MSUS CULMINATING EXPERIENCE GUIDE
2019-2020

Fall 2019

Master of Sustainability Solutions (MSUS)
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MSUS CULMINATING EXPERIENCE GUIDE

“Make MSUS projects the most amazing experience possible for every MSUS student!”
Rob Melnick, Executive Director
Julie Ann Wrigley Global Institute of Sustainability

INTRODUCTION

Welcome to the Master of Sustainability Solutions (MSUS) Culminating Experience (CE) Guide. This document outlines the purpose of the CE within the MSUS degree program and how to identify, create, and execute a successful project.

As MSUS students you are required to participate in a CE that takes sustainability concepts from the classroom (or other venues like workshops and research projects), and apply them in real world situations. The CE program is intended to demonstrate your mastery of those concepts, and build on the core competency areas that sustainability students must acquire in order to succeed in the field.

Although many students have developed and executed projects as individuals, the ASU School of Sustainability (SOS) faculty, administration, and MSUS Supervisory Committee strongly recommend group projects as the optimal vehicle for both sustainability and student learning outcomes. Sustainability practitioners cannot expect to work alone after graduation because they need to work with trans-disciplinary partners to successfully address the complexity of sustainability problems. Therefore, a group MSUS CE is an opportunity to increase competence in group settings.

In this document the full process and requirements for the MSUS CE will be laid out as they relate to the current expectations and requirements for MSUS students. The “Applied Projects” section, immediately following this introduction, is an explanation of the mission and purpose of the CE (aka Applied Project). The “Project Attributes” section will present metrics for successful projects, and the “Delivering a Quality Project” section will outline how to communicate the project’s outcomes to the various stakeholders.

The “Project Development Section” looks at how your CE fits into the context of your MSUS experience and the process of preparing, developing, and executing your CE. The two sections, titled “Working with Faculty and Subject Matter Experts”
and “Working with the MSUS Learning Projects Program Manager,” focus on the supportive infrastructure available to you and your project.

Finally, a section on “Additional Resources” offers some places to look for project ideas, project partners, research, and some sustainability tools.

APPLIED PROJECTS

What is the applied project and why is it a degree requirement? There is a plethora of research coming from all scientific disciplines that characterize the current state of the environment, people, and the economy, and provide business as usual forecasts. There are far fewer applications of that knowledge in the service of normative aspirations and desirable, sustainable, future visions. The MSUS program is designed to prepare students to use research as the building blocks for creating a more sustainable future. To that end MSUS students must demonstrate an ability to interpret scientific studies in a way that supports the creation of more productive and sustainable outcomes.

Applied Project Mission

Connect students with projects aligned to their passion

The MSUS CE program is a student’s opportunity to work on a sustainability challenge, or an area of interest, about which they are passionate. The importance of an emotional connection to your work cannot be overstated. The most successful CE experiences are driven by the passion of the project participants. Conversely, the least successful projects lack emotional investment. Students who embark on difficult projects in areas with which they have great affinity, find it easier to dedicate time to the project, consistently find the means to surmount barriers, and produce higher quality project deliverables. To successfully complete the MSUS CE requirement, high quality deliverables are necessary (see “Delivering a Quality Project” below).

Demonstration of sustainability knowledge

Since the CE work comes near the end of the graduate student experience at SOS, the work produced should reference and reflect the knowledge gained as a student in the MSUS program. Project deliverables should demonstrate familiarity with the goals and purposes of sustainability practices, complex systems and their challenges, and efforts to increase the sustainability of our planet. Foundational, core, and topic courses taken at SOS should be the academic underpinning for a student’s CE. That is not to say students won’t need to explore and understand related topics—inevitably they will.

Demonstration of ability to implement and extend knowledge

Your CE should contribute to the existing knowledge base by addressing a knowledge gap, creating new pathways to understanding, or implementing a new
method to address a sustainability challenge. Merely qualifying or quantifying the current state, such as documenting a company's greenhouse gas (GHG) footprint, is insufficient as a CE deliverable. Developing new pathways to reduce that same company's GHG production is a path to implementation, and an extension of sustainability knowledge and methods. Overall, a CE should be a demonstration of a student's leadership and display an ability to apply existing knowledge to address a sustainability challenge.

**Career Preparation**

Working in an applied and practical fashion with a corporate partner is an excellent way to develop skills that are in demand by potential employers. Every student’s project should help that student prepare for a career after completing the MSUS program. This career preparation can be done within the CE scope by increasing specialized knowledge, addressing sustainability elements specific to an industry, using special technology and tools, and working with people in your desired area of expertise or specialization. For example, if you want to work in International Development, a project that addresses a sustainability problem in the developing world might be more useful than a development issue in a developed country. Students talk to people on their career path to get information on what skills and tools are required to pursue that path, and then build opportunities to employ those skills and tools in their CE. Developing a network of colleagues and resources during the course of your CE is a common side benefit of MSUS projects and will ease your path to a career in sustainability.

Regardless of the CE topic or deliverables, the experience should help build interpersonal skills like task management, conflict resolution, and negotiation – all of which are as critical to success as subject area expertise.

**Applied Project Purpose**

**Building Competence**

One purpose of the CE is to build student competency and capacity through the planning and execution of applied projects.

First and foremost, it is critical that students can identify a sustainability challenge and create a project management plan that creates an appropriate response to that challenge. Project Management skills include: creating a project scope; identifying desirable outcomes; gathering resources; assembling stakeholders; developing response strategies; planning project-specific tasks; communicating with team members and stakeholders, and; coordinating timelines.

The SOS faculty and administration expect each student to develop 5 core competencies during their time in the program. Students should be able to demonstrate those competencies as they execute their CE.

**Systems thinking**
Every student should be well versed in systems thinking and demonstrate their knowledge of interconnected variables and their effects on each other over time. Knowing that systems can operate at multiple scales, cross various boundaries, and have effects that emerge on varying timelines is critical to developing intervention and transition strategies.

**Anticipatory Thinking**
As students develop intervention strategies, they need to think critically and forecast probable outcomes. Anticipatory thinking is critical for developing future scenarios absent interventions, and sustainable visions resulting from interventions.

**Strategic Thinking**
To develop transition strategies, leading to a more sustainable future, strategic competence is required. Students must be able to design and implement interventions that lead to positive outcomes.

**Normative Thinking**
Without a map of sustainability values, principles, goals, and targets, future visions have no purpose, and strategies are without direction. Normative competence might be better understood as our collective thoughts about what is important to society as we move forward. Protecting the ability of future generations to enjoy the benefits of our planets resources, is an example of normative thinking.

**Collaborative/Interpersonal**
All of the above competencies rely on collaborative or interpersonal competence, especially normative competence. Without the ability to elicit common values, co-create knowledge and strategies, intervention strategies are neither targeted nor visionary. Interpersonal skills are critical for both collaboration and consensus.

*Leadership capacity building*
Outside of the core competencies are another set of competencies prized by academics, practitioners, and enterprise leaders. The MSUS CE is designed to help you grow in these areas, and become resilient, resourceful leaders.

**Grit**
Working in the sustainability field brings many challenges and seemingly insurmountable odds. The same is true in the relatively protected SOS environment, particularly in the CE program. Students are expected to demonstrate resilience in the face of disappointment and barriers. In short, you must show gritty determination to get the job done against long odds. Perseverance in the face of difficulty is a critical leadership quality.
Creativity
Getting the job done against long odds might mean you are adapting as you go – as one faculty member once described it, “Building your airplane as you plummet toward the ground.” Successful students have shown the ability to create alternate solutions and scenarios as they proceed to the end goal.

Innovation
Sometimes students discover innovative solutions, methods, or tools. Those who can do this have a powerful story to tell potential employers, and make themselves more marketable upon completion of their project and degree.

Creative Problem Solving
As you work through your CE, things will not go as expected-it’s almost guaranteed. Ask most MSUS alumni if their project went as expected, and a large majority will respond negatively. Prior preparation may not be enough, and thinking on your feet to creatively turn negative inputs into positive attributes is a useful competence, for both your project and your career.

Independence
Even though most sustainability challenges require a collaborative approach and engage multiple stakeholders, a singularity of vision and independence is required to drive the project to success. Independence can be witnessed in objective thinking, critical evaluations of evidence, and equitable management of project resources. Those qualities must be embodied in the project leader in order for projects to make it to completion regardless of the shortcomings of project participants. Self-reliance is a necessity for MSUS Applied projects and life.

If you develop these competencies you are more likely to create outcomes of value for yourself, your project stakeholders, and the SOS community.

Community Engagement
Communities are much more aware of the intricacies of sustainability challenges in their area, therefore they are important repositories of knowledge that can hold the key to positive outcomes.

Stakeholder Engagement
At SOS we know that legitimate, coherent, nuanced, motivational, and shared outcomes are unlikely to be achieved without stakeholder participation. Plausible, tangible, and relevant outcomes are conceivable without stakeholder engagement, but they are much less desirable. Without these and other qualities, MSUS projects that do not engage stakeholders are not considered sustainability solutions, or acceptable for fulfilling the degree requirements.

Service Learning
Part of the mission at SOS is to make a positive impact within the communities where we work and/or develop projects. Most often MSUS Students
are not paid for the work they do, but providing pro-bono services to the community benefits you (the student) as a valuable learning experience. Service learning allows for more creativity, experimentation, and freedom for students to gain leadership experience they might not otherwise gain. If students are paid, they assume a role similar to a consultant and must balance what’s best for the majority of stakeholders with the client’s needs.

Representing ASU

Being out in the community means you not only represent yourselves and your families, but you are the face of ASU in general and SOS in particular. Your professionalism should reflect your respect for the outside community, the reputation of fellow ASU students, and SOS faculty, staff and peers. Make the most of your opportunity to train yourself for a professional career by developing skills and relationships that honor your origins. Comradery, future support, and collaboration opportunities are often built on the professional comportment you develop and exercise while working on your CE.

PROJECT DEVELOPMENT

As your time at ASU’s School of Sustainability progresses, you will be exposed to many areas of study, and your interests become more focused. Students are encouraged to contemplate their career direction and interests as they relate to possible culminating experiences, after completing the first semester of coursework. Varying student circumstances related to work, family, and funding are supported by creating flexibility in the length of time you might spend in the MSUS program. Those options dictate the relative timing of the CE in your degree program timeline. Outlined below are the current available degree and degree timeline configurations.

Project Timing within the traditional MSUS Degree Program

All MSUS students should develop a degree completion timeline that fits their own needs. Recent graduates have opted for a three or four semester completion schedule for the traditional MSUS track. You should note that as completion schedules are compressed, flexibility within the program and cohesion with peers may diminish. Some courses are not offered in both fall and spring semesters so it may be difficult to align your desired course selections with your official interactive plan of study (iPOS); the university agreement that lists specific courses used to fulfill your degree requirements. Summer course offerings are limited at this writing – usually only study abroad classes are offered in SOS – but could change as demand increases.

Within the degree timeline options, the CE is designed to fit into the final two semesters of study. In the first and second MSUS semesters, students enroll in core and foundational courses critical to their understanding of sustainability
concepts, methods, and tools. (For more information on course requirements see the latest version of the MSUS Graduate Handbook). Following those courses, the CE experience has two course components: SOS 582 Sustainability Project Management and SOS 593 Applied Project. In SOS 582 students learn project management concepts, methods, and tools in the classroom, define the scope and mission of their individual or group CE project, and develop a CE project management plan as a part of the course. The next semester in SOS 593, student(s) will (independently or in groups) execute their project according to the project management plan developed in SOS 582.

**Four Semester Program**

The traditional, four semester, two-year, program is the most popular option because it allows for a lower intensity pace and more opportunity for participation in extra-curricular activities. Students who are employed half or full-time also find this an attractive option because the academic load is lower in each of the four semesters. Students in this track graduate in spring of their second year.

Students on this track, and in the MSUS 4+1 program, typically take SOS 582 Project Management in their 3rd semester in the MSUS program. The SOS 593 Applied Project follows in their 4th Semester.
The four-semester track also allows for Study Abroad windows in summers following either the 2nd or 4th semester of study. Study Abroad is highly recommended for our students as an opportunity to explore sustainability challenges across the globe.

Another advantage of the program is that it can lessen the academic load in one of the four semesters when it is used in lieu of a Focus Area Elective.

Figure 1 shows an example of how to organize your coursework to fit within the four-semester timeframe and options for including a Study Abroad experience. (If you are a 4+1
student see Figure 3 and the discussion below.) The white circle with a number inside indicates the number of course credit hours you’ll need to take in each semester. The study abroad courses typically have 3 credit hours and can replace an elective in any of the semesters, thus reducing that semester load by 3 credits.

**Three Semester Program**

The three-semester, 1½ year, program is a popular alternative for students who want to reduce their degree completion time and/or the total cost of their degree. A three-semester timeline brings a higher intensity pace, and there may be less time for participation in extracurricular activities.

Students who are employed half or full-time might find this option more stressful because the academic load is higher in each of the three semesters. Students on the three-semester track graduate in December of their second year. Due to 4+1 program restrictions on courses available to students in their first two semesters, 4+1 students in the are typically not able complete the MSUS degree requirements in three semesters.

Students on this track may take SOS 582 Project Management in their 2nd semester in the MSUS program if it is offered. The SOS 593 Applied Project follows in their 3rd Semester; also if offered.

The three-semester track also allows for a Study Abroad window in the summer following the 2nd semester of study. Study Abroad is highly recommended for the same reason as it is for four semester students, and as a way to lower the load in one of your semesters. Study Abroad can be used in lieu of a Focus Area Elective.

Figure 2 shows an example of how to organize your coursework to fit within the three-semester time frame, and an option for including Study Abroad.
circle with a number inside indicates the number of course credit hours you’ll need to take in each semester. Study Abroad courses typically have 3 credit hours and they can replace an elective in any of the semesters, thus reducing that semester load by 3 credits.

On either the three or four semester tracks, students may use an internship as an elective course credit, and as a launch point for their Applied Project.

**Project Timing within the MSUS 4+1 Degree Program**

All MSUS 4+1 students should develop a degree completion timeline that fits their own needs. Due to the program design, your completion schedule is compressed and has diminished flexibility. Figure 3 shows an example of how to organize your coursework to fit within the four-semester time frame. You should be designing your course of study during your “overlap” (senior undergraduate) year. Unlike traditional MSUS students, SOS undergrads have time to identify graduate courses of interest and their timing in fall and spring semesters. Take time early in the program to align your desired course selections with your proposed iPOS. One important note: 4+1 students are not allowed to take graduate courses in the summer between undergraduate commencement and their fall enrollment for graduate school. Furthermore, summer graduate course offerings are limited.

In the last two semesters of your undergraduate program, 4+1 students must enroll in core and foundational courses critical to their understanding of sustainability concepts, methods, and tools. (For more information on course requirements see the latest version of the MSUS Graduate Handbook). Within the MSUS 4+1 degree timeline, the CE is designed to fit into the two graduate semesters.
of study. The CE experience has two course components: SOS 582 Sustainability Project Management and SOS 593 Applied Project. In SOS 582 students learn project management concepts, methods, and tools in the classroom, define the scope and mission of their individual or group CE project, and develop a CE project management plan as a part of their classwork. The next semester in SOS 593, the student(s) will (independently or in groups) execute their project according to the project management plan developed in SOS 582.

Summer Projects

Students often ask if it is permissible to complete their project work over the summer session. We know that some students have time constraints and financial pressures that prompt the question. For a number of reasons, we say it is not impossible to complete a project over the summer semester but the degree of difficulty to complete the work rises significantly. First, summer sessions are much shorter than fall and spring forcing your project into a compressed time frame. Any barriers or difficulties you encounter during the execution of your CE project will have more serious repercussions in the summer session. Second, faculty availability is extremely limited, thus getting feedback on your deliverables is difficult without prior arrangements. If you have compelling reasons to start and finish a project over summer session, it is imperative that you line up summer faculty support, preferably in writing, one full semester prior to summer session. Finally, peer support will be extremely limited as most students leave campus for the summer.

Identifying a Project

Project Sources

Sustainability Connect

The Sustainability Connect (SC) website (https://sustainabilityconnect.asu.edu/) is a platform designed to connect students, faculty, and community members for applied learning experiences related to sustainability. SC is also a resource for students to explore completed projects as sources of inspiration, partnerships with other students, and to connect with a wide variety of ASU faculty.

Once you access the website, create an account to get full access to people and projects on the site. You can also see new projects, workshops, volunteer opportunities, and internship opportunities.

ASU & Affiliates

Within the Julie Ann Wrigley Global Institute of Sustainability (GIOS) and SOS there are many affiliated programs and organizations. Quite often these entities are looking for student assistance and may allow a MSUS project to be built within the organization’s initiatives or a jumping off point for an MSUS project. SOS faculty and scholars are good sources for understanding what goes on under the various organizational umbrellas, and what project and learning opportunities are possible
within. A few of the organizations are: Central Arizona Phoenix Long-term Ecological Research (CAP LTER), The Sustainable Cities Network (SCN), Project Cities (PC), Decision Center for Desert Cities (DCDC), Urban Resilience to Extremes-Sustainability Research Network (UREx SRN), The Sustainability Consortium (TSC), Walton Sustainability Solutions Initiatives (WSSI) and Center for Biodiversity Outcomes (CBO).

Faculty

Faculty drive a lot of what happens at SOS, and many of them engage student participation in their research. Some have set up “labs” in which students can participate. Examples within SOS are The Happiness Lab and the Sustainability Transition and Intervention Lab. Students can learn more about these from conversations with peers, faculty, and administration. In these settings faculty may help students set up MSUS projects that simultaneously further student and faculty goals.

Internships

Internships can qualify as elective credits, and they can be opportunities to develop an applied project in parallel with that experience. Interning for an organization can reveal useful insights to sustainability problems within, and externalities generated by the organization. As a result, an applied project can be more targeted and beneficial to both the student and the organization. Our SOS Internship Coordinator and the Sustainability Connect website can help you find internship opportunities.

Networking

Sustainability projects often arise through conversations with people you meet both inside and outside of SOS. It never hurts to follow up on a conversation to see if a project opportunity exists. Many students have created projects this way, but it does not have to be the only avenue. Be advised that projects coming to you in this way are subject to the review and approval of the MSUS Supervisory Committee. As a precautionary measure, discuss opportunities found through networking with a faculty member prior to pitching it to the committee.

Other graduate students

Other SOS graduate students in the MA/MS and PhD programs, and alumni, can be sources for projects either through the social network or by following up on their research projects. MSUS students may also find paths to projects by comparing skills and interests in the new, one-credit colloquium course, SOS 598 Applied Leadership Lab.

Other Project Sources

Other opportunities and partnerships can be found outside of the SOS family. For example, the Ira A. Fulton School of Engineering’s EPICS program, the Thunderbird School of Global Management, and the WP Carey School of Business.
The Solutions Summit and Changemaker Challenge hosted every year by ASU's Changemaker Central, or entrepreneurial opportunities like the ASU Innovation Open and the Edson Student Entrepreneur Initiative are on-campus initiatives that can provide project inspiration.

Other units within the ASU community, like the University Sustainability Practices (USP) office and the Office of the University Architect (OUA) are constant sources of project ideas.

**Student Learning Projects Program Manager**

The MSUS Student Learning Projects Program Manager was added to staff in Spring 2016 as a resource for MSUS projects. Numerous project opportunities are forwarded to the Program Manager by faculty, staff, and other partner organizations. Projects reviewed and developed by the Program Manager appear on the Sustainability Connect website. New opportunities take time to get through the review process, but get posted as soon as they are ready for student participation. Consult with the Program Manager early on in your MSUS journey to alert him/her to your interests. A project may not be available immediately, but the Program Manager can alert you when suitable options arise.

**Student Identified Projects**

Students may bring their own project partners to the table for their MSUS CE but the partner needs to be approved by the SOS faculty and staff, and the project will need to be reviewed for its ability to fulfill MSUS CE project criteria. Contact the MSUS Learning Projects Program Manager to review project suitability before bringing it to a potential Subject Matter Expert.

**Partnering with a Project Provider**

Project partners come from all sectors of life and business. On campus, multiple organizations like University Sustainability Practices (USP), Office of the University Architect (OUA), Facilities and Grounds, and Food Services (through Aramark) have sustainability projects students can work on. Outside organizations include, but are not limited to businesses, non-profits, governing bodies, or citizen groups.

**Building a relationship**

Partnerships provide value to students and their partner organizations, so working with partners requires all parties to understand what is required of them. SOS faculty and staff have ongoing relationships with these organizations so it is important for students to nurture those client relationships. The best and simplest ways to do so are to spend time with client personnel, listen to what they need, discuss what their vision is for their project, and co-develop pathways to improvement with them.

**Co-creating project goals and objectives**
A student’s interest is the starting point for the project focus, but the process of developing project goals and objectives needs to be a collaborative process with the project partner. Negotiating this part of the project is a good way to determine whether or not your interests match up with the client, and provides a glimpse into your future working relationship. If interests are too divergent or collaboration is difficult, you may want to reconsider entering into a partnership.

Soliciting faculty support

Choosing a project advising team is critical to the success of student projects. Students are encouraged to consult the MSUS Learning Projects Program Manager and/or the Graduate Academic Success Coordinator first for information on suitable Subject Matter Experts. Their knowledge of faculty expertise can save you time and energy. Faculty profiles can be found and searched on the GIOS website (https://sustainability.asu.edu/people/expert-search/).

Use your ASU, SOS and Graduate networks to gather information on advising candidates. Do your homework before you contact or meet with them so you don’t waste meeting time asking them what their areas of research and expertise are. Be ready to pitch your project idea to them as an extension of their area of interest. Presenting a value proposition that serves both you and your Subject Matter Expert’s interests is an effective way to garner assistance.

Building a Project Team

SOS Individual or SOS Team

To get the most relevant experience from you CE experience, the MSUS Supervisory Committee strongly advises that you work with a small group of fellow students, MSUS or otherwise. Multi-disciplinary teams are the closest approximation of how you will be working in the “wild”, post-graduation. Individual projects are still acceptable, if you have no other option, but working alone in the field of sustainability is rare. Therefore, a solo project experience will not prepare you as well as a group project. Identifying MSUS students with similar interests can be difficult given the divergent academic schedules. Hence, it is recommended that getting to know classmates through the recently added SOS 598 Applied Leadership Lab wherein students connect with other students to learn about power dynamics in relationships, the role of gender, being authentic and vulnerable in relationships, community engagement, professional speaking skills, knowing an audience before presenting, reading body language, practicing mindfulness, and more.

When choosing project partners or constructing teams, shared interests are not the sole criteria for success. Complimentary skillsets and personalities should be of equal interest. There are many personality assessment tools available online for understanding a teammate’s motivations and working style. Use tests like Myers-Briggs and others to better understand your teammates personalities, and why one may be a procrastinator and others quick starters. Knowing these things in advance
can help you anticipate how each of you will perform over the life of the project. The same is true for skillsets. Each team member should share skills, strengths, and tools they possess with the team. In doing so, skill or knowledge gaps can be understood in the context of the project, and rectified before a project starts.

*Multi-discipline diversity*

A multi-disciplinary team brings diverse perspectives and expertise to a project. However, adding other disciplines for the sake of diversity should not be done if the subject and object of the project are not served by their addition. Choose project contributors strategically and with specific work products in mind, otherwise their efforts will distract you from the main objective.

**PROJECT ATTRIBUTES**

To qualify as an MSUS Applied Project, multiple criteria must be met and the project must be measured against those criteria.

**Identifying a Quality Project**

All CE projects should allow students to engage core sustainability competencies in the execution of their CE and have an identifiable connection to sustainability. From the practical side the project must: address a sustainability challenge; be a feasible scope for a student or group of students to execute; have stakeholder support and engagement; have clearly identified outcomes; broaden participating students’ skills and knowledge; put the MSUS student in a leadership role, and; fit the students’ passion and goals.

*Competencies Required*

**Systems thinking**

Projects should address complex problems and provide opportunities for students to examine the problem constellation, the current situation, and its history, before intervention points are identified, or transition strategies are developed. Understanding the societal, economic and environmental domains, the different scales affected and systemic effects (including cascading effects), inertia, and feedback loops within a system, is necessary before any problem solving can proceed.

**Anticipatory Thinking**

Analysis, evaluation and problem framing help students anticipate possible business as usual scenarios, as well as predictions, scenarios, and visions for a more sustainable future. Further, understanding and accounting for risk, path dependence, inertia, intergenerational equity, and prevention is critical to creating sustainability solutions. Demonstrating anticipatory competence should not only be part of the CE project management plan but evident in the results of the work.
Normative Thinking
Before creating visions for a sustainable future, the ability to map, specify, and negotiate shared values is key. Students should be familiar with social justice, equity, socio-ecological integrity, and ethical issues when normative frameworks are being developed.

Strategic Thinking
To reach a vision for a future based on shared values, students should be able to create intervention strategies that support the vision and the value system. They must be able to collaboratively design and implement pathways to eliminate negatives: inertia, path dependence, and uncertainty. Future-oriented strategies must also take advantage of system efficiencies, viability, and positive action, while defining the metrics of success.

Collaborative/Interpersonal
Interpersonal competence is what ties the other four competencies together. Without the ability to communicate with, facilitate, motivate, and enable team members and stakeholders, the four other competencies are moot.

Sustainability Connection
All CE projects must have a sustainability connection as the basis for exploration. Complex problems that manifest on multiple geographic, temporal, and ecological scales should be the focus. Every project should identify the five characteristics of a sustainability problem. The problem should be highly complex with dispersed effects and no simple solutions. Further, it must be urgent and life threatening.

Project Feasibility
The scale and complexity of the project should not be beyond the resources of the MSUS student or group. Projects must fit within the goals, academic timeline, financial budgets, and capacities of the students. That is not to say that students cannot increase their own capacity by tapping into other partnerships or seeking assistance from other scholars. In fact, students are encouraged to include outside expertise to increase the credibility of their work.

Stakeholder Support
Engaging relevant stakeholders is necessary for project credibility, legitimacy, and acceptance. Stakeholders may include parties directly affected by the work (residents, neighbors, owners, governance organizations, etc.) and need to be included in the process of developing, deploying, and using the work product. Stakeholders should be strategically selected for maximum impact on the outcomes.

Identifiable Outcomes
Clear outcomes should be collaboratively identified by the MSUS student(s), their project partners, and the project stakeholders. Qualitative and quantitative
metrics are needed to ensure that outcomes meet or exceed expectations, or require re-formulation of strategies for success.

_Incorporates New Knowledge and Skills_

CE projects should not only demonstrate a student’s facility with their newly acquired knowledge and skills, but it should provide a platform from which a student can contribute new knowledge, strategies, and tools to the sustainability community’s resource pool. Pushing against known boundaries is the only way to understand limitations to advancement. Further advancement and definition of boundaries through the CE process is a minimum expectation.

Be advised, the primary purpose of the CE/Applied Project is to stretch your skills, knowledge and capacities. This is not easy work and it can be physically and emotionally draining. If it were not so, then the MSUS program would not achieve its educational objectives.

_Leadership Role_

Students should not expect SOS faculty to lay out their path for project success. Future employers look for leaders in the field when hiring MSUS graduates. Therefore, you should expect to show leadership in choosing, developing, and executing your project – either as an individual or as a contributor to a group project. Leadership requires planning, anticipating, and responding to project needs on a day-to-day basis. Taking ownership of the project, or parts of a larger project, is an indication of leadership and will prepare you to be a project self-starter in the future.

Within the context of a group, the leadership question must be addressed in a nuanced manner. Top down approaches require a singular vision from a leader that is followed by the group members. The co-creative approach, or collaborative approach involves a shared vision, with areas of responsibility to be led by group members. A hybrid approach might be rotating final decision-making authority amongst group members, who each have areas of responsibility. In any case, develop a transparent leadership structure for your group, before the project starts, with an eye toward how each member would present their leadership role to potential employers. After choosing a leadership structure, memorialize the decision in a written document.

_Fits with Student Passion/Goals_

Whatever project you take on, make sure it feeds the fire burning within you. Projects of convenience, or ease, are neither educational, nor engines of personal growth. Furthermore, sustainability work when done right is hard, so a passionate focus is needed to carry projects to fruition. SOS students are expected to tap into their passions in order to make the work meaningful and to use their emotional reservoirs as a resource for perseverance in the face of difficulty. Not only
does working in an area of passionate interest help you along the way, but when you finish the work, feelings of immense satisfaction and accomplishment result.

Developing a Proposal for Submittal to the MSUS Committee

582 Project Management
All students must enroll in the SOS 582 Project Management course prior to executing their CE in a following semester. The course builds project management capacity of students through experiential project work and in-class presentations. Students will learn how to create a project management plan, and project management tools and techniques. During the semester you will identify your CE project, pitch it to faculty, develop a Scope and Charter, Preliminary Project Proposal, and Final Project Proposal. Only the Preliminary and Final Project Proposal will be submitted to the MSUS Supervisory Committee.

Developing a Preliminary Proposal
The Final Preliminary Proposal is a high-level introduction to the project, due in the 8th week of the student’s penultimate semester. This document is the students’ first opportunity to articulate their project to the MSUS committee. It identifies the type of project (individual or team), the main features including stakeholders, and a connection to sustainability and your career goals. Students are also expected to present a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis in the document. An initial draft of this preliminary proposal will be reviewed in SOS 582. The student will receive feedback on the document prior to submitting the Final Preliminary Proposal to the MSUS Supervisory Committee for comment and recommendations.

The Final Preliminary Proposal should be a polished version of the Draft Preliminary Proposal and include more detail. Upon completion, Final Preliminary Proposals are forwarded to the MSUS Supervisory Committee for review and comment in the 8th week of the semester. Students will also do a presentation to the class to elicit additional feedback from peers. The committee will provide feedback and recommendations on the project.

Developing an MSUS Culminating Experience Proposal
The major deliverable for SOS 582 is the MSUS Culminating Experience Proposal. Students prepare a detailed project description for review and approval by the MSUS Supervisory Committee. Students are not allowed to execute a CE project without preparing the proposal and receiving approval from the Committee. Proposals must be detailed, plausible, coherent, and well written explanations of the project. Showcase your understanding of sustainability and demonstrate professionalism in both the written document and your project presentation to the Committee. In addition to mapping out your project plan, the intent of this exercise is to gain experience in writing proposal documents, and to acquire professional
project management skills. A well written proposal requires the author to anticipate and assess risk in order to test the project’s viability.

Even the best project management plans run afoul of fate and projects must be abandoned. The best project managers are aware of this possibility and always have a backup plan. Every student should have a “Plan B” project in mind in case unanticipated roadblocks occur.

**Scope and Charter**
Co-developing requirements with project partners is integral to the creation of a scope and charter. Project partners provide background for the project from their perspective, and can describe the relevant issues. As the project manager you must record this information, frame its connection to sustainability, and set out a project plan to address the sustainability challenge. In the planning process you will identify the project purpose, how the project work is supported by the courses you’ve taken, and how it furthers your professional goals. Outcomes, stakeholders, engagement and implementation methods, client deliverables, and project timelines are defined in detail. Of all of these things, the most important to the client or partner, is the content and timing of deliverables and other project outputs. Setting reasonable and achievable expectations on both sides will set the project off on the right path.

For group projects, each student participant should break down their own interests and duties in the project, how these tie to professional goals and previous coursework, and the project issues their work will address. Furthermore, a group accountability contract should be negotiated prior to the proposal and attached to the Project Proposal submittal. In the contract students should include a team member bill of rights, a code of cooperation, team-member’s skill self-assessments, a leadership distribution plan, an end-of-project peer review process, and a conflict resolution plan.

In the Scope and Charter section each student must frame the project using the five characteristics of a sustainability problem. The overall problem must be urgent, highly complex, life altering, have dispersed effects with contested solutions. Students are not being asked to solve global problems, but to contribute to solving global problems with local solutions. However, the local piece of the problem and its solution must be placed into perspective with the global problem.

**Project Resources**
All projects require financial and human resources and those resources must be allocated as required by the project. Therefore, team members and roles must be defined, costs estimated, work structured, tasks assigned, and timelines defined. As with other project elements, resource allocation is a collaborative process requiring input from all participating team members. Since time is a vital resource, detailed
timelines, in the form of milestones or charts, are critical components of the project proposal.

Within MSUS group projects, the team must distribute and assign the workload of each group member. The project proposal should identify the tasks assigned to each group member, and identify the same on the Gannt chart and work breakdown structure. Working together on the project proposal should give you a preview of how the group will interact during project execution. Make note of things that don’t go smoothly in the proposal process so conflict can be resolved before the project work begins.

**Communication and Engagement Plan**

In project work, clear communication makes a project run smoothly. Lack of communication can sabotage meaningful progress. Communication plans are needed to ensure that team members and stakeholders are informed in a timely and efficient manner. Your project proposal should articulate target audiences, methods, means, motivations, and timing for key communications.

Communication and engagement between student practitioners are especially important in group projects. Student project proposals should identify the means and methods for collaboration, including multiple contact methods for each group member, accessible repositories for resources and documents in progress, regular meeting times, and other plans to maintain the flow of work and information.

**Risk Management Plan**

A key component in project success is anticipating potential risks and preparing plans to avoid, mitigate, or adapt to the consequences of those risks. Risks can have either a positive or negative impact on a project. Identifying and planning for risks to the furthest extent possible, at the beginning of a project, can save time and resources later on. This section should demonstrate that students have anticipated risks and developed contingency plans.

Group work requires managing risks within your group’s human resources. Think about how you would cope with the loss of a group member’s services due to illness, family emergency, or other circumstances, and develop contingency plans. Some contingency measures might be project scope reductions, extended timelines, distributing unmet workloads, or finding temporary help. Clients might want to know about your contingency plans as well, so keep them informed, especially if your loss of capacity could affect their ability to function.

Conflict within the group is another source of project risk and can freeze progress if unresolved. A written agreement between group members about conflict resolution, developed before a conflict happens, is an essential tool. The agreement should include rules of engagement, resolution processes, and a list of arbiters or mediators that can facilitate resolution.
Project Closeout

If expectations for deliverables and outputs were agreed to by the client and project team, closing out the project should mostly consist of handing deliverables over to the client, and if necessary communicating logical next steps for moving forward. In some cases, it may be wise to hand over contact information, documents, and important knowledge sources.

As part of the closeout process you will need to provide instructions with SOS staff about access to documents and other records produced on your project. Students and some project partners may not want project related information, proprietary to their project or organization, disseminated beyond the stakeholders. Project partners who have requested Non-Disclosure Agreements (NDA) from an MSUS student must provide permission before access to deliverables can be granted. The student must work with the project partner at the end of the project to provide a document to SOS staff outlining information disclosure restrictions.

When disclosure requirements are completed, students must then redact their projects as needed for inclusion in the ASU Digital Repository for the SOS Applied Project Collection or declare their project ineligible for inclusion. In either case, students are required to prepare a project Executive Summary (template provided in 593 Applied Project course) and a Project Abstract for posting in the Sustainability Connect database to provide information about what was done without revealing sensitive content. Project Executive Summaries will then be posted on the site with links to the SOS Graduate Culminating Experience Repository. Executive summaries for projects excluded from the Repository collection will still be visible to the public without a link to the Graduate Culminating Experience Repository. Links on Sustainability Connect will take users to the Repository where project abstracts and files are viewable.

Reporting to the MSUS Committee

In addition to client deliverables there are deliverables required by the MSUS Supervisory Committee. The committee deliverables should communicate what was learned from the student’s project experience. Midway through the student’s final semester and CE project execution, an Interim Final Report must be prepared for review of project progress by the Committee. After committee members have read the Interim Final Report the student will prepare a short project progress presentation for their Committee reviewers. A short discussion will follow the presentation in which the committee and student will determine changes or enhancements to the project trajectory and outputs.

After completion of the CE project, students are required to prepare an executive summary of the project, a Final Project Report, a Reflection paper, and a live presentation in front of the MSUS Supervisory Committee, their Subject Matter Experts, student peers, and other members of the community.
In rare instances students may not be able to appear in person to the MSUS Supervisory Committee. If that is the case, then the student must petition the committee to use a remote presentation delivery method. To gain committee approval for remote presentations, the student must take on the additional responsibility of creating a storyboard and/or outline of the presentation that must show the structure, media and methodology for a 8 to 10-minute digital presentation. Examples could be an online webinar, TED style talk, or a video presentation. The presented information should be accompanied by a narrative voice over, graphics, exhibits, photographs, and/or on-the-scene video. The presentation must clearly communicate, the process employed for the CE work, the interventions that were undertaken, what the student learned from the CE and the intervention, and the outcomes of the intervention.

MSUS Committee Approvals

The Committee has oversight authority on the worthiness of CE project proposals, as well as work product generated during project execution, and after project completion. A student’s work is reviewed by the Committee whose feedback is then shared with the SOS 593 Applied Project Instructor and then the student. The student has the opportunity to incorporate the Committee’s comments prior to the assignment of a final grade by the SOS 593 course instructor.

Timing

Students can expect to hear from the Committee a few times during the SOS 582 Project Management course (project planning phase) and the SOS 593 Applied Project course (project execution phase).

During SOS 582 Project Management course, the Committee will review and comment on the Preliminary Proposals submitted in Week 7 and a Final Proposal submitted in Week 13. The last two weeks of the semester, the Committee will be present for oral in-class presentations for your proposed project and give their final feedback as well as approval. Members of the committee will also attend 2 or 3 class sessions to answer student questions, guide students to subject matter experts, and discuss project expectations with student

During SOS 593 Applied Project course, the Committee will review and comment on student’s Interim Final Reports typically submitted in Week 8 and presented in Week 9. Final MSUS deliverables (i.e. including client deliverables) should be sent to the Committee by the start of week 13 to allow for a comment period by the Committee and a week for subsequent revisions by the student. The last days of the semester, the Committee will be present for oral project presentations, give their final feedback, and help students celebrate successful completion of their project and degree requirements.
### Table 1: SOS 582 Project Management Course Submittal Schedule

<table>
<thead>
<tr>
<th>MSUS Project Submittal</th>
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</thead>
<tbody>
<tr>
<td><strong>MSUS CE Draft Pre-proposal</strong></td>
</tr>
<tr>
<td><strong>Revised MSUS CE Final Pre-Proposal</strong></td>
</tr>
<tr>
<td><strong>MSUS Culminating Experience Class Presentation</strong></td>
</tr>
<tr>
<td><strong>MSUS Culminating Experience - Full Proposal</strong></td>
</tr>
<tr>
<td><strong>MSUS Culminating Experience Presentation to MSUS Supervisory Committee</strong></td>
</tr>
</tbody>
</table>

*Timing may vary - Consult the course syllabus for actual dates.*

#### Interim Feedback

Students may receive unscheduled feedback, assistance, and advisement from members of the Committee depending upon the member’s availability. However, it is strongly recommended that students communicate their needs with the MSUS Learning Projects Program Manager before approaching Committee faculty, unless that faculty member has already established a working relationship with the student. The Program Manager can provide, or help students find, procedural and logistical support, and connect them with faculty (inside and outside the Committee) should they need subject matter or research support.

#### Grading

Grading for CE work products submitted in SOS 582 Project Management course is done by the faculty and staff assigned to lead the course. The course instructors assign the final grade based on student performance on graded assignments submitted throughout the semester. Students will have the opportunity to submit ungraded drafts of CE related assignments prior to the final, graded submission. Grades will be assigned based on the quality, completeness, and professionalism of the documents as well as the incorporation of feedback from the drafts, as appropriate. Grades are given on the A-E letter grade system. If a student’s grade is lower than a B- for the course they will need to re-take the course before moving on to their project and SOS 593. Course instructors have the option of assigning a “I” (course in progress) grade if they feel corrections to your work can be made in a simple and straightforward fashion. Students are not allowed to enroll
in the 593 Applied Project course until the “I” grade is cleared and a B- or better has been recorded by the 582 course instructor.

For students working on their projects and enrolled in SOS 593 Applied Project, the MSUS Supervisory Committee provides review comments to the students but the SOS 593 Applied Project course instructor assigns the final grade with Committee input. Grades are given on the A-E letter grade system. Course instructors have the option of assigning a “Z” (course in progress) grade if they feel corrections to a student’s work can be made in a simple and straightforward fashion, and are willing to allow that student time to finish. Please be aware students may have to enroll in SOS 593 Continuing Registration to complete the work in a following semester. Students must earn at least a B grade in the course to fulfill degree requirements. Grades of B- or lower will result in the student needing to retake the class, per university rules.

Setting Timelines

Project Timelines

Mapping milestones, task durations, and critical path relationships onto timelines, helps students manage the progress of the project. Setting goals for completing tasks, and recognizing the order in which tasks must be completed, brings professionalism to the project and builds credibility with a student’s project partners.

Academic Timelines

CE project timelines are inextricably linked to the ASU academic calendar in general and to the timing of Committee faculty interface with MSUS students enrolled in SOS 582 and SOS 593. Therefore, project timelines must synchronize client deliverable deadlines with the ASU academic schedule. If timeline coordination is overlooked, then faculty review of your project work could be delayed, postponing project completion, and ultimately, completion of your MSUS degree. Be sure to build in academic and client review time wherever needed to avoid preventable delays.

DELIVERING A QUALITY PROJECT

Academic Expectations

Writing Quality
As graduate students, it is assumed that you have strong command of vocabulary, syntax and grammar. Consequently, in work delivered to clients, SOS 582 and SOS 593 course instructors, and the MSUS Supervisory Committee; expectations for concise, direct, and logical discourse, are high. To ensure that you deliver on these high expectations, leave time for multiple rounds of self-editing, and invite student peers to review project work before submission. Or, schedule a one-on-one appointment at ASU’s Graduate Writing Center (go in-person to Noble Library, or seek online support) where students in language arts tutor students needing help. Use all the writing tools available, especially spellcheck software.

Plagiarism is not tolerated at ASU and carries serious academic consequences. Be aware of what constitutes plagiarism and avoid it at all costs. Instructors use software tools to detect plagiarism on all submitted assignments. This includes all drafts, preliminary reports, and the like. Evidence of plagiarism can
result in a failing grade for the assignment and/or the course, academic probation, and possible dismissal from the degree program.

Scientific Evidence and Methodological Logic

CE projects must be supported by scientific evidence and an appropriate methodological framework. A student’s academic advisor(s) and/or subject matter expert(s) are the ultimate authorities on what is appropriate, but it is the student’s responsibility to find the evidence and methods that fit best with the project.

Whether a student plans to use literature reviews, case studies or other evidence, make sure that the use of evidence in client deliverables, as well as reports to the Supervisory Committee, are clear in their intent. Scientific evidence must be logically connected to the work, and sources properly attributed. All resources used in planning and executing the project should be appropriately cited. Unless otherwise requested, all citations should follow APA format.

Original Content

Every project should advance the body of sustainability knowledge in some way. Methods, frameworks, tools and programs are a few categories of knowledge advancement. In any case it is not enough to describe and assess the current state, providing a pathway to alter the current state or making actual improvement is required. For applied projects, the translation and use of basic research is where MSUS students must create new knowledge content.

Negotiated Deliverables for the Project Client

Working with a project partner or client means that the project scope, goals objectives, outcomes, and deliverables need to be agreed upon by the stakeholders. There are many types and formats for deliverables. Some projects may require several different types or formats depending on audience needs. Students will need to be mindful of their own limits before negotiating a set of deliverables, otherwise projects may end up unfinished, with an unhappy client, or both. Whatever happens, make sure what was agreed to is documented, and shared with stakeholders. If any information or deliverable is private or proprietary to any project stakeholders, make sure the information is secured from public access to the satisfaction of the stakeholders. For academic evaluation, all deliverables will need to be reviewed by the members of the MSUS committee but non-disclosure agreements can be requested if necessary. For public presentations or documents, confidential material may be excluded if the committee is notified beforehand.

Project Reports/Outputs

A common deliverable is a written report that describes the current state, a vision for the future, and pathways and strategies to attain that vision. A sustainability plan for an organization is a good example of a project deliverable. Sustainability plans will benchmark the current state, create a future vision for the
organization, identify intervention points, and provide goals and strategies that overcome sustainability challenges and barriers.

Solution outputs can be physical, like planting trees for shade and Urban Heat Island (UHI) mitigation. Other outputs can be sustainability pathways or plans as solutions, like a Tree and Shade Master Plan for a city, or a tree planting program that provides shade and mitigates against UHI effects.

Even when your solutions or plans for sustainable outcomes seem feasible, challenges and barriers to implementation can arise. Reports, solution sets, or pathways should acknowledge and anticipate their existence and dispense guidance to overcome challenges during intervention implementation.

**Tools**

Complicated, multi-dimensional sustainability challenges frequently require new ways of understanding and modeling. Frameworks and assessment tools may need to be built before sustainability deficiencies can be identified, and productive strategies to overcome them can be implemented. A recent example is a software tool, built on a questionnaire, that assesses neighborhood sustainability. A tool like this can help city planners identify neighborhoods in need, or common sustainability challenges across city neighborhoods that need to be prioritized for change.

**Management Strategies**

Sometimes project partners need help in becoming more sustainable in their day-to-day operations. Production by-products or externalities fall in this category, so partners might be looking for strategies that reduce or eliminate the harm externalities generate. Greenhouse gas mitigation, energy management, and waste diversion plans codify sustainability strategies for organizations that want to reduce externalities.

**Programs**

Quite often the biggest barriers to positive sustainability outcomes are based in human behavior, which is difficult to change due to structural inertia, social pressures, or the way the human brains process change. In these situations, outreach and engagement programs can be designed to effect change. A program example might be consumer education workshops, or events, paired with new infrastructure that supports the desired behavior change.

In all of these cases the student must collaborate with the project stakeholders to determine not only what is desirable as a deliverable, but what is doable with allotted resources and time. Furthermore, the time allotted must allow for high quality measurable outputs, no matter what path is taken.
**Required MSUS Documentation**

There are multiple deliverables required for every MSUS CE project. The major items are the products delivered to the client/partner, an executive summary, a final project report, a personal reflection, and a public presentation of the project. MSUS CE project deliverable templates for items deliverable to the MSUS Advisory Committee may be requested from the LPPM prior to course enrollment or on the course site after the start of the semester. Deliverables for the project must be submitted as noted in the table below.

<table>
<thead>
<tr>
<th>MSUS Project Submittal SOS 593</th>
<th>Review by:</th>
<th>Week to be Submitted in the Semester*</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>MSUS Supervisory Committee</td>
<td>Subject Matter Expert</td>
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<tr>
<td>Project Status Updates</td>
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<td>Draft Interim Project Report</td>
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<td>✓</td>
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<tr>
<td>Final Interim Project Report &amp; Presentation to reviewers</td>
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<td>✓</td>
</tr>
<tr>
<td>Draft Final Project Report with Executive Summary and Reflection</td>
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<td>✓</td>
</tr>
<tr>
<td>Deliverables to Project Partners</td>
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</tr>
<tr>
<td>Final Project Report with Executive Summary and Reflection</td>
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<td>Project Reflection Paper</td>
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<td>Executive Summary (for posting)</td>
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<td>Repository Collection Form</td>
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<tr>
<td>Public MSUS CE Presentation to MSUS Committee</td>
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<tr>
<td>Final Deliverables for uploading to MSUS Culminating Experience Repository</td>
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<td>✓</td>
</tr>
</tbody>
</table>

**TABLE 2: SOS 593 Applied Project Course Submittal Schedule**

*Timing may vary—consult the course syllabus for more exact dates.

**Draft Final Project Reports**

Around the mid-way point of a CE project timeline, students are required to provide a Draft Final Project Report for review by the MSUS Supervisory Committee. In the document you will provide draft sections including: an abstract; introduction and context; literature review; approach and methodology; expected outcomes; significant changes to the project scope and timing; and, requests for advice or assistance. If revisions to project scope and goals, timelines, or outputs are necessary due to new understanding of the challenges or other circumstances, then the Draft Project Report should identify changes to scope, timeline, outcomes, and client deliverables. Students should work with their faculty advisor, and/or the
MSUS Learning Projects Program Manager (LPPM), to determine what changes to the project warrant inclusion in the draft report.

**Project Reports/Deliverables**

The most important rule to remember about deliverables is: If it was identified in the approved project proposal, then the student must produce that deliverable, unless there is a reason or circumstance that is acceptable to their project stakeholders, faculty advisor and/or the MSUS Supervisory Committee. Circumstances do change projects, but a project manager must adapt to those quickly. When unanticipated issues arise, communicate those to stakeholders first to co-create responses, then communicate them to the faculty advisor or the Learning Projects Program Manager to determine if, when, and how the project deliverables must be altered. Projects do fail, but that doesn’t mean that students can’t learn from that experience. If a project has a significant failure, document it, analyze it, and present it to the Committee in the final project report deliverable – after review by the faculty advisor.

**Executive Summary (template provided in 593 Applied Project course)**

The executive summary should tell the compelling story of your CE from the problem statement to the outcomes, and be built as a brief recap of the project. It is primarily intended to tell the MSUS Supervisory Committee, what you did, why you did it, how you did it, and the outcomes of what you did in a single page. Additionally, the summary should identify next steps for fellow scholars or stakeholders interested in continuing your work. Finally, it should identify significant challenges and opportunities that arose during the execution of the project. The summary should be submitted at the front of the final project report document and as a separate document for posting on the Sustainability Connect website database. Be sure to understand what your project partners and stakeholders will allow to be disclosed on the executive summary, and what should be kept private before releasing it for posting.

**Final Project Report (template provided in 593 Applied Project course)**

The intent of the Final Project Report is to communicate project specific information to the MSUS Supervisory Committee and fellow scholars. After a brief abstract and an executive summary, the document should introduce the project including information about the project context, its scope and goals, major stakeholders, and desired outcomes. Following that, a short literature review sets the foundation for methods and intervention points. The findings section then compares actual outcomes with desired outcomes, and comparable work in the field. After the findings, a discussion section about process and methods, and successes and failures, needs to be written. Then the conclusion section summarizing the findings, including logical next steps and research gaps, can terminate the document. Remember to include relevant citations and references to support your work. For more complete information see the Final Project Report.
outline template on my.asu.edu in the folder (Blackboard/Organizations/SOS Graduate Student Community/Policies, Procedures and Forms/MSUS Culminating Experience Materials/MSUS Culminating Experience Project Deliverable Templates).

Your Final Report may be made accessible to the public through Sustainability Connect, the SOS Graduate Culminating Experience Projects repository, or other means, after the repository release form is completed by the project partner and returned to SOS staff.

Reflection Paper (template provided in 593 Applied Project course)

The 1-3 page reflection is intended to delve into a student’s learning experiences during the execution of the project. The student should introduce their sustainability perspective prior to project start, and the reasons for choosing the project. Discuss the how the project changed your sustainability perspective after you completed the project. Students should talk about the impact and usefulness (positive or negative) of the work on their career and professional goals. Don’t forget to enlighten us with project management lessons learned, implementation of project management tools, and what could have been done differently. Alert us to the biggest barriers and aids to the completion of the work. Brag about what your project accomplished for your client. Finally, speak to the applicability of the MSUS coursework to the project. Tell us what was most helpful and what pieces were missing. This is an opportunity to identify what was valuable from the experience, share it with those who follow in your footsteps, and pass on constructive criticism to SOS faculty, staff, and administration.

Project Presentation

The purpose of this deliverable is to provide a succinct highlight reel of your project and learning experiences to student peers and the MSUS Supervisory Committee. It is also an opportunity to practice storytelling skills. Think of it like a 10-minute documentary film of the work that describes both the events and experiences of the participants. The point is to celebrate growth and achievement before moving into a career in sustainability.

As noted earlier in this document students unable to appear in person to the MSUS Supervisory Committee may petition the committee to use an alternative (remote) presentation delivery method.

Sustainability Connect & CE Repository Upload

After all of project deliverables are completed and approved, students are asked to provide an executive summary for upload to the Sustainability Connect project database, by the database coordinator. Deliverables, like the final project report, client deliverables, published manuscripts, or other media related to the project, may be archived in the ASU Library’s, Graduate Culminating Experience Collection Repository and linked from the Sustainability Connect database. The
repository release form must be filled out by the project stakeholders and submitted with all project documents to the SOS 593 course instructor. The two reasons for making your documents available are to create a sustainability solutions database and a source of project ideas for future students and project partners. Additionally, students can point prospective collaborators or employers to a trusted source, verifying a student’s credibility.

**MSUS Supervisory Committee Review**

The MSUS Supervisory Committee is the team of SOS faculty who oversee and monitor student CE progress. This team is designed to provide constructive criticism as you identify, define, and execute your CE project.

**Review Timing**

Most of the MSUS Supervisory Committee review is pre-arranged in accordance with the SOS 582 Project Management and SOS 593 Applied Project course syllabi. (see the check sheets in Figures 1, 2 & 3)

**Scheduling with the Review Team**

Students or project groups should schedule meetings with the Learning Projects Program Manager (LPPM) as project needs dictate. Contact with the MSUS Supervisory Committee may be forwarded through the Learning Projects Program Manager or the Academic Success Coordinator, but students are strongly encouraged to build relationships directly with them as either advisors or subject matter experts.

**Anticipating Review time**

Anticipatory thinking starts with the CE project and review process, especially when it comes to project reviews by the Committee. Students need to get documents to the Committee and/or subject matter experts with sufficient lead time to allow them to comment, and then for the student to respond to the review. The timing of submittals and reviews are built into the SOS 593 Applied Project course syllabus. Consult the Learning Projects Program Manager, or the Academic Success Coordinator if you have questions about the project timeline.

**Interim Reviews**

Keeping your advising team aware of project progress is a good way to stay on track with a CE project. Their feedback can preempt unnecessary effort and help you troubleshoot barriers to progress. Discuss and set a meeting schedule with the advising team prior to starting project work.

The SOS 593 Applied project course meetings are designed to help student “project managers” stay on track. Weekly roundtable meetings allow for status updates, troubleshooting sessions, and requests for assistance.
WORKING WITH FACULTY, MENTORS, STAFF, ADVISORS, AND SUBJECT MATTER EXPERTS

Mentors

At the beginning of their time at SOS, every student is assigned a faculty mentor from the list of faculty at the School of Sustainability. The Mentor’s role is to serve as a “safety net” who helps keep students on track for their degree. The Graduate Academic Success Coordinator does 98% of the student advising work, but Mentors may provide course input, sign-off on some department required paperwork, and approve course petitions. The mentor does not have to be a member of the MSUS Supervisory Committee or a student’s advisor. Students should meet with their Faculty Mentor at least once a semester to provide a degree progress update.

A Mentor may also serve as the Subject Matter Expert (or an advisor) if the student chooses that person to participate in their CE project.

MSUS Supervisory Committee

The MSUS Supervisory Committee’s role is advisory and is designed to make sure the sustainability topic and project chosen by a student meets the academic requirements of the MSUS program, and that the student(s) applies the appropriate scientific means and methods of investigation. Unlike MA or MS students, MSUS students are not required to have specific advisory committee members to create and execute their project. The MSUS committee is more of an oversight body than are MS/MA advisory teams. Students may select an “advisor” if they desire, and the faculty member is agreeable, but a dedicated advisor is not required for the project to develop.

Committee membership consists of rotating SOS faculty members, the Learning Projects Program Manager, the SOS 582 lead instructor, and the Graduate Academic Success Coordinator. The overarching goal of the committee is to ensure that student projects are a success and meet student’s personal goals and objectives, as well as those of SOS.

Advisors and Subject Matter Experts

Subject Matter Experts (or advisors) assist students with content in proposals and CE deliverables. The Subject Matter Expert’s role is to lend project specific expertise to a student’s CE project. They provide students with advice about how to initiate, plan, execute, and close out their CE project. Depending on CE project complexity, students may have multiple Subject Matter Experts, but Subject Matter Experts are not required.

Subject Matter Experts do not have to be faculty members. For example, a student who develops a project from an internship experience may be working
closely with the supervisor at the job site. That person can serve as the Subject Matter Expert, providing guidance on the project and reviewing content in the proposals and CE deliverables.

In addition to serving as a project resource, a Subject Matter Expert may be an Advisor and as such may have more direct contact with the student throughout the life of the project. If a Subject Matter Expert is also a faculty member, a student may list them as a mentor for their iPOS by working with the SOS Academic Success Coordinator to complete university paperwork. The Graduate College must approve changes to faculty serving as a graduate student’s iPOS mentor.

Subject Matter Experts who do not hold a faculty position (such as an internship provider) cannot be listed on the iPOS as a mentor, per university rules. Any Subject Matter Expert (faculty member or not, listed on the iPOS or not) should be considered a stakeholder, and as such be included in the appropriate project proposal and planning documents (resources, timelines, communication, etc.).

You may also choose additional Subject Matter Experts for subject areas critical to executing your project, but having a team of Subject Matter Experts is not a requirement. Outside advisors can provide advice on topics, beyond a Subject Matter Expert’s area of expertise, that may need to be incorporated in your project. You may use as many as you need to get the job done, but there is no need to assemble and declare an official committee as MS or MA theses, or PhD dissertations require. Again, Subject Matter Experts are not required to be faculty.

**Staff Members**

The Learning Projects Program Manager (LPPM), along with the Academic Success Coordinator manage the day-to-day administrative and logistical aspects of your CE project, such as assessing your readiness to submit proposals or deliverables, scheduling your progress updates to the Committee, and forwarding project submittals for Committee review. The SOS 582 and SOS 593 instructors determine the final grade for CE proposals, deliverables, and reports.

With input from the MSUS Supervisory Committee, MSUS student CE grades will be recorded by course instructors at the end of the semester. The final CE grade must be “B” or higher to graduate, per university rules. A grade of “B-” or lower is not passing.
## MSUS Student and Project Support Roles

<table>
<thead>
<tr>
<th>Role</th>
<th>Eligible Members</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentors</td>
<td>MSUS Committee members, SOS Faculty, Graduate College approved faculty</td>
<td>• Listed on a student’s IPOS;</td>
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<tr>
<td></td>
<td></td>
<td>• “Safety net” to keep students on track for their degree</td>
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<td></td>
<td></td>
<td>• Provide course selection input</td>
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<td></td>
<td></td>
<td>• Sign-off on some department required paperwork</td>
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<td></td>
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<td>• Approve course petitions.</td>
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<tr>
<td></td>
<td></td>
<td>• Meet with your Faculty Mentor at least once a semester to provide a degree progress update.</td>
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<tr>
<td>MSUS Supervisory</td>
<td>Dean appointed SOS Faculty</td>
<td>• Provide academic oversight to the CE process;</td>
</tr>
<tr>
<td>Committee</td>
<td></td>
<td>Advisory body that replaces the traditional thesis committee model with multiple advisors with whom students may consult</td>
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<tr>
<td></td>
<td></td>
<td>• Review and provide feedback on student CE Pre-Proposals, Final Proposals, Interim CE Reports, and Final CE Reports</td>
</tr>
<tr>
<td>Advisors</td>
<td>Faculty chosen by MSUS student to collaborate on CE</td>
<td>• Provide direct academic and application advice on a student's CE</td>
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<td></td>
<td></td>
<td>• Suggest subject matter resources</td>
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<td></td>
<td></td>
<td>• Coach students on deliverables and reports</td>
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<tr>
<td></td>
<td></td>
<td>• Publication support</td>
</tr>
<tr>
<td>Subject Matter</td>
<td>Faculty, Researchers, MSUS Committee Members, Organization Leaders, Stakeholders</td>
<td>• A Faculty Mentor may also serve as the Subject Matter Expert (or an advisor) if the student chooses that person to participate in their CE project</td>
</tr>
<tr>
<td>Experts</td>
<td>or others with expertise germane to the CE</td>
<td></td>
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</tbody>
</table>
### MSUS Student and Project Support Roles

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<tr>
<th>Role</th>
<th>Eligible Members</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate Student Success Coordinator</td>
<td>Staff Member</td>
<td>The Graduate Academic Success Coordinator does 98% of the student advising work including:</td>
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<tr>
<td></td>
<td></td>
<td>• Incoming student orientation</td>
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<td></td>
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<td>• IPOS facilitation</td>
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<td>• Resource advising</td>
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<td></td>
<td></td>
<td>• Course petition and override processing</td>
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<td></td>
<td></td>
<td>• Graduation preparation</td>
</tr>
<tr>
<td>Learning Projects Program Manager</td>
<td>Staff Member</td>
<td>• Resource and guide for students to find and develop CE projects</td>
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<tr>
<td></td>
<td></td>
<td>• Course instructor for SOS 582 and SOS 593</td>
</tr>
</tbody>
</table>

#### Selecting a Subject Matter Expert

View Subject Matter Experts (SME) as academic collaborators, with more experience, from whom you can learn. Make sure they have subject matter expertise so they can provide relevant guidance and help the project remain focused. Ask questions about their experience in work similar to the project topic, their interest in the project, and their interest in providing project assistance. Discuss the potential expert’s availability and work load for the semester in which the project will be executed. Heavily loaded faculty and faculty on sabbatical might have limited access for meetings and advice. Talk with other students about their experience with Subject Matter Experts and use your student networks to identify potential experts.

Students must negotiate an agreement with SMEs detailing how they will work together on the project including meeting times, project review schedules, and resource support. An agreement template is available from the LPPM.

Keep in mind, like you, faculty SME’s may want recognition for the work they do to further career goals. To most faculty this means adhering to the “publish or perish” adage. A co-authored, peer-reviewed, journal article about your project is a strong incentive for garnering faculty support. Proposing a journal article, or similar publication, as a deliverable may strengthen project outcomes and sustainability impacts through the SME’s deeper commitment to the project.

#### What to Expect from a Subject Matter Expert (SME)

Expect your primary Subject Matter Expert to act as a collaborative guide on your project. Students set the direction but Subject Matter Expert help frame the
project, sharpen its scope, and identify appropriate means and methods for project execution. The MSUS Supervisory Committee will weigh in on project completeness, and scholastic rigor based on their review of CE work products and deliverables.

**What SME's, the MSUS Committee, and the LPPM Expect from Students**

Graduate students are expected to be self-directed, self-motivated, and self-policing. Students are expected to manage their projects and time professionally, and accept the consequences when they don’t meet academic expectations, or delivery timelines. If commitments are made for deliverables and timelines in the project management plan, students’ must present the work as promised and in a timely fashion. When there are extenuating circumstances beyond a student’s control, student’s must work with all parties involved, as soon as circumstances change, so they can assist in troubleshooting or damage control. Members of this team are very busy people, and may have multiple advisees or projects. So, don’t procrastinate when a problem presents itself; they may not be able to help at the last minute.

**WORKING WITH THE MSUS LEARNING PROJECTS PROGRAM MANAGER**

**582 Project Management Class**

The MSUS Learning Projects Program Manager (LPPM) works like an executive in a consulting firm overseeing project managers (MSUS students) within the firm. That oversight includes understanding project manager’s capabilities and weaknesses, and helping them to capitalize on strengths and fill gaps in capacity. Within the course structure, the LPPM will mentor students as they acquire project management skills and prepare to use them on the project.

One of the LPPM’s duties is to work with community partners to develop project opportunities for MSUS students. Expect the LPPM to present project offerings that are suitable CE applied projects for particular students, based on what the LPPM knows of a student’s interests. As the semester progresses, the LPPM will collaborate with a student to find a project opportunity, develop a suitable project scope, timeline, and deliverables for a project that kicks off the student’s sustainability career.

Within the course structure, the LPPM mentors students as they prepare their CE Preliminary Project Proposal, Final Project Proposal, and Oral Presentation for review by the MSUS Supervisory Committee. Other advice from the LPPM may include how to anticipate and overcome barriers, manage tasks, develop critical path linkages, acquire resources, and use communication tools strategically. The LPPM is tasked with helping students succeed. Students should use that relationship to help map the road to success.
593 Applied Project Class

Once students define the “road to success” in SOS 582, they must travel the road in the SOS 593 Applied Project course. Led by the LPPM, the Applied Project course meets weekly through the semester to monitor project progress, and to help students execute an excellent project with a minimum of disruption. Meetings simulate a consulting firm environment, with the LPPM serving as Project Director and the (student) project managers reporting project progress. In the meetings, student’s interim deliverables, client deliverables, and MSUS Supervisory Committee deliverables will be tracked, discussed, and critiqued. The LPPM will provide timely reviews of deliverables to ensure students are meeting commitments and project quality standards.

ADDITIONAL RESOURCES

Sustainability Connect

An ASU SOS website designed to connect students, faculty and community partners on sustainability projects.

Sustainability Research

The Julie Ann Wrigley Global Institute of Sustainability has multiple research initiatives and affiliated research programs.

Food Systems Transformation Initiative
Complex Adaptive Systems Initiative
Stardust Center for Affordable Homes and the Family
Consortium for Science Policy & Outcomes
Center for Urban Innovation
Urbanization and Global Environmental Change
Decision Center for Desert Cities
Central Arizona-Phoenix Long-Term Ecological Research
Global Consortium for Sustainability Outcomes
Global Drylands Center
Global Development Research
Resource Innovation and Solutions Network
UREx Sustainability Research Network
SOS Academic Labs

The Happiness Lab

Sustainability Transition and Intervention Lab.