
Time at UW-Madison as a Graduate Student

Years to Doctoral Degree

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This visualization was created by Academic Planning and Institutional Research (APIR), Office of the Provost, UW-Madison. Questions should be directed to Sara Lazenby, sara.lazenby@wisc.edu.
Distribution of Elapsed Years to Degree (Fall 2006 - Fall 2016)

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<th>Degree Level</th>
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<td>Doctorate</td>
<td>68.2%</td>
</tr>
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</table>

- Less than 5 years: 18.2%
- 5-5 years: 9.1%
- 6-7 years: 4.5%
- 8-9 years: 8.3%
PhD Retention/Completion Rates, Peer Comparison

Dashboard will populate the retention/completion rates for the UW-Madison program (top graph) and the retention/completion rates for comparable peer programs at other AAU institutions (bottom graph).

Select UW-Madison Program
Biological Systems Engineering

UW-Madison Retention/Completion Rates (Biological Systems Engineering)

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<td>8</td>
<td>66.7%</td>
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<tr>
<td>9</td>
<td>66.7%</td>
</tr>
<tr>
<td>10</td>
<td>66.7%</td>
</tr>
</tbody>
</table>

Association of American Universities Peer Program Retention/Completion Rates (Biological Systems Engineering)

<table>
<thead>
<tr>
<th>Number of years since PhD entrance cohort entered program</th>
<th>Percent of Entrance Cohort</th>
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<tr>
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<tr>
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</tr>
<tr>
<td>10</td>
<td>18.0%</td>
</tr>
</tbody>
</table>

Student Status
- % Not Enrolled
- % Completed
- % Enrolled

This visualization was created by Academic Planning and Institutional Research (APIR), Office of the Provost, UW-Madison. Questions should be directed to Sara Lazenby, sara.lazenby@wisc.edu.