

# The University Senate of Michigan Technological University

## Proposal 7-18 (Voting Units: Academic)

“A Proposal for a **Bachelor’s of Science Degree in Sustainability Science and Society**”  
(Department of Social Sciences, Michigan Technological University)

**1. Date:** Nov. 6, 2017

**2. Contact:** Dr. Nancy Langston, Chair of Ad-hoc Major Committee nelangs3@mtu.edu

### **Committee members and associated departments:**

Dr. Angie Carter	Social Sciences
Dr. Kathleen Halvorsen	SFRES and Social Sciences
Dr. Don Lafreniere	Social Sciences
Dr. Nancy Langston	Social Sciences; affiliate in SFRES
Dr. Chelsea Schelly	Social Sciences
Dr. Roman Sidortsov	Social Science

**3. Interdisciplinary programs require approval from each department and dean:** The proposed major will be administered within a single department (Social Sciences), so this is not applicable.

### **4. General description and characteristics of program, including learning goals:**

The proposed Bachelor of Science degree in Sustainability Science and Society will help students develop the *interdisciplinary social science knowledge and skills* needed to address the world’s most significant environmental sustainability problems. Challenges in environmental sustainability involve significant social dimensions, so finding solutions and providing leadership on sustainability issues benefits from an interdisciplinary foundation in the social sciences. Traditional approaches to environmental management have largely been based on compartmentalized models where different disciplines exist in separate silos, even though the systems we try to manage are tightly coupled and dynamic. In contrast, sustainability science examines the interactions between human, environmental, and engineered systems to understand and contribute to real-world solutions.

*Advisory Committee:* As the name of the major suggests, the proposed major is focused on the social sciences yet draws upon other disciplines involved in sustainability science to give students disciplinary depth and interdisciplinary skills. For example, we require students to take at least 9 classes related to sustainability in other departments. To provide guidance to ensure that we expose students to important disciplinary knowledge and approaches outside of the social sciences, we have invited faculty and staff from across the university to join an advisory committee that will meet annually to discuss core concepts that all students interested in sustainability should know.

**Advisory Committee:**

Dr. Joshua Pearce	Materials Science & Engineering; affiliate Social Sciences
Dr. Casey Huckins	Biological Sciences
Dr. Jay Meldrum	Director of Sustainability for MTU, KRC
Dr. Sarah Green	Chemistry
Dr. Rob Handler	Sustainable Futures Institute
Dr. Latika Gupta	School of Business and Economics
Dr. Chris Webster	SFRES

The proposed major will attract students with diverse interests in the social science dimensions of sustainability, preparing them to become professionals with a solid knowledge of the environment who can contribute creative solutions to environmental problems. A recent review of the growth of sustainability science (Bettencourt and Kaur 2011) shows that 42% of the field's research is published in social sciences journals; 21% is published in engineering and the physical sciences; and 30% is published within the life sciences.<sup>1</sup> Our proposed curriculum reflects this interdisciplinary. Students in our proposed major would need to take a minimum of 43% of their courses in the social sciences; 15% in the life sciences; and 10% in the engineering and physical sciences. Their other 32% of coursework must fit within sustainability themes as described below, while the student may select the disciplinary mix that best reflects their professional goals.

*Learning Goals for the Proposed Major*

1. Sustainability Social Sciences Knowledge. Students will demonstrate depth of knowledge in the core themes, issues, and developments in the social science dimensions of sustainability science, and breadth of exposure to the natural and physical science dimensions of sustainability science.
2. Sustainability Social Science Engagement and Critical Analysis. Students will be able to understand and engage in discussions about major societal changes in sustainability, demonstrating a grasp of basic social science issues in sustainability. Students will understand the interactions between human, environmental, and engineered systems to understand and contribute to real world solutions.
3. Sustainability Research and Communication Skills: Students will demonstrate their competency in the following transferable skills:
  - Ability to conduct research and present findings
  - Ability to collect and analyze data
  - Critical thinking and problem solving skills
  - Ability to work in teams and communicate across disciplines
  - Solid writing skills
  - A set of tools and techniques widely used in industry and the academy to identify, communicate, and resolve complex societal issues and support policy creation and decision making.

**5. Rationale**

Global climate change and environmental degradation offer new challenges and new opportunities as government, businesses, and the public look for solutions. The Sustainability

Science and Society major is designed to help students understand and respond to these complicated issues and to lead the way in the creation of a sustainable future, while preparing them for the new jobs of the emerging green economy. Sustainability requires the integration of three core dimensions: 1) ethics, equity, and justice; 2) natural sciences and technology; 3) economics, policy, and governance (Figure 1).

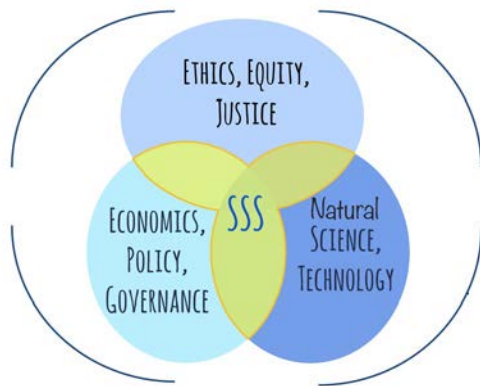


Figure 1. Components of Sustainability (modified from <https://www.mcgill.ca/sss/about-sss>)

Sustainability promotes environmental health and restoration, social equity, and economic vitality. The goal is to meet the needs of the present (such as health, energy, food, shelter, and transportation) without compromising the ability of future generations to meet their own needs. In light of unprecedented environmental degradation, social instability, and economic uncertainties in today's world, the sustainability degree cultivates the complex knowledge and skills needed to secure a healthy future for all. The major builds a community of faculty and students committed to tackling the complex socio-environmental problems confronting our communities and the world. In addition to the traditional classroom, the sustainability major bridges the gap between campus and community through civic engagement and experiential, project-based, and service learning.

*Enrollment trends:* Nationally, enrollment in environmental majors with significant interdisciplinary components are growing.<sup>2</sup> At the University of Wisconsin-Madison, for example, one year after a new environmental studies major was created in 2011, 200 majors had enrolled. Majors focused on various dimensions of sustainability have appeared only in the past decade, but they are growing rapidly. The proposed program aims to capitalize on this trend and anticipate future student interests and occupational trends.

*Job market:* Sustainability jobs are found in some of the fastest growing fields in the 21st-century economy. Some of these positions involve technical skills in retrofitting buildings and installing renewable energy infrastructure. Many jobs in sustainability, however, require the social science skills that we will teach. Many organizations have begun reprioritizing departments and creating initiatives to develop environmentally friendly products and develop new green business practices. Minimizing the use of resources while lowering costs is an important incentive for businesses, government, and individuals to innovate and operate more sustainably. To achieve this, there is a need for skilled analysts, consultants, educators, planners, and policy makers. Many of these jobs did not exist several years ago and this sector of the economy is expected to continue to grow, according to U.S Bureau of Labor Statistics.<sup>3</sup>

Figure 2 shows salaries, enrollment in graduate programs, and employment for 2015 graduates across the United States. Nationally, sustainability studies graduates from the class of 2015 earned a mean starting salary of \$51,541—significantly higher than other social sciences majors currently represented at Michigan Tech. 45% found a full-time job in their chosen career within a year of graduation; 14% entered graduate school. The salary and employment figures are higher than our other majors in the social sciences (anthropology majors nationwide have a mean starting salary of \$34,085 and 34% employment; history majors earn a mean starting salary of \$38,936 with 37% employment).<sup>4</sup>

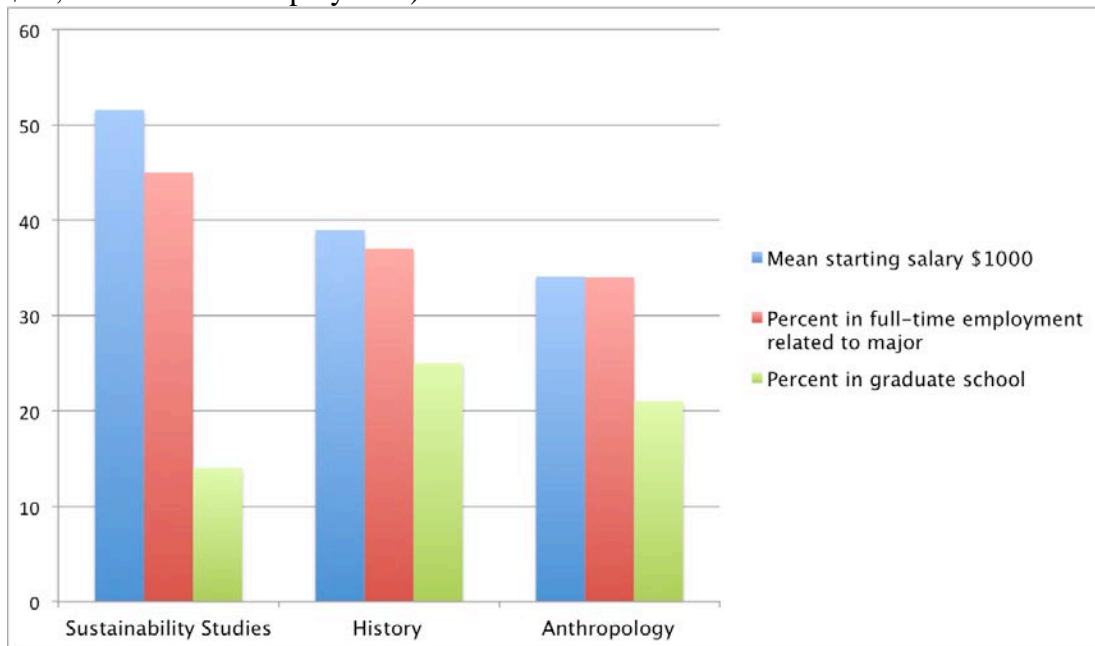


Figure 2. 2016 salaries, employment, and graduate school rates for 2015 graduates. Data from NACE Survey [www.naceweb.org](http://www.naceweb.org)

*University and School mission:* The proposed program is consistent with the mission of Michigan Tech, especially in the areas of engagement to advance sustainable economic prosperity, ethical conduct, and responsible use of resources. The proposed major addresses goal 2 in the strategic plan “A distinctive and rigorous action-based learning experience grounded in science, engineering, technology, sustainability, business, and an understanding of the social and cultural contexts of our contemporary world.” The mission of the Department of Social Sciences is to foster excellence in social sciences. The proposed major in sustainability will contribute to this mission by training social scientists who can address critical sustainability issues. The major will mesh well with our current MS and PhD programs in Environmental and Energy Policy (EEP), allowing us to attract additional undergraduates interested in the research fields of our existing graduate students and faculty involved in the EEP program.

## 6. Related Programs

There is no other undergraduate major on campus focused exclusively on sustainability. Within the School of Forest Resources and Environmental Science, the new natural resources management major focuses on the technical and biophysical aspects of natural resources and ecosystem management. While this major does contain a social sciences component, the

proposed Sustainability Science and Society major is designed to meet the needs of students who want more depth in the social sciences, sustainability, and environmental justice. We see the two majors as complementary, not competitive.

*Supporting Programs at Michigan Tech* Many academic units at Michigan Tech offer coursework relevant to students pursuing the B.S. in sustainability. The following academic units provide required or elective classes for students pursuing this degree: SFRES, the Departments of Biological Sciences, Humanities, Geological Engineering and Sciences, Environmental Engineering, and the School of Business and Economics.

*At other institutions:* There is no similar Bachelor of Science program in sustainability in Michigan, although in other states such as Arizona and New York, public universities offer similar programs that are successful. Within Michigan, Northern Michigan University, Michigan State, and Western Michigan all offer majors in environmental and sustainability studies that differ from our proposed major in significant ways. Northern Michigan's Environmental Studies and Sustainability major consists of geography courses, so it has a different emphasis than our proposed interdisciplinary major and lacks the engineering coursework. Western Michigan University's Environmental and Sustainability Studies major has a greater focus on the humanities and a lesser focus on engineering, economics, methods, and technology. Western's major can only be taken as a second or coordinate major rather than a stand-alone major. Michigan State's Environmental Studies and Sustainability major does not engage with the engineering sciences.

Our closest model is the successful major at Arizona State University, where the School of Sustainability offers a major in Sustainability. Our major requires more coursework in the environmental and engineering sciences. At ASU, similar interdisciplinary coursework is optional rather than required.

A Sustainability Science and Society major at Michigan Tech is expected to offer a unique experience to students interested in careers that focus on environmental social science, environmental justice, and sustainability. Small class sizes at Michigan Tech afford instructors the ability to provide field experiences, community based research, project based courses, and applied research experiences to students that larger institutions cannot.

## **7. Projection of student enrollments**

We project an annual enrollment of 10-20 new students per year in this program with existing faculty numbers.

## **8. Scheduling plans**

Regular

## **9. Curriculum Design**

In addition to the general education requirements, students will take a minimum of 62 credits in the major and 21-28 free electives, for a total of 122 credits, as detailed below. This total does not include the credits associated with the university's co-curricular requirement.

Beyond university-wide general education and elective requirements, we aim to equip students with the research methods, analytical tools, and social theories developed within social sciences in order to encourage an integrative and interdisciplinary approach to sustainability. Section A (11 credits) represents the foundational courses for the program.

Section B provides students with three courses in methods that will introduce students to a set of applied tools and research approaches that are used broadly across the social sciences for research and dissemination. These skills provide the foundation for investigative scholarship and are widely sought after by employers in both the public and private sector. We strongly advise students to take GIS.

Sections C and D provide familiarity with approaches and research within the life sciences, physical sciences, and economics.

Section E provides students with depth in a particular theme within sustainability. We do this by requiring at least 9 credits within a particular list while maintaining breadth through another 15 credits across at least five different themes of sustainability.

Section F requires an internship, thesis, or independent study focused on sustainability issues. The majority of sustainability professions require creative problem solving as well as organizational and leadership skills in addition to a broad knowledge base and training in analytical ability and critical thinking. Many classes in the major will challenge students to develop solutions and work in teams. However, experiences of working in real world settings are irreplaceable in developing core skills. Our program encourages students to do internships with existing organizations focused on sustainability. We also will encourage students to become involved in on-campus sustainability initiatives to acquire hands-on experience and develop civic engagement skills; examples include the new Sustainability Demonstration House. Finally, all majors will participate in a final professional development seminar that will help them debrief their individual internship and/or research experiences, share their lessons learned from these experiences, and prepare them to apply them to their career goals.

#### **DEPARTMENTAL MAJOR REQUIREMENTS (MIN 62 credits)**

##### **A. Core courses:** Students must take all of the following courses. (12 credits)

- EC 2001 (3) \_\_ [Principles of Economics]
- SS 1001 (1) \_\_ [Orientation to Social Sciences]
- SS 2300 (3) \_\_ [Environment & Society]
- SS 3313/ FW3313 (3) \_\_ [Sustainability Science, Policy, and Assessment]
- FW2030 (2) \_\_ [Natural Resources Conservation]

##### **B. Methods & Statistics:** choose 3 classes from the following list (MIN 9 credits):

- FW 3540 (4) \_\_ [Intro to GIS for Natural Resource Management]
- SS 2001 (3) \_\_ [Research Methods]
- SS 2050 (3) \_\_ [Fundamentals of GIS]\*
- SS 4009 (3) \_\_ [Intro to Survey Methodology]
- SS 4010 (3) \_\_ [Statistics for the Soc. Sci]
- SS 4040 (3) \_\_ [Advanced Social Science Methods]
- SS 4050 (3) \_\_ [Advanced GIS Methods]

- SS 4211 (3) \_\_ [Ethnographic Methods]
- SS 4700 (3) \_\_ [Communities and Research]

**C. Environmental sciences:** choose 3 classes, with at least one from each list. (MIN 7 credits)

*List 1: ecology*

- BL 3400 (4) \_\_ [Principles of Ecology]
- BL 4090 (2) \_\_ [Tropical Island Biology]
- BL 4440 (4) \_\_ [Fish Biology]
- BL 4447 (4) \_\_ [Stream Ecology and Fish Biology]
- BL 4450 (4) \_\_ [Limnology]
- BL 4461 (3) \_\_ [Ecosystem Ecology]
- BL 4465 (3) \_\_ [Biological Oceanography]
- FW 2010 (4) \_\_ [Vegetation of North America]
- FW 3020 (3) \_\_ [Forest Ecology]
- FW 3410 (3) \_\_ [Conservation Biology]
- FW 3640 (2) \_\_ [Aquatic ecosystems]
- FW 4128 (3) \_\_ [Conservation genetics]
- FW 4220 (4) \_\_ [Wetlands]
- FW 4240 (4) \_\_ [Mammalogy]
- FW 4260 (3) \_\_ [Population Ecology]
- FW 3610 (4) \_\_ [Ornithology]
- SS 4380 (3) \_\_ [Landscape Ecology and Planning]

*List 2: earth and physical sciences*

- GE 2000 (3) \_\_ [Understanding the Earth]
- GE 2100 (3) \_\_ [Environmental Geology]
- GE 2500 (3) \_\_ [Introduction to Oceanography]
- GE 2640 (3) \_\_ [Atmospheric Observations and Meteorology]
- GE 3320 (3) \_\_ [Earth History]
- GE 3850 (3) \_\_ [Geohydrology]
- FW 3180 (2) \_\_ [Geomorphology, Landscapes & Ecosystems]
- FW 4370 (3) \_\_ [Forest and Landscape Hydrology]
- FW 3330 (4) \_\_ [Soil science]

**D. Environmental economics:** choose 1 class from the following list (3 credits):

- EC 4620 (3) \_\_ [Energy Economics]
- EC 4630 (3) \_\_ [Mineral Industry Economics]
- EC 4640 (3) \_\_ [Natural Resource Economics]
- EC 4650 (3) \_\_ [Environmental Economics]

**E. Environment & Sustainability:** Choose 9 classes. One class must come from each of five lists, and three classes must come from within one list. The remaining two classes may come from any list. (27 credits). [\*Courses marked with an asterisk have been proposed in 2017-2018 binder process; proposals are attached]

*List 1. Policy*

- FW 3110 (3) \_\_ [Natural Resource Policy]
- SS 3630 (3) \_\_ [Environmental Policy & Politics]
- SS 3800 (3) \_\_ [Energy Policy and Technology]
- SS 5635 (3) \_\_ [International Environmental Policy]
- SS 3621 (3) \_\_ [Introduction to Public Policy and Public Management]
- SS 3600 (3) \_\_ [American Foreign Policy]

SS 3612 (3) \_\_ [International Relations]  
SS 3800 (3) \_\_ [Energy Policy and Technology]  
SS 4325 (3) \_\_ [Water Policy, History, and Governance]\*  
UN 4400 (3) \_\_ [Climate Sciences and Policy]\*

*List 2. Engineering Sustainability*

CMG 4800(3) \_\_ [Sustainable Construction]  
ENG 4510(3) \_\_ [Sustainable Futures I]  
ENVE 4506(3) \_ [Appl of Sustain Principles to Eng Prac]  
MEEM 4685(3) \_ [Env Resp Design & Manuf]

*List 3. Sustainability & Communities*

SS 3300 (3) \_\_ [Environmental Problems]  
SS 3110 (3) \_\_ [Food Systems and Sustainability]\*  
SS 3315 (3) \_\_ [Population and Environment]  
SS 4380/FW4380 (3) \_\_ [Landscape Ecology and Planning]  
SS 4390 (3) \_ [Seminar in Sustainability Issues]

*List 4. Environment & Society*

FA 3190 (3) \_\_ [Society, Art, and Environment]  
HU 3508 (3) \_\_ [Literature and the Environment]  
SS 3512 (3) \_\_ [Building America]  
SS 3520 (3) \_\_ [U.S. Environmental History]  
SS 3760 (3) \_\_ [Human Dimensions of Natural Resources]  
SS 3801 (3) \_\_ [Science, Technology, & Society]  
SS 3815 (3) \_\_ [Energy and Society]  
SS 4001 (3) \_\_ [History of Social Thought]  
SS 4120 (3) \_\_ [Anthropology of International Development]\*  
SS 4200 (3) \_\_ [Environmental Anthropology]  
SS 4540 (3) \_\_ [Global Environmental History]\*

*List 5. Environmental health & justice.*

BL 4120 (3) \_\_ [Environmental remediation and toxicology]  
BL 4070 (3) \_ [Environmental Toxicology]  
HU 4625 (3) \_\_ [Risk communication]  
FW 3075 (3) \_\_ [Intro to Biotechnology]  
SS 3105 (3) \_\_ [Native American and Indigenous Communities]  
SS 3750 (3) \_\_ [Social inequality]  
SS 3805 (3) \_\_ [Environmental Justice]\*  
SS 3811 (3) \_ [Energy Security and Justice]  
SS 4530 (3) \_\_ [Deindustrialization and the Urban Environment]\*

*List 6. Decision Making and Persuasion*

PSY 2800 (3) \_\_ [Critical Thinking for Social and Behavioral Sciences]  
PSY 3250 (3) \_\_ [Persuasion and Attitude Change]  
PSY 3750 (3) \_\_ [Judgment and Decision Making]

**F. Culminating Experience:** Capstone, internship, thesis, or research experience focused on sustainability issues (**4 credits**)

*Take 1 course from the following list, in consultation with an advisor who can assure the project focuses on sustainability AND participate in SS4910, a final professional development seminar.*



SS 3960 (3) \_ Cultural Immersion  
SS 4000 (3) \_ Independent Study  
SS 4920 (3) \_ Internship experience  
SS 4921 (3) \_ Washington experience: Professional practicum  
ENT 3950, 3960, 4900, 4910, 4950, or 4960 (3-4) \_\_ Enterprise Capstone. Students may participate in the Enterprise Program to serve as their culminating experience for the major, with approval from Enterprise faculty mentor. Students should have 3-4 semesters of participation in Enterprise.

AND

SS4910 (1) \_\_ [Professional Development for the Social Sciences]

### **10. New course descriptions.**

The following courses were all proposed in the 2017-2018 binder process; course proposals are attached:

SS 2050 (3) \_\_ [Fundamentals of GIS]  
SS 3110 (3) \_\_ [Food Systems and Sustainability]  
SS 3805 (3) \_\_ [Environmental Justice]  
SS 4120 (3) \_\_ [Anthropology of International Development]  
SS 4325 (3) \_\_ [Water Policy, History, and Governance]  
SS 4530 (3) \_\_ [Deindustrialization and the Urban Environment]  
SS 4540 (3) \_\_ [Global Environmental History]

**11. Model schedule demonstrating completion time. Total credits=122**

<b>Fall Year 1</b>			<b>Spring Year 1</b>		
<b>Course</b>	<b>Credit</b>	<b>Requirements</b>	<b>Course</b>	<b>Credits</b>	<b>Requirements</b>
UN1015	3	Gen Ed core	UN1025	3	Gen Ed core
SS1001	1	Major A	SS2300	3	Major A
MA1032 or 1135	4	STEM	EC2001	3	Major A
BL1040	4	STEM	HASS	3	HASS course
Electives	3		Electives	3	

<b>Fall Year 2</b>			<b>Spring Year 2</b>		
<b>Course</b>	<b>Credit</b>	<b>Requirements</b>	<b>Course</b>	<b>Credits</b>	<b>Requirements</b>
SS3520	3	Major E.4	SS3313	3	Major A
HASS comm	3	HASS comm	SS4050	3	Major B
ENG4510	3	Major E.2	GE2000	3	Major C
SS3630	3	Major E.1	BL4090	2	Major C
FW2030	2	Major A	HASS SBS	3	HASS SBS
Electives	1		Electives	2	

<b>Fall Year 3</b>			<b>Spring Year 3</b>		
<b>Course</b>	<b>Credit</b>	<b>Requirements</b>	<b>Course</b>	<b>Credits</b>	<b>Requirements</b>
SS4700	3	Major B	EC4650	3	Major D
SS3300	3	Major E.3	PSY2800	4	Major E.6
SS3815	3	Major E.4	SS3621	3	Major B
STEM	3	STEM class	STEM	3	STEM class
Electives	3		Electives	3	

<b>Fall Year 4</b>			<b>Spring Year 4</b>		
<b>Course</b>	<b>Credit</b>	<b>Requirements</b>	<b>Course</b>	<b>Credits</b>	<b>Requirements</b>
UN4400	3	Major E.1	SS4910	1	Major F
SS3811	3	Major E.6	SS4920	3	Major F
FA4190	3	Major E.4	FW3410	3	Major C
HASS	3	HASS HU/FA	STEM	3	STEM
Electives	3		Electives	5	
			Total Electives	23	

**12. Library and other learning resources.**

The proposed degree is based on courses currently offered for Social Sciences, Anthropology, and History majors. The basic library resources are already in place supporting these programs, including journals, electronic databases, government documents and access to interlibrary loan services.

**13. Faculty resumes.** See <http://www.mtu.edu/social-sciences/department/faculty-staff/>

**14. Description of available and needed equipment.**

Existing computer facilities and equipment are adequate to support this program. Investments have been made by the Department from 2014-2016 to modernize and expand laboratory resources for students. This includes computer teaching labs around campus, software, and network access.

**15. Program costs: years 1, 2, and 3.**

The need for advising will be met by Dr. Kari Henquinet, who had directed the Peace Corps Master's International Program (which the Peace Corps ended in 2016). The department has hired six faculty since 2012 who are serving on the major committee and who are also offering courses for the proposed major (Schelly, Baird, Carter, Langston, Lafreniere, Sidortsov), which meets the need for additional spaces in courses.

**16. Space.** The Department of Social Sciences occupies space in the Academic Office Building and the Annex. The Annex provides laboratory space for classes, graduate student offices, computer facilities, and a lounge, while the Academic Office Building provides faculty and graduate student offices, teaching classrooms, and seminar space. This space is sufficient to meet the needs of this program.

**17. Policies, regulations, and rules.**

Responsibility for administration of the program will reside with the Department Chair of Social Sciences, who reports to the Dean of the College of Sciences and Arts.

**18. Accreditation requirements.**

This degree requires no special accreditation beyond those of our existing majors.

**19. Planned implementation date**

Fall 2018.

**Appendix A: Documentation****1. Relation to University Strategic Plan****a. Relation of program to the university's educational and research goals.**

The proposed major fits with goal 2 of the strategic plan. "GOAL 2: A distinctive and rigorous action-based learning experience grounded in science, engineering, technology, sustainability, business, and an understanding of the social and cultural contexts of our contemporary world." Specifically, the proposed major integrates science, sustainability, business and the social and

cultural contexts of natural resources and natural resource management.

**b. Consistency with the university's resource allocation criteria.**

No new resources are being requested at this time.

**2. Impact on University Enrollment**

**a. Projected number of students in the program.**

We project an annual enrollment of 10-20 new students per year in this program.

**b. Source of new students; in particular, will the students be drawn from existing programs, or will they be students who would otherwise not have come to Tech?**

We anticipate that many students may come from other majors within the Department of Social Sciences, particularly from our general social sciences major. We do expect that additional enrollment will include students who are looking for a more interdisciplinary program focused on the environment than those currently offered. Some students looking for a sustainability major may enroll at Michigan Tech who would not otherwise have enrolled because we currently lack such a major. This major is also expected to help retention at Tech by providing students from other majors with additional options.

**c. What is the likely correlation between demand for the new program and existing enrollment patterns at Michigan Tech?**

We project that enrollment in the Sustainability Science and Society major will increase the number of students majoring in the Department of Social Sciences and the College of Sciences and Arts. This may be correlated with a slight increase in the overall percentage of Michigan Tech students enrolled in the College of Sciences and Arts vs. other units on campus.

**d. What is the current enrollment in the unit?**

37 graduate students and 35 undergraduate majors.

**3. Assessment.**

This program will be assessed as part of the ongoing University assessment program. All of the University learning goals will be addressed by one or more classes in the proposed program. Courses that are outside of the general education requirements will address disciplinary knowledge as well as other university learning goals.

**4. Discuss impact on resources required by department in which the program is housed.**

**a. Faculty lines.** No new faculty lines are requested.

**b. Faculty and student labs, including ongoing maintenance.** Adequate classroom and laboratory space is already available.

**c. Advising.** The current resources for advising within the Department of Social Sciences will be adequate.

## 5. Discuss impact on resources required by other units within the university.

**a. Impact on other classes:** Classes in other academic units are being reviewed by those units, and we expect that the capacity is available to serve the students in the new major, given the large number of choices we offer students. Existing information technology, library, central administration, and career planning resources are sufficient to support the new major.

**b. For high demand fields, will it be possible to fill allocated faculty lines?**

No faculty lines are requested at the initiation of this degree program

**c. Has the department initiated any other new degree programs in the last five years?**

No undergraduate degree programs have been proposed by the department in the last 5 years.

**d. How do the benefits from this program compare to other alternatives that are currently under consideration or development?**

We believe that approval of this program will not require a significant allocation of resources, so it should not preclude the development of other programs.

## 6. Discuss departmental budget contribution

**a. What is the department's total general fund budget?**

Salaries (with fringes): \$2,406,724  
Summer teaching returns: ~\$70,000  
SS&E: \$21,111

**b. How much tuition does the department generate?** Based on data provide by Institutional Analysis:

Tuition generated through credit hours taught by Department: \$6,500,000  
Tuition generated through credit hours taken by Department's Majors: \$900,000

In addition, the faculty in the department of Social Sciences have been active researchers:

2014-16 Funded proposals with SS faculty as PIs: \$4,609,222  
2014-16 Funded proposals with SS faculty as co-PIs: \$2,567,636

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<sup>1</sup> Luis Bettencourt and Jasleen Kaur, "Evolution and structure of sustainability science," *PNAS* 108 (Dec 6, 2011): 19540-19545.

<sup>2</sup> Shirley Vincent, 2009, "Growth in environmental studies and science programs," *Association for Environmental Studies and Sciences* 2 (2009): 1-4.

<sup>3</sup> <http://www.bls.gov/green/overview.htm>

<sup>4</sup> <http://www.naceweb.org/job-market/graduate-outcomes/first-destination/class-of-2015/>