

(NEW GRADUATE INITIATIVES)**PROPOSAL PROCEDURES CHECKLIST**

Academic units should adhere to the following procedures when requesting new curricular initiatives (degrees, concentrations or certificates).

Obtain the required approval from the Office of the Provost to move the initiative forward for internal ASU governance reviews/approvals.

- Establishment of new curricular initiative requests; degrees, concentrations, or certificates
- Rename requests; existing degrees, concentrations or certificates
- Disestablishment requests; existing degrees, concentrations or certificates

Submit any new courses that will be required for the new curricular program to the Curriculum ChangeMaker online course approval system for review and approval.

- Additional information can be found at the Provost's Office Curriculum Development website: [Courses link](#)
- For questions regarding proposing new courses, send an email to: courses@asu.edu

Prepare the applicable proposal template and operational appendix for the proposed initiative.

- New degree, concentration and certificate templates (contain proposal template and operational appendix) can be found at the Provost's Office Curriculum Development website: [Academic Programs link](#)

Obtain letters or memos of support or collaboration. (if applicable)

- When resources (faculty or courses) from another academic unit will be utilized
- When other academic units may be impacted by the proposed program request

Obtain the internal reviews/approvals of the academic unit.

- Internal faculty governance review committee(s)
- Academic unit head (e.g. Department Chair or School Director)
- Academic unit Dean (will submit approved proposal to the curriculumplanning@asu.edu email account for further ASU internal governance reviews (as applicable, University Graduate Council, CAPC and Senate)

Additional Recommendations - All new graduate programs require specific processes and procedures to maintain a successful degree program. Below are items that Graduate Education strongly recommends that academic units establish after the program is approved for implementation.

Set-up a Graduate Faculty Roster for new PhD Programs – This roster will include the faculty eligible to mentor, co-chair or chair dissertations. For more information, please go to http://graduate.asu.edu/graduate_faculty_initiative.

Establish Satisfactory Academic Progress Policies, Processes and Guidelines – Check within the proposing academic unit and/or college to see if there are existing academic progress policies and processes in place. If none have been established, please go to http://graduate.asu.edu/faculty_staff/policies and scroll down to the **academic progress review and remediation processes** (for faculty and staff) section to locate the reference tool and samples for establishing these procedures.

Establish a Graduate Student Handbook for the New Degree Program – Students need to know the specific requirements and milestones they must meet throughout their degree program. A Graduate Student Handbook provided to students when they are admitted to the degree program and published on the website for the new degree gives students this information. Include in the handbook the unit/college satisfactory academic progress policies, current degree program requirements (outlined in the approved proposal) and provide a link to the Graduate Policies and Procedures website. Please go to http://graduate.asu.edu/faculty_staff/policies to access Graduate Policies and Procedures.

Check Box Directions – To place an “X” in the check box, place the cursor on the left-side of the box, right click to open the drop down menu, select **Properties**, under **Default value**, select **Checked** and then select **Ok**.



ARIZONA STATE UNIVERSITY
PROPOSAL TO ESTABLISH A NEW GRADUATE DEGREE

This template is to be used only by programs that have received specific written approval from the University Provost's Office to proceed with internal proposal development and review. A separate proposal must be submitted for each individual new degree program.

DEGREE PROGRAM

College/School(s) offering this degree: School of Sustainability

Unit(s) within college/school responsible for program: School of Sustainability Dean's office

If this is for an official joint degree program, list all units and colleges/schools that will be involved in offering the degree program and providing the necessary resources: School of Sustainability, Fulton School of Engineering, School of Life Sciences, and Department of Physics

Proposed Degree Name: Doctor of Philosophy (PhD) in Sustainable Energy

Doctoral Degree Type: Doctor of Philosophy (PhD)

Proposed title of major: Sustainable Energy

Is a program fee required? Yes No

Requested effective term: Fall and year: 2017

(The first semester and year for which students may begin applying to the program)

PROPOSAL CONTACT INFORMATION

(Person to contact regarding this proposal)

Name: Caroline J Harrison

Title: Curriculum Developer

Phone: 5-8645

email: caroline.harrison@asu.edu

DEAN APPROVAL

This proposal has been approved by all necessary unit and College/School levels of review, and the College/School(s) has the resources to offer this degree program. I recommend implementation of the proposed degree program. (Note: An electronic signature, an email from the dean or dean's designee, or a PDF of the signed signature page is acceptable.)

College Dean name: Christopher Boone

College Dean Signature  Date: 4/29/16

College Dean name:
(if more than one college involved)

College Dean Signature _____ Date: _____

**ARIZONA STATE UNIVERSITY
PROPOSAL TO ESTABLISH A NEW GRADUATE DEGREE**

This proposal template should be completed in full and submitted to the University Provost's Office [mail to: curriculumplanning@asu.edu]. It must undergo all internal university review and approval steps including those at the unit, college, and university levels. A program **may not** be implemented until the Provost's Office notifies the academic unit that the program may be offered.

DEGREE PROGRAM INFORMATION

Doctoral Type: PhD
(E.g. PhD, EdD, or other)

Proposed title of major: Sustainable Energy

1. PURPOSE AND NATURE OF PROGRAM:

A. Brief program description -

Our society struggles under the weight of its dependence on fossil fuels. Ultimately, the vast majority of the current fossil-fuel use will need to be transitioned to renewable sources and this will need to occur at a rapid pace. As the global energy system is a complex, socio-technical system, in which the technical and societal elements of producing and consuming energy have co-evolved into humanity's largest enterprise, educating the next generation of leaders in guiding society toward a sustainable energy future requires that future energy leaders can seamlessly navigate this very transdisciplinary landscape. Toward this end, ASU, in July 2012, was awarded the five-year Solar Utilization Network (SUN) Interdisciplinary Graduate Education and Research Traineeship (IGERT) grant by the National Science Foundation (NSF). The overall goals of the IGERT SUN program are two-fold: 1) to train doctoral students who can see beyond the boundaries of traditional methodologies and disciplinary viewpoints, and who can integrate scientific excellence with societal and policy insights, and 2) to develop an innovative energy core curriculum for a new transdisciplinary PhD in Sustainable Energy program to be offered through the School of Sustainability by 2017.

This proposed PhD in Sustainable Energy program, jump started by the NSF-funded IGERT SUN grant, is designed to do just that, i.e. to train doctoral students who can see beyond the boundaries of traditional methodologies and disciplinary viewpoints, and who can integrate scientific excellence with societal and policy insights. The required core curriculum of 18 credit hours engages the students to look at sustainable energy both from a transdisciplinary perspective and at different scales, from the lab to commercial application. This has been designed as a truly transdisciplinary degree that is not specific to any traditional program such as engineering, social sciences, etc.

B. Will concentrations be established under this degree program? Yes No
(Please provide additional concentration information in the operational appendix – number 5A.)

2. PROGRAM NEED - Explain why the university should offer this program (include data and discussion of the target audience and market).

Sustainable energy is on the forefront of many students' minds, and yet there are very few universities with a graduate (particularly a PhD) degree in this area. One of the reasons why sustainable energy is an overlooked area in educational offerings nationwide is because it is a highly interdisciplinary area where doctoral students need to be trained to see beyond the boundaries of traditional methodologies and disciplinary viewpoints, and integrate scientific excellence with societal and policy insights. The PhD in Sustainable Energy program is designed to be suitable for students from a variety of different backgrounds, ranging from the natural sciences and engineering urban planning and those interested in future innovations. Students with a completed PhD in Sustainable Energy will find employment as faculty, fellows, and researchers in academic institutions or government organizations such as the U.S. Department of Energy; as researchers at national

laboratories such as Argonne, Los Alamos, Lawrence Livermore, etc.; as analysts in industries in the renewable energy sector such as Solar City, the conventional energy sector such as Exxon-Mobil, and other related industries such as Siemens and General Electric; and non-governmental organizations such as the Carbon Trust and Ceres, depending on the students' program of study and specific research area.

Regarding the demand for a PhD in Sustainable Energy program: ASU has a successful NSF-supported graduate training grant in solar energy (IGERT-SUN) that included an institutional commitment to NSF to establish a Sustainable Energy PhD program merging traditional disciplines. The need for the PhD in Sustainable Energy program is demonstrated by the fact that the IGERT-SUN program has had on average 30 applications annually for just six slots per year over the past four years, indicating that there is substantial interest in a transdisciplinary sustainable energy program. Moreover, an additional dozen or more graduate applications from students who would be very well served by a Sustainable Energy doctoral program come in to the various units annually. ASU's commitment to a PhD in Sustainable Energy program is in line with the LightWorks MetaPlan, which was developed about eight years ago to provide a framework for renewable energy emphases at ASU under the LightWorks umbrella (see sustainability.asu.edu/lightworks for more information on LightWorks), and which seeks to strengthen transdisciplinary educational opportunities in sustainable energy. A PhD in Sustainable Energy program at ASU will provide a vibrant hub of student and faculty activity in this area that is likely to lead to further development and growth in the sustainable energy area at ASU.

ASU is very well positioned for a degree in Sustainable Energy as there is a major interdisciplinary effort in this area, involving many units including the Schools of (1) Sustainability, (2) Engineering of Matter, Transport and Energy, (3) Sustainable Engineering and the Built Environment, (4) Geographical Sciences and Urban Planning, (5) Molecular Sciences, (6) Life Sciences, (7) Future of Innovation in Society and (8) Physics. In the past few years, faculty from these units have come together to develop transdisciplinary graduate courses in sustainable energy. To facilitate involvement of faculty from many different Schools in mentoring and teaching graduate students in the PhD in Sustainable Energy program, the School of Sustainability will be the home of the graduate program: most faculty involved with the program have an affiliation as Senior Sustainability Scientists in the School of Sustainability.

3. **IMPACT ON OTHER PROGRAMS** - Attach any letters of collaboration/support from impacted programs. (see Checklist coversheet) Support memos from Engineering of Matter, Transport and Energy, Sustainable Engineering and the Built Environment, Geographical Sciences and Urban Planning, Molecular Sciences, Life Sciences, Future of Innovation in Society and Physics are included in Appendix II.
4. **PROJECTED ENROLLMENT** – How many new students do you anticipate enrolling in this program each year for the next five years? Please note, The Arizona Board of Regents (ABOR) requires nine masters and six doctoral degrees be awarded every three years. Thus, the projected enrollment numbers must account for this ABOR requirement.

5-YEAR PROJECTED ANNUAL ENROLLMENT					
Please utilize the following tabular format.	1st Year	2nd Year (Yr 1 continuing + new entering)	3rd Year (Yr 1 & 2 continuing + new entering)	4th Year (Yrs 1, 2, 3 continuing + new entering)	5th Year (Yrs 1, 2, 3, 4 continuing + new entering)
Number of Students Majoring (Headcount)	10	20	30	40	40

5. STUDENT LEARNING OUTCOMES AND ASSESMENT:

- A. **List the knowledge, competencies, and skills** students should have attained by graduation from the proposed degree program. (You can find examples of program Learning Outcomes at (<http://www.asu.edu/oue/assessment.html>)).

Measureable student learning outcomes for the PhD in Sustainable Energy include:

1. Graduates of the PhD in Sustainable Energy will be able to use their analytical and theoretical knowledge to elucidate and contextualize complex, transdisciplinary issues surrounding energy.
2. Graduates of the PhD in Sustainable Energy will be able to identify and pursue transdisciplinary research topics in the field.
3. Graduates of the PhD in Sustainable Energy will contribute to the body of knowledge of complex systems.
4. Graduates of the PhD in Sustainable Energy will participate in the community of scholars by disseminating their contributions to sustainable energy research conducted through course work or through RA positions with faculty at professional conferences and by publishing in peer-reviewed journals.
5. Graduates of the PhD in Sustainable Energy will produce a portfolio of research accomplishments that position them to be competitive for appropriate level of employment opportunities in academia, industry, and government. Such a portfolio would include the dissertation, publications in impactful journals, conference publications, and participation in the development of research proposals that PhD students will naturally assemble as they complete their studies.

- B. **Describe the plans and methods to assess** whether students have achieved the knowledge, competencies and skills identified in the Learning Outcomes. (You can find examples of assessment methods at (<http://www.asu.edu/oue/assessment.html>)).

Outcome 1: Graduates of the PhD in Sustainable Energy will be able to use their analytical and theoretical knowledge to elucidate and contextualize complex, transdisciplinary issues surrounding energy.

- *Performance criterion 1: Doctoral Dissertation*
80% or more of doctoral dissertations will receive a rating of pass based on the criteria determined by the School, including evidence of a transdisciplinary approach.
- *Performance criterion 2: Comprehensive Exam*
90% or more of students pass the written sections of the comprehensive exam.

Outcome 2: Graduates of the PhD in Sustainable Energy will be able to identify and pursue transdisciplinary research topics in the field.

- *Performance criterion 1: Dissertation Prospectus/proposal*
90% or more of students will meet expectations on the written research proposals
- *Performance criterion 2: Defense of Dissertation Prospectus*
90% or more of students will earn a grade of B or better on the initial oral defense of research proposals
- *Performance criterion 3: SOS 575 Sustainable Energy Research Seminar*
90% or more of students will average a grade of B or better in over 4 semesters of SOS 575.

Outcome 3: Graduates of the PhD in Sustainable Energy will contribute to the body of knowledge of complex engineering, technical, social, and scientific systems involved with transdisciplinary energy research.

- *Performance criterion 1: Journal Publications 1*

90% of graduates will have principal authorship on at least one publication in a reputable journal prior to graduation.

- *Performance criterion 2: Conference Proceedings*
90% of students will publish their work in the proceedings of an appropriate professional conference

Outcome 4: Graduates of the PhD in Sustainable Energy will participate in the community of scholars by disseminating their contributions to sustainable energy research conducted through course work or through RA positions with faculty at professional conferences and by publishing in peer-reviewed journals.

- *Performance criterion 1: Journal Publications 2*
100% of graduates will be a co-author on at least one manuscript accepted for publication in peer reviewed journals before their graduation.
- *Performance criterion 2: Conference Participation*
90% of students will actively participate and present their work to an audience of their aspirational peers at an appropriate professional conference before their graduation.
- *Performance criterion 3: Development of Research Proposals*
80% of students will have participated in the preparation of proposals to obtain funding for research projects before their graduation.

Outcome 5: Graduates of the PhD in Sustainable Energy will produce a portfolio of research accomplishments that position them to be competitive for appropriate level of employment opportunities in academia, industry, and government.

- *Performance criterion 1: Job Placement*
85% or more of graduates will have successful placement in positions and careers that are in their field of study within one year of graduation
- *Performance criterion 2: Alumni Survey*
85% or more of alumni survey respondents will report that they are currently employed in a field that is related or closely related to their degree program.

- 6. ACCREDITATION OR LICENSING REQUIREMENTS (if applicable):** Provide the names of the external agencies for accreditation, professional licensing, etc. that guide your curriculum for this program, if any. Describe any requirements for accreditation or licensing.

NA

7. FACULTY, STAFF, AND RESOURCE REQUIREMENTS:

A. Faculty

- i. **Current Faculty** - List the name, rank, highest degree, area of specialization/expertise and estimate of the level of involvement of all current faculty members who will teach in the program.

Below is a list of the proposed faculty for the PhD in Sustainable Energy program. The faculty listed represents Engineering of Matter, Transport and Energy, Sustainable Engineering and the Built Environment, Geographical Sciences and Urban Planning, Molecular Sciences, Life Sciences, Future of Innovation in Society, Physics as well as the School of Sustainability. We expect additional faculty from a wide range of disciplines related to sustainable energy will be teaching, participating as guest lecturers, and serving as mentors in the program.

Note: (a): Committee Chair; (b): Co-Chair or member (c): Teach courses, or (d) contribute to courses

Name	Rank	Expertise	Level of Involvement
Anderies, John (Marty), PhD	Professor	Ecological, behavioral, social and institutional factors that generate vulnerabilities and/or enhance resilience and robustness in social-ecological systems	a, b, and c
Boone, Christopher, PhD	Professor	Sustainable urbanization, environmental justice, vulnerability and global environmental change	a, b
Breetz, Hanna, PhD	Assistant Professor	Political economy of alternative energy, focusing on biofuels and synthetic fuels	a, b, and c
Bryan, Harvey, PhD	Professor	Building technology with a focus on the interface between technology and the design of ecologically responsible environments	a, b, and c
Goodnick, Stephen, PhD	Professor	Solid state device physics, transport in nanostructures, nanoelectronic devices and circuits, computational electronics, radiofrequency and microwave devices, optoelectronic energy conversion devices	a, b, and c
Graffy, Elisabeth, PhD	Professor of Practice	Energy policy, law and governance	a, b, and c
Guston, David, PhD	Professor	Policy of science, technology assessment, public participation in science and technology	a, b
Jones, Anne, PhD	Associate Professor	Artificial, hydrogen-producing catalysts and functionally connecting them to electrode surfaces	a, b
Lobo, Jose, PhD	Associate Research Professor	Metropolitan economic performance and location-specific economic growth, the application of machine learning, data mining and spatial statistics methods to the study of socioeconomic data	a, b, and c
MacFayden, Joshua, PhD	Assistant Professor	Social and ecological problems of Energy	a, b, and c
Miller, Clark, PhD	Associate Professor	Science, technology and globalization with design and critical analysis of knowledge systems in support of international and global policymaking	a, b, and c
Moore, Ana, PhD	Professor	Artificial photosynthesis for the conversion of solar energy into chemical potential	a, b
Moore, Gary, PhD	Assistant Professor	Nanoscale materials with applications including solar energy transduction, photocatalysis, molecular electronics, chemical sensing and proton coupled electron transfer	a, b, and d
Moore, Thomas, PhD	Professor	Bio-inspired constructs for solar energy conversion, catalysis and signal transduction	a, b, and c

Parker, Nathan, PhD	Assistant Research Professor	Transportation and energy, alternative fuels, biofuels, energy transitions, spatial simulation of future of transportation energy, transportation energy policy	a, b, and c
Pasqualetti, Martin, PhD	Professor	Renewable energy, energy/water nexus, energy landscapes and energy and society	a, b, and c
Phelan, Patrick, PhD	Professor	Energy applications including nanofluids, solar cooling and thermal storage, waste heat utilization, thermogalvanic energy conversion	a, b, and c
Richter, Jennifer, PhD	Assistant Professor	Energy justice; intersections of science and society and how federal policies are enacted locally	a, b, and c
Seager, Thomas, PhD	Associate Professor	Game theory to develop new strategies for teaching ethical reasoning skills relevant to sustainability to science and engineering graduate students	a, b, and d
Selin, Cynthia	Assistant Professor	Social implications of new technologies on the future related to sustainability, climate and energy	a, b and d
Strumsky, Deborah, PhD	Assistant Research Professor	Science and economics of energy	a, b, and c
Torres, Cesar, PhD	Assistant Professor	Biofilm modeling, electrochemical microscopic, and analytical techniques to characterize ARB kinetics and thermodynamics	a, b, and c
Wang, Liping, PhD	Assistant Professor	Use of meta-materials for energy harvesting and thermophotovoltaic applications; Si thin film or Si nanowire arrays for photovoltaic, nanophotonics, thermal system modeling, electronic cooling and optical characterization	a, b and d
Wang, Robert, PhD	Assistant Professor	Thermal energy conversion, storage, and transport in nanostructured materials; thermoelectric power generation; thermal storage media	a, b, and d
Wang, Xuan, PhD	Assistant Professor	Biomass conversion by microbial systems to generate fuels and chemicals	a, b
Vermaas, Willem, PhD	Professor	Light-energy conversion by photosynthetic microbes: basic science and “green chemistry” applications	a, b, and c

- ii. **New Faculty** – Describe the new faculty hiring needed during the next three years to sustain the program. List the anticipated hiring schedule and financial sources for supporting the addition of these faculty members.

This program will be supported with current faculty and new faculty hired under the existing, approved, hiring plan. The addition of this program will aid in recruitment of highly qualified junior faculty by providing opportunities for professional growth that are closely aligned with the other schools in the university.

- iii. **Administration of the program** – Explain how the program will be administered for the purposes of admissions, advising, course offerings, etc. Discuss the available staff support.

Administration of the program will be the responsibility of the Graduate Committee Chair and the School of Sustainability Graduate Committee. The PhD in Sustainable Energy Admissions Subcommittee, a transdisciplinary subcommittee consisting of faculty from schools and colleges identified above, will make an initial recommendation of applicants to the School of Sustainability Graduate Committee. The School of Sustainability Graduate Committee, appointed by the Dean, will have the responsibility of screening the applicants recommended by the subcommittee and sending the final list of applicants the Dean of the School of Sustainability and to Graduate Education. The Graduate Committee with advice from the Subcommittee will also be responsible for assuring the integrity of the program and distribution of any monetary awards, including internal scholarships, and any graduate teaching and research assistantships that are not directly funded by faculty research programs.

The existing graduate advising staff of the School of Sustainability will provide procedural advising for the program, and the Graduate Committee Chair will coordinate technical and programmatic advising. The School of Sustainability will provide additional staff support for the program including preparing and disseminating materials such as recruiting information, graduate applications, admission decisions and evaluations of student progress.

- B. Resource requirements needed to launch and sustain the program:** Describe any new resources required for this program's success such as new staff, new facilities, new library resources, new technology resources, etc.

None. The program dovetails with previous and ongoing activities in other units of the university such as the Integrative Graduate Education and Research Traineeship: Solar Utilization Network ([IGERT-SUN](#)) program. This program will be part of the institutional commitment to NSF to establish a Sustainable Energy to transition from the IGERT-SUN program. This program also fits with existing initiatives and programs that are part of the Julie Ann Wrigley Global Institute of Sustainability as well as existing undergraduate programs and areas of focus in the School of Sustainability.

8. COURSES:

- A. Course Prefix(es):** Provide the following information for the proposed graduate program.

- i. Will a new course prefix(es) be required for this degree program?
Yes No

- B. New Courses Required for Proposed Degree Program:** Provide course prefix, number, title, and credit hours and description for any new courses required for this degree program.

Note: Courses have been submitted through Curriculum Changemaker.

SOS 571: Sustainable Energy I: Technologies and Systems (3 credits)

This is the first in a sequence of foundational courses (571, 572, and 573) in the graduate program for sustainable energy. This course provides a primer on the scientific, technological, and social aspects of energy. It has three core modules: (1) primer on the physics of energy, (2) a review of power systems and electricity generation technologies, and (3) a review of transportation systems and fuel/vehicle technologies. Although the class focuses on energy technology, it also incorporates discussions of the human dimensions of energy systems.

SOS 572: Sustainable Energy II: Transitions (3 credits)

This is the second foundational course (571, 572, and 573) in the graduate program for sustainable energy. This course follows the thread of energy transitions through every aspect of our lives. It stresses the technological, economic, social, and political contexts of energy transitions. It addresses energy use throughout history, the influence of energy on quality of life, how energy use has influenced the process of urbanization and how considerations of access to and control of energy sources shapes geopolitical strategies. It will draw on insights garnered by research in human

ecology, anthropology, archaeology, economics, historiography, natural science and engineering as to the role energy use, and technological change involving the use of technology, has played in human development.

SOS 573: Sustainable Energy III: Futures Analysis, Negotiation and Governance (3 credits)

This is the third foundational course (571, 572, and 573) in the graduate program for sustainable energy. It is designed to complement other courses in this program and draw on experience and learning from other fields. This course provides a basis for understanding the intersection of social, political, cultural, economic, and technical dynamics of existing and emerging energy system possibilities, emphasizing the roles of human decision-making as well as new scientific and technological developments. It emphasizes the development of sophisticated competency in several broad thematic capacities that are required to understand, engage with, and provide thought leadership in the ongoing challenge of creating and cultivating sustainable energy systems.

SOS 574: Sustainable Energy Analytics in Context (3 credits)

This course will address the primary metrics, data sources, and methodologies used to measure sustainable energy, including how they are used to track progress toward sustainability goals and shape public policies. It covers the metrics for comparing the cost, efficiency, social equity and environmental impacts of various energy sources, and issues pertaining to product life cycle evaluation. These metrics provide the foundation for assessing the relative merits of various energy and production options based on a variety of possible criteria. In addition to imparting factual knowledge for quantitatively evaluating a multiplicity of energy sources and systems and their impact on the environment, it will build skills in research, comparative analysis and critical thinking that will catalyze a lifetime of engagement with the complex and evolving issues surrounding sustainability.

SOS 575: Sustainable Energy Research Seminar (1 credit)

(Students take this course in four different semester terms for 1 credit hour each for a total of 4 credit hours)

This is a seminar-based course for Sustainable Energy doctoral students focusing on research skills for transdisciplinary energy research. Students take the course over two years. Second-year students are expected to take on more of a leadership role in the class and to contribute more developed research presentations in the spring semester. The seminar has a different focus in the Fall and Spring. In the Fall, the course focuses on research methods. In the Spring, the course focuses on the process of generating research ideas and writing effective research proposals.

APPENDIX I
OPERATIONAL INFORMATION FOR GRADUATE PROGRAMS

(This information is used to populate the [Graduate Programs Search](#)/catalog website.)

1. Provide a brief (catalog type – no more than 150 words) program description.

Our society struggles under the weight of its dependence on fossil fuels. As the global energy system is a complex, socio-technical system, in which the technical and societal elements of producing and consuming energy have co-evolved into humanity's largest enterprise, educating the next generation of leaders in guiding society toward a sustainable energy future requires that future energy leaders can seamlessly navigate this very transdisciplinary landscape. The doctoral program in sustainable energy is designed to train students who can see beyond the boundaries of traditional methodologies and disciplinary viewpoints, and who can integrate scientific excellence with societal and policy insights. The curriculum engages students to look at sustainable energy both from a transdisciplinary perspective and at different scales, from the lab to commercial application.

Curricular Structure Breakdown for the Academic Catalog:

84 credit hours, a written comprehensive exam, an oral comprehensive exam, a prospectus and a dissertation

Required Core (18 credit hours)

SOS 571 Sustainable Energy I: Technologies and Systems (3)

SOS 572 Sustainable Energy II: Transitions (3)

SOS 573 Sustainable Energy III: Futures Analysis, Negotiation, and Governance (3)

SOS 574 Sustainable Energy Analytics in Context (3)

SOS 575 Sustainable Energy Research Seminar (4)

SOS 589 Community of Graduate Student Scholars (2)

Electives or Research (12 credit hours)

Other Requirement (12 credit hours)

SOS 792 Research (12)

Culminating Experience (12 credit hours)

SOS 799 Dissertation (12)

Additional Curriculum Information

Students take SOS 575 in four different semester terms for 1 credit hour each.

Electives can be chosen from applicable courses in the following areas based on the students' area of interest and approval from their committee: engineering of matter, transport and energy; sustainable engineering and the built environment; geographical sciences and urban planning, molecular sciences, life sciences, Future of Innovation in Society, physics, and sustainability.

Other electives may be used with approval from the academic unit. Student electives are customizable based on the student's area of research.

Doctoral students will be expected to include higher level (600-700) course numbers as part of the elective and research coursework.

When approved by the student's supervisory committee and Graduate Education, this program allows 30 credit hours from a previously awarded master's degree to be used for this degree. If students do not have a previously awarded master's degree, the 30 hours of coursework will be made up of electives and research.

2. Campus(es) where program will be offered:

(Please note that Office of the Provost approval is needed for ASU Online campus options.)

ASU Online only (all courses online)

All other campus options (please select all that apply):

Downtown Polytechnic
 Tempe West

Both on-campus and **ASU Online (*)** – (Check applicable campus from options listed.)

(*) Please note: Once students elect a campus option, students will not be able to move back and forth between the on-campus (in-person) or hybrid options and the ASU Online campus option.

3. Admission Requirements:

Degree: Minimum of a bachelor’s or master’s degree from a regionally accredited College or University. The school encourages applicants with diverse educational backgrounds and experience. Sample related fields include engineering, geography, urban planning, environmental science, physics, chemistry or planning for future innovations and societal changes.

GPA: Minimum of a 3.25 cumulative GPA (scale is 4.0=A) in the last 60 hours of a student’s first Bachelor’s degree program. Minimum of 3.00 cumulative GPA (scale is 4.0 = A) in an applicable Master’s degree.

English Proficiency Requirement for International Applicants: The English proficiency requirements are the same as the Graduate Education requirement. (see Graduate Education requirement http://graduate.asu.edu/admissions/international/english_proficiency): **Yes** **No**

Foreign Language Exam:

Foreign Language Examination(s) required? Yes No

Required Admission Examinations: GRE GMAT Millers Analogies None required
(Select all that apply.)

Letters of Recommendation: Yes No

Statement of Intent: Yes No

All applicants must upload a statement of intent as part of the application process. In no more than 600 words, applicants must explain the goals they intend to achieve through their program of study at the School of Sustainability. Applicants should describe how their background will contribute to their success in the program and how completion of their degree will support their long-term career goals. Finally, applicants should elaborate on key research questions they wish to address or problems they wish to solve as part of their program of study and identify potential faculty advisors.

4. Application Review Terms (if applicable Session): Indicate all terms for which applications for Admissions are accepted:

Fall (regular) year: 2017

Note: Applications will roll every fall term after this.

5. Curricular Requirements:

(Please expand tables as needed. Right click in white space of last cell. Select "Insert Rows Below")

5A. Will concentrations be established under this degree program? Yes No

5B. Curricular Structure:

Required Core Courses for the Degree			Credit Hours
(Prefix & Number)	(Course Title)	(New Course?) Yes or No?	(Insert Section Sub-total) 18
SOS 571	Sustainable Energy I: Technologies and Systems	Y	3
SOS 572	Sustainable Energy II: Transitions	Y	3
SOS 573	Sustainable Energy III: Futures Analysis, Negotiation, and Governance	Y	3
SOS 574	Sustainable Energy Analytics in Context	Y	3
SOS 575	Sustainable Energy Research Seminar <i>(Students take this course in four different semester terms for 1 credit hour each)</i>	Y	4
SOS 589	Community of Graduate Student Scholars	N	2
Elective or Research Courses <i>(as deemed necessary by supervisory committee)</i>			Credit Hours
(Prefix & Number)	(Course Title)	(New Course?) Yes or No?	(Insert Section Sub-total) 12
<p>Electives can be chosen from applicable courses in the following areas based on the students' area of interest and approval from their committee: Engineering of Matter, Transport and Energy, Sustainable Engineering and the Built Environment, Geographical Sciences and Urban Planning, Molecular Sciences, Life Sciences, Future of Innovation in Society, Physics as well as the School of Sustainability.</p> <p>Other electives may be used with approval from the academic unit. Student electives are customizable based on the student's area of research.</p> <p>Doctoral students will be expected to include higher level (600-700) course numbers as part of the elective and research coursework.</p>			
Culminating Experience			Credit Hours
<p><i>E.g. – Capstone course, applied project, thesis (masters only) – 6 credit hours) or dissertation (doctoral only) – 12 credit hours) as applicable</i></p>			(Insert Section Sub-total)
SOS 799 Dissertation			12
Other Requirements			Credit Hours
<p><i>E.g. – Internships, clinical requirements, field studies as applicable</i></p>			(Insert Section Sub-total)
SOS 792 Research			12

<p>For doctoral programs – when approved by the student’s supervisory committee, will this program allow 30 credit hours from a previously awarded master’s degree to be used for this program? If applicable, please indicate the 30 credit hour allowance that will be used for this degree program.</p> <p>If students do not have a previously awarded master’s degree, the 30 hours of coursework will be made up of electives and research.</p>	30
Total required credit hours	84

- List all required core courses and total credit hours for the core (required courses other than internships, thesis, dissertation, capstone course, etc.).
- Omnibus numbered courses cannot be used as core courses.
- Permanent numbers must be requested by submitting a course proposal to Curriculum ChangeMaker for approval. Courses that are new, but do not yet have a new number can be designated with the prefix, level of the course and X’s (e.g. ENG 5XX or ENG 6XX).

6. Comprehensive Exams:

Doctoral Comprehensive Exam (required), please select the appropriate box.

(Written comprehensive exam is required)

- Oral comprehensive exam is required – in addition to written exam
- No oral comprehensive exam required – only written exam is required

7. For Doctoral Degrees that require a dissertation, submission of a written dissertation prospectus and its oral defense are required. (Please include any required timelines for defense of the prospectus.) It is expected that the submission of a written dissertation prospectus and its oral defense will take place no later than the end of the fourth year.

All students are expected to meet the program milestones. Failure to meet these milestones could subject students to probation and a formal request to Graduate Education to dismiss the student from the program. Students should complete the doctoral degree program within three to five years. In some instances, students may need some additional time to complete the dissertation or required revisions. If this happens, students should not exceed a total of ten years for completing the degree per Graduate Education Policy.

The ten-year period starts with initial enrollment in the doctoral program. In addition, the student must take the final oral examination in defense of the dissertation within five years of advancing to candidacy, i.e., passing the written comprehensive exam and the prospectus defense. Any exception must be approved by the supervisory committee and the Office of Graduate Education, and ordinarily involves repetition of the comprehensive examination and/or the prospectus defense. To request an exception, students must submit a Petition to the Office of Graduate Education.

Also, the student must defend the prospectus within six months of passing the written comprehensive exam, per SOS policies. A student can petition for an extension of the six-month rule by submitting a SOS petition form. The petition will need to be approved by supervisory committee and the graduate director for the extension to be granted. If the academic unit does not grant the student permission to retake the proposal defense, or if the student fails to pass the retake of the proposal defense, Graduate Education may withdraw the student from the degree program.

8. Allow 400-level courses: Yes No (No more than 6-credit hours of 400-level coursework can be included on a graduate student plan of study.)

9. Committee: Required Number of Thesis or Dissertation Committee Members (must be at least 3 including chair or co-chairs): Three from a minimum of two diverse disciplines

- 10. Keywords** (List all keywords that could be used to search for this program. Keywords should be specific to the proposed program.)
Sustainability, Energy, Renewable Energy, Sustainable Energy, Energy Policy, Energy Technology, Energy Science, Alternative Energy, Energy Research, Solar Energy, Wind Energy, Geothermal Energy, Wave Energy, Bioenergy, Biofuel

11. Area(s) of Interest

A. Select **one (1)** primary area of interest from the list below that applies to this program.

- | | |
|--|---|
| <input type="checkbox"/> Architecture & Construction | <input type="checkbox"/> Interdisciplinary Studies |
| <input type="checkbox"/> Arts | <input type="checkbox"/> Law & Justice |
| <input type="checkbox"/> Business | <input type="checkbox"/> Mathematics |
| <input type="checkbox"/> Communication & Media | <input type="checkbox"/> Psychology |
| <input type="checkbox"/> Education & Teaching | <input type="checkbox"/> STEM |
| <input type="checkbox"/> Engineering & Technology | <input type="checkbox"/> Science |
| <input type="checkbox"/> Entrepreneurship | <input type="checkbox"/> Social and Behavioral Sciences |
| <input type="checkbox"/> Health & Wellness | <input checked="" type="checkbox"/> Sustainability |
| <input type="checkbox"/> Humanities | |

B. Select **one (1)** secondary area of interest from the list below that applies to this program.

- | | |
|--|---|
| <input type="checkbox"/> Architecture & Construction | <input type="checkbox"/> Interdisciplinary Studies |
| <input type="checkbox"/> Arts | <input type="checkbox"/> Law & Justice |
| <input type="checkbox"/> Business | <input type="checkbox"/> Mathematics |
| <input type="checkbox"/> Communications & Media | <input type="checkbox"/> Psychology |
| <input type="checkbox"/> Education & Teaching | <input checked="" type="checkbox"/> STEM |
| <input type="checkbox"/> Engineering & Technology | <input type="checkbox"/> Science |
| <input type="checkbox"/> Entrepreneurship | <input type="checkbox"/> Social and Behavioral Sciences |
| <input type="checkbox"/> Health & Wellness | <input type="checkbox"/> Sustainability |
| <input type="checkbox"/> Humanities | |

12. Contact and Support Information:

Office Location (Building & Room):	Wrigley Hall, 108
Campus Telephone Number:	480-727-6963
Program email address:	SOSGradSunDevil@asu.edu
Program website address:	https://schoolofsustainability.asu.edu/degrees/graduate/
Program Director (Name):	John M. Anderies
Program Director (ASU ID):	janderie
Program Support Staff (Name):	Katerina Kinast, Ivy Gerbis
Program Support Staff (ASU ID):	kkinast; bohnlein
Admissions Contact (Name):	Ivy Gerbis
Admissions Contact (ASU ID):	bohnlein

- 13. Application and iPOS Recommendations:** List the Faculty and Staff who will input admission/POS recommendations to Gportal **and** indicate their approval for Admissions and/or POS:

Name	ADMSN	POS
Ivy Gerbis	X	X
Katerina Kinast	X	X
Lisa Murphy	X	X

APPENDIX II
Support Statements

Official Submission – School of Sustainability

From: Caroline Harrison [<mailto:Caroline.Harrison@asu.edu>]
Sent: Friday, May 13, 2016 3:43 PM
To: curriculumplanning@asu.edu
Cc: Marty Anderies (m.anderies@asu.edu); Christopher Boone; Willem Vermaas; Anna Keilty
Subject: Proposal to establish Sustainable Energy PhD

Please find the attached completed proposal to establish a new Sustainable Energy PhD program. I have attached a pdf that includes Dean Chris Boone's signature as well as letters of support from other schools for both the program itself and the new courses. I have also attached a word version of the proposal in case that is useful.

The new courses have been submitted through Curriculum Changemaker and are currently in University Review.

Please let me know if you need anything else from us.

Thank you.

Caroline J. Harrison, PhD
Curriculum Developer



P.O. Box 875502 | Tempe, Arizona | 85287-5502

Support Letter - School for the Future of Innovation in Society

From: [David Guston](#)
To: [Christopher Boone](#)
Cc: [Caroline Harrison](#)
Subject: Re: Sustainable Energy PhD: request for impact statement
Date: Saturday, April 23, 2016 9:43:07 AM

Chris

Thank you for sending the proposal for the establishment of the PhD in Sustainable Energy. I have read it, and I am very excited about the opportunity to extend the SUN IGERT into a formal curricular program. I see only positive impacts on the School for the Future of Innovation in Society, particularly in opportunities for broader, interdisciplinary training of doctoral students among the several contributing units.

I fully support this program.

Dave Guston

Director, School for the Future of Innovation in Society

From: Christopher Boone <Christopher.G.Boone@asu.edu>
Date: Friday, April 22, 2016 at 2:39 PM
To: David Guston <david.guston@asu.edu>
Cc: Caroline Harrison <Caroline.Harrison@asu.edu>
Subject: Sustainable Energy PhD: request for impact statement

Dave,

Attached is a proposal for the establishment of a PhD in Sustainable Energy. This degree program is the culmination of efforts of the IGERT-SUN (Solar Utilization Network). It will be administered by the School of Sustainability. I would appreciate it very much if you could provide an impact statement for the degree program (thank you for your earlier statement regarding the new required courses). Please return your statement to me by Friday, May 6, and let me know if you have any questions.

Thank you,
Chris

Christopher Boone
Dean, School of Sustainability
Senior Sustainability Scientist, Julie Ann Wrigley Global Institute of Sustainability
P.O. Box 875502 | Tempe, Arizona | 85287-5502
PH: 480-965-2236 | Main: 480-965-2975
<http://cgboone.personal.asu.edu> | Twitter: @cgboone
Dean's Executive Assistant: Lorraine.Protocollo@asu.edu

Support Letter - School of Geographical Sciences and Urban Planning

Caroline Harrison

From: Christopher Boone
Sent: Wednesday, April 27, 2016 3:41 PM
To: Caroline Harrison
Subject: Fwd: Sustainable Energy PhD: request for impact statement

Sent from my iPhone
Christopher Boone
Dean, School of Sustainability
Arizona State University

Begin forwarded message:

From: Patricia Gober <gober@asu.edu>
Date: April 26, 2016 at 5:56:42 PM EDT
To: Christopher Boone <Christopher.G.Boone@asu.edu>
Subject: RE: Sustainable Energy PhD: request for impact statement

Chris:

The SGSUP is fully supportive of your proposed Ph.D. Program in Sustainable Energy. Although our School has interests in this area, we have been unable to build the critical mass of faculty to support Ph.D. work. One of our faculty members, Mike Pasqualetti, worked closely with your team in the development of this proposal. We support his effort to build an interdisciplinary program under the SOS umbrella.

Patricia Gober
Interim Director
School of Geographical Sciences and Urban Planning

From: Christopher Boone
Sent: Friday, April 22, 2016 2:37 PM
To: Patricia Gober <gober@asu.edu>
Cc: Caroline Harrison <Caroline.Harrison@asu.edu>
Subject: Sustainable Energy PhD: request for impact statement

Dear Pat,

Attached is a proposal for the establishment of a PhD in Sustainable Energy. This degree program is the culmination of efforts of the IGERT-SUN (Solar Utilization Network). It will be administered by the School of Sustainability. I would appreciate it very much if you could provide an impact statement for the degree program (thank you for your earlier statement regarding the new required courses). Please return your statement to me by Friday, May 6, and let me know if you have any questions.

Thank you,

Chris

Christopher Boone
Dean, School of Sustainability
Senior Sustainability Scientist, Julie Ann Wrigley Global Institute of Sustainability
P.O. Box 875502 | Tempe, Arizona | 85287-5502
PH: 480-985-2236 | Main: 480-985-2975
<http://cgboone.personal.asu.edu> | Twitter: @cgboone
Dean's Executive Assistant: Lorraine.Protocollo@asu.edu

Support Letter - School for Engineering of Matter, Transport and Energy

Caroline Harrison

From: Mia Kroeger
Sent: Thursday, May 05, 2016 1:59 PM
To: Christopher Boone
Cc: Caroline Harrison; Lenore Dai; Cara Rickard
Subject: RE: Sustainable Energy PhD: request for impact statement

Dr. Boone,

The School for Engineering of Matter, Transport and Energy has no objections to your new PhD degree in Sustainable Energy.

Thank you!

Mia Kroeger
Assistant Director, Academic Services
School for Engineering of Matter, Transport & Energy
Ira A. Fulton Schools of Engineering
Arizona State University | P.O. Box 876106 | Tempe, AZ 85287-6106 – Mailing Address
501 E. Tyler Mall | Engineering Center G-Wing, #207 | Tempe, AZ 85287-6106 – Physical Address
Phone: (480) 965-4979 | Fax: (480) 727-9321 | Email: Mia.Kroeger@asu.edu
Website: semt.eengineering.asu.edu



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For information regarding Arizona's State University's non-discrimination policies, please visit: asu.edu/sad/manuals/acd/acd401.html

From: Christopher Boone
Sent: Friday, April 22, 2016 2:33 PM
To: Lenore Dai <Lenore.Dai@asu.edu>
Cc: Caroline Harrison <Caroline.Harrison@asu.edu>
Subject: Sustainable Energy PhD: request for impact statement

Dear Dr. Dai,

Attached is a proposal for the establishment of a PhD in Sustainable Energy. This degree program is the culmination of efforts of the IGERT-SUN (Solar Utilization Network). It will be administered by the School of Sustainability. I would appreciate it very much if you could provide an impact statement for the degree program (thank you for your earlier statement regarding the new required courses). Please return your statement to me by Friday, May 6, and let me know if you have any questions.

Thank you,

Chris Boone

Support Letter - School of Sustainable Engineering and the Built Environment

Caroline Harrison

From: G Gibson
Sent: Friday, May 13, 2016 3:05 PM
To: Christopher Boone
Cc: Caroline Harrison
Subject: Re: Sustainable Energy PhD: request for impact statement

Chris

We have no significant concerns about the program. We do not think it will have a major impact on our courses or ongoing programs. We would request that you be clear in your description of the program that it is not an engineering program and does not lead to an engineering degree. We request that clarifying language be added to the program description, including on the web page when it's up, indicating that while it may include technical subjects and analysis, this is not an engineering degree.

Thanks

Edd

From: Christopher Boone <Christopher.G.Boone@asu.edu>
Date: Friday, April 22, 2016 at 2:36 PM
To: G Gibson <Edd.Gibson@asu.edu>
Cc: Caroline Harrison <Caroline.Harrison@asu.edu>
Subject: Sustainable Energy PhD: request for impact statement

Dear Edd,

Attached is a proposal for the establishment of a PhD in Sustainable Energy. This degree program is the culmination of efforts of the IGERT-SUN (Solar Utilization Network). It will be administered by the School of Sustainability. I would appreciate it very much if you could provide an impact statement for the degree program (thank you for your earlier statement regarding the new required courses). Please return your statement to me by Friday, May 6, and let me know if you have any questions.

Thank you,
Chris

Christopher Boone
Dean, School of Sustainability
Senior Sustainability Scientist, Julie Ann Wrigley Global Institute of Sustainability
P.O. Box 875502 | Tempe, Arizona | 85287-5502
PH: 480-965-2238 | Main: 480-965-2975
<http://cgboone.personal.asu.edu> | Twitter: @cgboone
Dean's Executive Assistant: Lorraine.Protocollo@asu.edu

Caroline Harrison

From: Christopher Boone
Sent: Thursday, May 05, 2016 1:48 PM
To: Caroline Harrison
Subject: Fwd: Sustainable Energy PhD: request for impact statement

Sent from my iPhone
Christopher Boone
Dean, School of Sustainability
Arizona State University

Begin forwarded message:

From: Peter Bennett <peter.bennett@asu.edu>
Date: May 5, 2016 at 12:26:49 PM EDT
To: Christopher Boone <Christopher.G.Boone@asu.edu>
Subject: RE: Sustainable Energy PhD: request for impact statement

Christopher,

I have reviewed the proposed degree program in Sustainable Energy, and find no conflict or impact with our physics program. Good luck with the new degree.

Peter A. Bennett
Professor and Chair, Department of Physics, PSF470
Arizona State University, Box 871504, Tempe AZ 85287-1504
Contacts: 480-727-9394; peter.bennett@asu.edu; <http://bennett.asu.edu/>

From: Christopher Boone
Sent: Friday, April 22, 2016 2:38 PM
To: Peter Bennett
Cc: Caroline Harrison
Subject: Sustainable Energy PhD: request for impact statement

Dear Dr. Bennett,

Attached is a proposal for the establishment of a PhD in Sustainable Energy. This degree program is the culmination of efforts of the IGERT-SUN (Solar Utilization Network). It will be administered by the School of Sustainability. I would appreciate it very much if you could provide an impact statement for the degree program (thank you for your earlier statement regarding the new required courses). Please return your statement to me by Friday, May 6, and let me know if you have any questions.

Thank you,
Chris Boone

APPENDIX III

Course Impact Forms/Letters

School of Life Sciences



Date: March 4, 2016
To: Bertram Jacobs and Susanne Neuer
Unit: School of Life Sciences

From: Willem Vermaas, IGERT-SUN Director
Unit: School of Life Sciences

As a step in the procedures governing curricular actions, the attached course syllabi are provided for your review and response. This is being done to regularize the IGERT-SUN courses for their continuation after the grant period as a step towards meeting NSF IGERT program sustainability goals.

Please complete and sign this form and return a copy to Anna Keilty at a.keilty@asu.edu on or before Monday, March 14th.

Proposed Courses:

SOS 571	Sustainable Energy I: Technologies and Systems
SOS 572	Sustainable Energy II: Transitions
SOS 573	Sustainable Energy III: Futures Analysis, Negotiation and Governance
SOS 574	Sustainable Energy Analytics in Context
SOS 575	Sustainable Energy Research Seminar

I (choose one) to the proposed courses. *If applicable, state the reason(s) for objection and /or other comments/recommendations.*

have no objections

object for the following reasons:

Name of Reviewer (Print) Susanne Neuer

Signature of Reviewer (required) 

Date 3-8-16

ASU
Course Impact Form

Date: March 4, 2016
To: Neal Woodbury and Anne Jones
Unit: School of Molecular Sciences

From: Willem Vermaas, IGERT-SUN Director
Unit: School of Life Sciences

As a step in the procedures governing curricular actions, the attached course syllabi are provided for your review and response. This is being done to regularize the IGERT-SUN courses for their continuation after the grant period as a step towards meeting NSF IGERT program sustainability goals.

Please complete and sign this form and return a copy to Anna Keilty at a.keilty@asu.edu on or before Monday, March 14th.

Proposed Courses:

SOS 571	Sustainable Energy I: Technologies and Systems
SOS 572	Sustainable Energy II: Transitions
SOS 573	Sustainable Energy III: Futures Analysis, Negotiation and Governance
SOS 574	Sustainable Energy Analytics in Context
SOS 575	Sustainable Energy Research Seminar

I (choose one) to the proposed courses. *If applicable, state the reason(s) for objection and /or other comments/recommendations.*

have no objections

object for the following reasons:

Name of Reviewer (Print) Anne Katherine Jones

Signature of Reviewer (required) Anne Katherine Jones Date 10 March 2016

ASU
Course Impact Form

Date: March 4, 2016
To: Patricia Gober
Unit: School of Geographical Science and Urban Planning

From: Willem Vermaas, IGERT-SUN Director
Unit: School of Life Sciences

As a step in the procedures governing curricular actions, the attached course syllabi are provided for your review and response. This is being done to regularize the IGERT-SUN courses for their continuation after the grant period as a step towards meeting NSF IGERT program sustainability goals.

Please complete and sign this form and return a copy to Anna Keilty at a.keilty@asu.edu on or before Monday, March 14th.

Proposed Courses:

SOS 571	Sustainable Energy I: Technologies and Systems
SOS 572	Sustainable Energy II: Transitions
SOS 573	Sustainable Energy III: Futures Analysis, Negotiation and Governance
SOS 574	Sustainable Energy Analytics in Context
SOS 575	Sustainable Energy Research Seminar

I (choose one) to the proposed courses. *If applicable, state the reason(s) for objection and /or other comments/recommendations.*

have no objections

object for the following reasons:

Name of Reviewer (Print) Patricia Gober
Signature of Reviewer (required) Patricia Gober Date 3/15/16

School for Engineering of Matter, Transport and Energy

From: Mia Kroeger
Sent: Wednesday, March 16, 2016 11:31 AM
To: Anna Keilty
Subject: FW: IGERT courses regularization: Impact Statements

Hi Anna,

The School for Engineering of Matter, Transport and Energy has no objections to the creation of SOS 571-575.

Thank you!

Mia Kroeger
Assistant Director, Academic Services
School for Engineering of Matter, Transport & Energy
Ira A. Fulton Schools of Engineering
Arizona State University | P.O. Box 876106 | Tempe, AZ 85287-6106 – Mailing Address
501 E. Tyler Mall | Engineering Center G-Wing, #207 | Tempe, AZ 85287-6106 – Physical Address
Phone: (480) 965-4979 | Fax: (480) 727-9321 | Email: Mia.Kroeger@asu.edu
Website: semte.engineering.asu.edu



I AM A SUN DEVIL FAN.

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For information regarding Arizona's State University's non-discrimination policies, please visit: asu.edu/aad/manuals/acd/acd401.html

From: Anna Keilty
Sent: Tuesday, March 15, 2016 12:42 PM
To: Lenore Dai; Mary Laura Lind; Terry Alford; Marc Mignolet
Cc: Caroline Harrison; Willem Vermaas
Subject: RE: IGERT courses regularization: Impact Statements
Importance: High

Dear Drs. Dai, Lind, Alford and Mignolet:

I have not received the impact statement requested by Dr. Vermaas in the email below. We are working under a hard deadline and need your response as soon as possible.

Thank you,
Anna

Anna T. Keilty
Program Manager

From: Willem Vermaas
Sent: Friday, March 04, 2016 6:38 PM
To: Lenore Dai; Mary Laura Lind; Terry Alford; Marc Mignolet
Subject: IGERT courses regularization: Impact Statements

Dear Drs. Dai, Lind, Alford and Mignolet:

In July 2014 the Schools of Engineering signed an impact statement giving approval to regularize the IGERT-SUN (Solar Utilization Network) courses as part of our commitment to NSF that the IGERT-SUN project would have a lasting effect at ASU beyond the end of the grant period.

The original syllabi that accompanied the Impact Statement approved by the Schools of Engineering in July 2014 (SOS courses 571-576) required some modification prior to official launch and at the time we hoped the modifications would be minor. As it turned out, as we looked more closely at the student base we hoped to serve through these new course offerings, it was decided to broaden the scope of the courses from the grant-required Solar Energy focus to a more inclusive Sustainable Energy basis. Over the past year and a half an interdisciplinary faculty committee made up of IGERT-SUN participants, School of Sustainability (SOS) instructors and others have worked collaboratively to modify SOS 571-575 with this goal in mind.

Attached for your review are the newly revised syllabi for SOS 571-575 (SOS 576 no longer is planned at the current time) along with an updated Impact Statement Letter. We appreciate your continued support in this process of regularizing offerings provided by the IGERT-SUN NSF grant at ASU. We plan to begin offering these courses in Fall 2017 and to meet this target we need approval from your School on or before next Monday, March 14th.

Could you please fill out the attached form, and return it to Anna Keilty (copied here)? It is sufficient if one of you returns the signed form.

Thanks,

Wim Vermaas

Wim Vermaas
Foundation Professor
School of Life Sciences, and
Center for Bioenergy and Photosynthesis
Arizona State University
Box 874501
LSE 549, 427 E. Tyler Mall
Tempe, AZ 85287-4501
(480)965-6250


Course Impact Form

Date: March 4, 2016

To: Stephen Phillips and Joseph Palais
Unit: School of Electrical, Computer and Energy Engineering

From: Willem Vermaas, IGERT-SUN Director
Unit: School of Life Sciences

As a step in the procedures governing curricular actions, the attached course syllabi are provided for your review and response. This is being done to regularize the IGERT-SUN courses for their continuation after the grant period as a step towards meeting NSF IGERT program sustainability goals.

Please complete and sign this form and return a copy to Anna Keilty at a.keilty@asu.edu on or before Monday, March 14th.

Proposed Courses:

SOS 571	Sustainable Energy I: Technologies and Systems
SOS 572	Sustainable Energy II: Transitions
SOS 573	Sustainable Energy III: Futures Analysis, Negotiation and Governance
SOS 574	Sustainable Energy Analytics in Context
SOS 575	Sustainable Energy Research Seminar

I (choose one) to the proposed courses. *If applicable, state the reason(s) for objection and /or other comments/recommendations.*

XX have no objections

object for the following reasons:

Comments: There is some overlap of topics with EEE courses, but we feel the focus would be different in SOS than in EEE. Therefore we have no objections. Because of the non-engineering direction of these SOS classes, it is anticipated that they will not count towards fulfilling core requirements for EE graduate degrees.

Name of Reviewer (Print) Joseph Palais, ECEE Graduate Program Chair

Signature of Reviewer (required) 

Date: March 24, 2016

ASU
Course Impact Form

Date: March 4, 2016
To: Peter Bennett and Peter Rez
Unit: Department of Physics

From: Willem Vermaas, IGERT-SUN Director
Unit: School of Life Sciences

As a step in the procedures governing curricular actions, the attached course syllabi are provided for your review and response. This is being done to regularize the IGERT-SUN courses for their continuation after the grant period as a step towards meeting NSF IGERT program sustainability goals.

Please complete and sign this form and return a copy to Anna Keilty at a.keilty@asu.edu on or before Monday, March 14th.

Proposed Courses:

SOS 571	Sustainable Energy I: Technologies and Systems
SOS 572	Sustainable Energy II: Transitions
SOS 573	Sustainable Energy III: Futures Analysis, Negotiation and Governance
SOS 574	Sustainable Energy Analytics in Context
SOS 575	Sustainable Energy Research Seminar

I (choose one) to the proposed courses. If applicable, state the reason(s) for objection and /or other comments/recommendations.

have no objections ~~but~~ We do have overlap w/ 571 through a course taught by Prof Rez (physics), but little/no overlap splitting enrollment. His orientation is strongly "contrarian" and may or may not be of interest as guest lecture, etc.

object for the following reasons:

Name of Reviewer (Print) Peter Bennett
 Signature of Reviewer (required) P Bennett Date 3-17-16



Course Impact Form

Date: March 4, 2016
To: Edward Gibson and Peter Fox
Unit: School of Sustainable Engineering and the Built Environment

From: Willem Vermaas, IGERT-SUN Director
Unit: School of Life Sciences

As a step in the procedures governing curricular actions, the attached course syllabi are provided for your review and response. This is being done to regularize the IGERT-SUN courses for their continuation after the grant period as a step towards meeting NSF IGERT program sustainability goals.

Please complete and sign this form and return a copy to **Anna Keilty** at a.keilty@asu.edu on or before **Monday, March 14th**.

Proposed Courses:

SOS 571	Sustainable Energy I: Technologies and Systems
SOS 572	Sustainable Energy II: Transitions
SOS 573	Sustainable Energy III: Futures Analysis, Negotiation and Governance
SOS 574	Sustainable Energy Analytics in Context
SOS 575	Sustainable Energy Research Seminar

I (choose one) to the proposed courses. *If applicable, state the reason(s) for objection and /or other comments/recommendations.*

have no objections

object for the following reasons:

Name of Reviewer (Print) Peter Fox

Signature of Reviewer (required) _____ Date 3/10/2016

Digital signed by Peter Fox
Edward Gibson, IGERT-SUN Director
University of Sustainable
Engineering and Built Environment
and Life Sciences, ASU
Date: 2016.03.10 14:29