Proposed Changes to MA, MS and PhD Curricula for Fall 2014

The School of Sustainability (SOS) is creating a differentiation between the more applied Master of Sustainability Solutions (M.SUS.) degree and the more research oriented degrees, which include the M.A., M.S., and Ph.D. programs. While the M.SUS. culminates with an applied project, internship or workshop, the M.A., M.S., and Ph.D. programs culminate with research writing: a Thesis (or publishable scientific paper), or a Dissertation. The assumption is that a student in the M.A. or M.S. program plans to go on to a Ph.D. program here or elsewhere.

To best support the development of strong researchers, the School is in the process of formalizing the following changes for Fall 2014. While the process is not yet complete, the purpose of this document is to give prospective applicants a fair warning that the program they are applying for is likely to be the one described here, rather than the one described elsewhere on the SOS website. While many of the courses are the same, there will be five (5) new courses, and the total degree will be 40 credits rather than 33. It has been designed over the past year by a dedicated group of faculty and graduate students to create a truly exceptional, student-focused, sustainability-centric graduate program for those who plan to be sustainability scholars. The plan has been approved by SOS faculty, but must be approved by the ASU Leadership before it is finalized. Below is a brief description of the proposed program of study.

Broadly speaking, central considerations of the committee reflected the desire to create a curriculum which:

- Provides students with both content knowledge and core skills related to sustainability
- Balances the need to impart a common set of knowledge and skills with the freedom for students to pursue depth of training pertinent to a diversity of research interests
- Contributes to the distinctiveness of SOS as a sustainability-focused educational institution
- Highlights team-based learning and team teaching as a central element of inter- and transdisciplinary education
- Supports the development of a strong student cohort

Based on these considerations the committee has crafted the proposal (Table 1) for a two-year M.A./M.S. curriculum. Green squares represent required elements; light-green squares represent electives chosen based on a defined set of parameters; blue squares represent open electives; and purple squares represent time set aside for thesis work.

In the first semester, all students take all of the same courses in order to develop a strong cohort with a shared body of knowledge. Subsequent semesters become increasingly open to allow students to customize their education.
Table 1: Overview of the proposed curriculum

<table>
<thead>
<tr>
<th>Sem.</th>
<th>Courses</th>
<th>Credits</th>
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<tbody>
<tr>
<td>1</td>
<td>Perspectives on Sustainability 3-credits C-Session</td>
<td>10</td>
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<tr>
<td></td>
<td>Research Design and Methods 3-credits C-Session</td>
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<td></td>
<td>Social-Ecological-Technical Systems: Domains and Interfaces 3-credits C-session</td>
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<td></td>
<td>SOS Sustainability Research Community 1-credit, C-session</td>
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<tr>
<td>2</td>
<td>Elective on: Normative Dimensions 3-credits, any session</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Elective: Sustainability Methodologies 3-credits, any session</td>
<td></td>
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<tr>
<td></td>
<td>SOS Sustainability Research Community 1-credit, C-session</td>
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<tr>
<td>3</td>
<td>Thesis Proposal Writing 3 credits C-Session</td>
<td>10</td>
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<tr>
<td></td>
<td>Elective: Method course 3-credits, any session</td>
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<tr>
<td></td>
<td>SOS Sustainability Research Community 1-credit, C-session</td>
<td></td>
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<tr>
<td>4</td>
<td>Synthesis course 3 credits, C-Session</td>
<td>10</td>
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<tr>
<td></td>
<td>Thesis Hours * 3 credits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOS Sustainability Research Community 1-credit, C-session</td>
<td></td>
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*Note: students will likely have the option to publish a second-year paper in lieu of a thesis*

Here is a summary of the allocation of credit hours:

**Total credit hours:** 40

**Total required (green and purple) credit hours:** 25

**Total elective credit hours:** 15

**CORE REQUIRED COURSES:**

**SOS 510: Perspectives on Sustainability - 3 credits, first semester**

The purpose of this course is to discuss the historical legacy of sustainability and place it in broader contexts of developments in related fields and watershed moments. It also introduces key sustainability problem domains. It is considered likely that this course would also provide an introduction to the normative component of sustainability.

**SOS 520: Research Design and Intro to Methods for Sustainability – 3 credits, first semester**

The goal of this course is two-fold. First, it would help students develop skills in defining research questions; choosing or developing methodological approaches best suited to these specific questions and identifying the implications of these choices. Second, it would provide a basic knowledge of a range of research approaches currently used in sustainability related fields so that a) students can make informed choices about further training, and b) students are better equipped to engage with researchers using diverse approaches.
Social-Ecological-Technical Systems (SETS): domains and interfaces: 3 credits, first semester

The purpose of this course is to develop an integrated approach/framework for thinking about complex adaptive systems in a sustainability context. While overviews of content, theories and methods from each of the SETS domains (Social, Ecological and Technical Systems) would be presented (see Figure 1 below), the primary focus will be on how to bring these domains together. The goal is to enable students to explore the SETS interfaces (intersections) from an integrated perspective and to equip students to make those linkages in their research and in subsequent elective courses. Given the need for depth and wide-ranging integration across all domains, it is strongly recommended that this course be developed and taught by a team of faculty.

Figure 1: Representation of the three SETS domains and their interfaces. Interfaces consist of all 2 and 3-way intersections of the SETS domains.

“Community of Scholars” – 1 credit, all semesters

Students (including Ph.D. students) would be required to take a one-credit “Community of Scholars” course each semester that would meet once a week. The idea is that this will foster cohort-building, provide faculty a consistent forum to interact with students, foster graduate student mentoring, and build support for an alumni network. It would be overseen by one faculty member each semester, but with potential for substantial involvement of students in the organization and administration of individual sessions.

Thesis Proposal Writing: 1 credit, third semester
The intent of this course would be to help students develop and strengthen their thesis, dissertation, grant and research proposals following the start they got in the research design course.

**Synthesis of Sustainability Research: 3 credits, fourth semester**

This course would engage students in inter- and transdisciplinary problem solving after they have gained depth of training in content areas, integrative approaches and methods. One feature of this proposal is that there is both an “individual” and a “team” option. In the “individual” option students would prepare a traditional thesis or final paper and would participate in a 3-credit synthesis workshop course. In the “team” option, students would be responsible for conducting a large team project (although individual papers could emerge from this) and would enroll in a more expansive 6-credit workshop course.

**ELECTIVES**

The goal of the electives is to allow students the greatest flexibility in determining their own pathway, while also ensuring that some core skills and knowledge are reflected in all SOS M.A./ M.S. graduates.

For this reason we are proposing an overarching strategy for the selection of electives. Students would take a minimum of five 3-credit electives. Of these, 3 3-credit electives are chosen from more specified bundles of options (light green in the diagram) while the remaining 2 3-credits electives (blue) are essentially free, subject to approval by the student’s committee.

**Defined Electives** (light green) – 3 3-credit courses in total.

Students would take one course from each of the following specified bundles:

**Methods – 3 credits, as soon as reasonably possible (2nd or 3rd semester)**

Students would take a course in at least one method pertinent to their research. Students will be strongly encouraged to draw upon the large number of methods courses taught across ASU to satisfy this elective. The purpose of maintaining an inventory of such courses, and building links across
programs to make sure our students are welcome and meet pre-req requirements for methods courses, would be a valuable service to students and their faculty mentors.

**Normative Dimensions – 3 credits, any session**

The intent of this elective would be to take a course that addresses the normative component of sustainability. At a first rough glance it appeared that current courses that may meet this elective requirement include those offered by Drs. Minteer, McGregor, Bolin, and Sarewitz.

**Sustainability Methodologies – 3 credits, second semester**

This elective would be chosen from a limited (2-4) set of approved options. The sustainability methodology courses support students in integrating different methods necessary for investigating sustainability issues. These courses build students’ capacity to understand how individual methods have limitations and need to be combined with other methods in order to comprehensively address sustainability challenges and develop evidence-based solution options. These courses familiarize students with methodological frameworks (sustainability methodologies) and enable students to describe, compare, evaluate, position, and combine different research methods within these frameworks. The methodology courses address quantitative and qualitative methods and convey critical methodological concepts of quality, validity, reliability, evidence, etc. Importantly, these “methodologies” courses differ in their purpose from more traditional “methods” courses; students will still need to pursue training in specific methods for their research.

The proposed criteria for a course to be considered a sustainability methodology course are:

1. All sustainability methodology courses build students' capacity in integrative capacity across at least two of the five sustainability competencies
2. All sustainability methodology courses deal with the SETS interfaces, by the nature of having to draw on a variety of methods to address questions spanning a variety of disciplines

Potential courses in this category include "Transformational Sustainability Research Methodology" (Wiek) and "Dynamic Modeling for Sustainability Science" (Anderies).

**Open Electives (2 or more 3 credit electives)**

The selection of these electives will be left to the discretion of the student and the student’s committee. However, these courses should serve to give the student specific depth in the SETS domains, interfaces, and sustainability competencies needed to conduct their research.
OTHER CURRICULAR COMPONENTS

Quantitative Competence

It is proposed that ALL students satisfy a quantitative competence requirement. This is not intended to favor quantitative methods but is meant to provide the foundational language of most quantitative methods so that all students (including those without strong quantitative backgrounds) have the opportunity to access appropriate methods courses as well as understand conceptual content from quantitative disciplines and systems approaches at more than a superficial level.

Thesis or Publishable Final Paper

Students may write a thesis or a publishable 2nd year paper. Such an output may be particularly well suited for M.A./ M.S. students that will be continuing on to get their Ph.D. We propose a flexible approach, allowing this tradeoff to be negotiated between a student and his/her committee. Students may also have the ability to work in teams to write and publish these scientific papers as a final degree product. We also support creating a matrix for students outlining the requirements, opportunities and potential shortcomings for each option to help students and their advisors to select the option that best fits his/ her needs. Regardless of the option chosen, we will require that a student’s thesis or final paper be of sufficient quality to be publishable in a peer-reviewed outlet, and that the student actually submit the paper for publication.