Proposal for a Minor in Sustainability

Stockton Program Acronym: SUST

Degree/level of Current Program:

BA/BS: CIP Code: 30.3301

Name(s) and signatures of Faculty Proposing New Option:

Maritza Jauregui

Maritza Jauregui, Ph.D.

Associate Professor of Sustainability

Tait Chirenje

Tait Chirenje, Ph.D.

Associate Professor of Environmental Studies

Patrick Hossay, Ph.D.

Associate Professor of Sustainability

Date of Program Faculty Vote to Approve the Proposed New Option: September 2015, September, 2017

A Proposal for a Minor in Sustainability

1. Overview

a. Definition and Rationale:

The proposed minor falls under the field of Sustainability Studies, and would be housed within the current Program in Sustainability in the School of Natural Sciences and Mathematics (NAMS). This is a proposal for a minor within a pre-existing major.

In general, sustainability refers to those social, economic, ethical, and scientific endeavors that help bring human existence into balance with the natural world. In particular, the field seeks to facilitate what the National Research Council has called a "transition toward sustainability," improving society's capacity to use the earth in ways that simultaneously "meet the needs of a much larger but stabilizing human population, … sustain the life support systems of the planet, and … substantially reduce hunger and poverty" (NRC, 1999).

Unlike the fields of environmental science and environmental studies, sustainability focuses not on environmental challenges, but on better ways to meet human individual, economic, and social needs with the understanding that this must be done in environmentally sustainable ways. It focuses on the dynamics of human systems and natural systems, with an equal emphasis on both, and on using this knowledge to change human systems in fundamental ways in order to prevent future problems.

A lack of understanding of the general principles of sustainability has contributed to many of the challenges that we face today; among them ecosystem degradation, climate change, public health challenges, poverty, and human conflict. It is for this reason that many universities (AASHE, 2018; NCES, 2018) are now including sustainability as part of their undergraduate curriculum. We already have a major in sustainability, but this is not for all students. It requires specific types of students who want to dedicate their lives to focusing on the field itself and its complexities.

If we want to build a better world, knowledge of how we create the social and environmental problems that we contend with every day, their interrelationships, and their possible solutions cannot be a theoretical endeavor, discussed among those already committed to its importance; imparting this knowledge to our students and helping them to understand how it can be used within their varied chosen professions must also be part of our mission to educate. With an understanding of sustainability, our students can make positive changes once they are graduates and are working within their own professions.

It is with this in mind, and after a discussion resulting from requests for a minor option from students enrolled in other programs, particularly students within NAMS, the faculty voted to move forward with a proposal for a minor in sustainability. The initial vote took place in the fall of 2015, and then reaffirmed in the fall of 2017 after the program's five year review process was completed and pending expanded curriculum offerings were finalized.

2. Needs Assessment

a. National/Regional Trends:

According to data provided by the Association for the Advancement of Sustainability Higher Education, there is an increasing trend among colleges and universities both in the United States and abroad to offer minors in sustainability. There are currently 76 universities and colleges in the United States that report offering minors in the subject, up from only 4 schools that offered minors in the subject in 2012 (AASHE, 2018). This dramatic 1800% increase in only five years is fueled not just by the recognition that a solid foundation in sustainability is becoming not just more common, but necessary for multiple occupations.

According to the Bureau of Labor Statistics (2012), the growth in sustainability-related jobs nationally and regionally will encompass both traditional jobs, which have sustainability-related goals and duties as an added element, and those positions specifically focused on sustainability. Along these lines, this workforce will likely be composed of two types of professionals: a relatively small group of experts who maintain a focus on sustainable

technologies, practices, policies, and concepts and would reflect the interests of the current students majoring in sustainability; and a much larger group of professionals who maintain more traditional roles but will be required to develop a broader perspective that can incorporate sustainability priorities into existing jobs. It is these students who would benefit from the creation of a sustainability minor. For many positions, the incorporation of sustainability knowledge will not be unlike the incorporation of computer knowledge for the past generation of professionals. Such a shift implies a need for specialists who can train and continuously retrain for the changing skills and practices needed in a rapidly changing social and ecological reality. For a list of some examples and an explanation of how sustainability would affect each example, please see Appendix A.

b. Student Interest-

Nationally, there are indications of a strong general interest in sustainability among new college students. In a 2010 Princeton Review survey of 16,000 college applicants and their parents, a full two-thirds expressed an interest in the college's sustainability efforts and a quarter said a school's environmental profile 'very much' influenced their choice of college.5 That same year, Princeton Review started publishing a guide to green colleges for prospective students that highlights colleges with the most exceptional commitment to sustainability based off on multiple factors including their academic offerings. The 2017 publication offers 376 colleges in its guide.

In order to evaluate the potential interest in sustainability studies regionally, we conducted a survey of high school educators in Atlantic, Ocean, and Cape May counties when we first developed the Sustainability degree in 2011. Participants were asked to assess the potential interest in a degree program in sustainability among their students, the general interest in sustainability among their students, and their perceived general need for such a minor program using a five point Likert scale. Over one hundred and fifty educators were asked to participate and fifty- two did so. While teachers in the sciences constituted just over half the respondents, teachers of many fields, from English to social studies to special education, were also represented. The results strongly indicate a

significant potential interest in the study of sustainability among high school students in the region. Sixty-eight percent of respondents described their students' current interest in sustainability, alternative energy, environmentalism, and related fields as "high" or "somewhat high." Similarly, half described their students' interest in pursuing a career in a sustainability related field as "high" or "somewhat high." Most notably, eighty-six percent of respondents rated the need for a degree program in sustainability in the region as high or somewhat high; and seventy-five percent predicted that the appeal of such a program to their future students would be high or somewhat high.

A comparable survey was distributed in several Stockton courses, including an Environmental Science course, a Political Science course, and two General Studies courses. The results indicate a significant interest in this area of study among participants. In all, two hundred students were surveyed. Using a five point Likert scale, fifty-six percent rated their current interest in sustainability and related fields as "high" or "somewhat high." Eighty percent rated the need for a degree program in sustainability as "high" or "somewhat high," and fifty-six percent predicted the appeal of such a program as "high" or "somewhat high."

In order to gauge student interest in the minor itself, a brief survey was conducted among current Stockton University students during the fall of 2017. The survey instrument was created using Qualtrics and contained four questions. The questionnaire briefly described the field of Sustainability and then asked if the respondent would be interested in a minor in sustainability should one be offered. The questionnaire also collected information on the respondent's major and year, as well as reason for their interest or lack thereof. The link to the survey was distributed via the Stockton Daily Digest, which is a newsletter that is published twice a week by the Office of Student Development and distributed electronically to the entire student body. The survey was advertised in the digest as a four question survey of student interest in future possible course offerings without any indication that it was specifically about sustainability related coursework. Although the total number of respondents was low (n=132), and the sample suffered from self-selection bias, as students had to read the advertisement and decide to click on the link, respondents were enrolled in

every school of the university and represented 34 distinct majors. (See Appendix B for complete list of majors represented.) Two of the respondents were graduate students and thus did not qualify for the survey.

It is important to note that the students were asked if they would be interested in the minor, not whether or not the minor should be offered. Thus, the survey responses were used as an indicator of possible enrollments in the minor and not just as indicators of approval of the subject matter or of the discipline.

Breakdown of respondents by school was as follows: BUSN 21.2%, SOBL 19.7%, NAMS 18.9%, Undecided or failed to declare 14.4%, HLTH 11.4%, ARHU 11.4%, GENS 1.5%, EDUC 1.5%. These percentages are fairly representative of the proportion of current enrollments by school, save for the School of Health Sciences, which was underrepresented by respondents.

Respondents were asked if they would be interested in a minor in sustainability if it were to be offered and given a choice of" Yes," "Maybe," and "No" for response options. Results of the survey were as follows:

Percent of respondents from each school answering yes, no or maybe to:

"*If there were to be a minor in sustainability, would you be interested in it?"*

School	% Yes	% Maybe	% No	% Yes/ Maybe**
NONE	41.18	29.41	11.76	41.18
HLTH	26.67	13.33	60.00	40.00
NAMS	48.00	36.00	16.00	76.00
ARHU	13.33	20.00	66.67	26.67
BUSN	21.43	42.86	35.71	46.43
EDUC*	0	0	0	0
GENS	50.00	0	50.00	50.00
SOBL	34.62	23.08	42.31	38.46
Total	31.06	28.03	37.12	46.15

*Undergraduate responses already used within other school major. Graduate responses removed during final analysis.

**Students answering "maybe" but indicating in their explanation that they felt a minor would be beneficial

Students were asked to explain their answers. Among the 37.1% of students that responded "no," 77.6% explained their negative response. Reasons for negative responses fell into five categories:

- a lack of interest "not Interested", "not related to my interests" (Major in Social Work)(42.1%)
- a lack of relevance to personal goals as exemplified by the comments "not relevant to my major" (Mass Communication major) or "not relevant to career plans"(major in Creative Writing) (31.6%)
- Already have minor/double minor/double major/already taking too many classes (18.4%)

- Didn’t feel that studying sustainability is worth it as exemplified by statements such as “pointless” (Psychology major) and “don't feel studying sustainability is worth it, it should be classes within existing majors and minors” (Computer Science major) (5%)
- Graduating soon 2.6%

Those responding “maybe” fell into three main categories:

- Those that were truly unsure of their interest in the field or its relevance to their field of study/career goals (29%) as exemplified by statements such as “I’m not sure if it’s very relatable to the career path I plan to take” (Biology major) and “I’m not too sure if I would be interested or not” (Health Science major).
- Those who thought that the minor should be offered because they were personally interested in the subject matter but weren’t sure if it was something they would add (50%) as exemplified by statements such as “It'd certainly interest me but I don't think I could fit it into my schedule”(Computer Science major) “It sounds interesting and useful for my future career”(Historical Studies major), and “It is something that I have been interested in. I factor would be what courses are offered and what could be done with it” (Psychology major)
- Interestingly, twenty-one percent of respondents who answered “maybe” had no personal interest in the minor but still thought that the minor should be offered (21%). These were demonstrated by statements such as
    - “Sustainability is important and in the business world” (Business Management major)
    - “Learning about sustainability will only give a student a better edge against other students. This minor can help build creativity and help to learn better problem solving skills.” (Business Studies major)
    - “The Earth needs people who specialize in sustainability.”(Undecided)
    - “It has nothing to do with my major nor my interests. I cannot morally bring myself to pick "no" because there are likely other NAMS students who would

benefit from a minor is sustainability." (CSIS)

It is important to note that 70.8% of students who explained why they answered "maybe" felt that offering the minor would be beneficial.

Among students who responded "yes," 76.9 gave a reason for the positive response. Responses fell into the following categories:

- Student was already interested in the subject matter (38.46%)
- The minor would relate to their major or career plans (15.38%)
- Sustainability is an important subject (30.78%)
- Learning about sustainability would be useful for the future (7.69%)
- Student felt they would gain a personal advantage with the minor (7.69%)

In total, a little over 31% of respondents across all schools were interested in the minor in sustainability. If those who felt that the minor would be beneficial but answered "Maybe" are added to this total, the percent in favor of a minor across respondents becomes 46.15%.

c. Target Groups

As mentioned earlier in the document, the discussion of a minor was first prompted by requests by other NAMS students for a minor in sustainability. NAMS students, particularly ENVL students, are most likely to see the connections between their major and career goals and the course offerings within SUST. Unfortunately, students in NAMS are not allowed to use NAMS courses outside of their majors to fulfill At Some Distance (ASD) requirements. This rule was created in order to force students in the sciences to gain breadth in their liberal arts education, but it makes it difficult for students who wish to take courses in another science major that is not an elective or a basic science to do so without adding on to their time at Stockton. Offering the minor would allow these students to gain recognition for their extra effort.

These students would not be other only ones who could gain from the existence of a sustainability minor. By its very nature, sustainability as a discipline exists at the nexus of multiple fields of knowledge. Research relevant to the goals of sustainability was addressed in the past within disciplines as diverse as sociology and geochemistry, environmental science and political science, economics and biology. Starting from these diverse foundations, sustainability became its own distinct field of research and study, transcending the concerns of its foundational disciplines and focusing instead on understanding the complex dynamics that arise from interactions between human and environmental systems.

Given the nature of the discipline and its foundations, the proposed minor could be applicable to students from almost every possible major and school of the university. While the minor will not prepare them to be professionals in the sustainability field, it will help them to prepare for the expanding career opportunities in within their own professions. Over the past decade there has been a call for majors in such diverse fields a Nursing (Goodman, 2011), Engineering (Bourn, 2008; Vemury, et al. 2015, 2018), Social Work (Pillai and Gupta, 2015; Hawkins, 2010), Art Education (Blandy, 2011), Criminal Justice (Hallenberg and Haddow, 2016), Business Studies (Springett, 2005; Cullen, 2017), Management (Figueiro

and Raufflet, 2015), and Hospitality and Tourism (Goh, et al. 2017) to incorporate sustainability education into the curriculum. Completing a minor in sustainability would enhance chances of success in employment and graduate studies in these fields and others that require students who are trained in systems thinking and understand the complexities and interdependencies of our world today. The importance of sustainability to these diverse disciplines is mirrored in the range of students from different majors that expressed an interest or felt that a minor would be beneficial.

Curriculum

d. Goals/Outcomes-

The mission of the sustainability program is to help train those that would lead and shape a fundamental societal transformation toward sustainability. We expect that the growth in sustainability-related jobs nationally and regionally -- so-called green collar jobs -- will likely be composed of two sorts of professionals: a relatively small group of experts who maintain a leading focus on sustainable technology, practices, policies, and innovations, and a much larger group of professionals who maintain more traditional roles but will be required to develop a broader perspective that can incorporate sustainability priorities into their existing roles. (This is, perhaps, not unlike the expansion of computer science professionals in the 1970s and 80s, with a small group of highly trained professionals focused on the expanding use of computer systems and a much larger set of professionals that incorporated computers into their established occupations.)

On a very basic level, the overall goal of the proposed minor in sustainability is to give students from majors across the university the opportunity for in depth exploration of the social, economic and environmental challenges that we face globally and to help them to develop the skills that they need to create solutions to these pressing issues at multiple scales. Our interest within the Sustainability Program has been in the training of those specialists who will shape the character of this revolution in the first instance by already providing a major in the discipline. As was mentioned earlier, a lack of understanding of the

general principles of sustainability has contributed to many of the challenges that we face today; among them ecosystem degradation, climate change, public health challenges, poverty, and human conflict. By also providing a minor in SUST, we aim to provide training for those that will work in business, public policy, science, industry, planning, advocacy, public health, education and other fields and give them the tools to foster and shape a more verdant, sustainable, and just society while working within their own chosen career paths. The minor is intended to draw from and supplement any major in the university. For examples of how this training can be applied, please see Appendix A.

The general objectives for the curricular content of the minor are the same as those of the program. These objectives are as follows:

1. The integration of an interdisciplinary approach to the central areas of understanding in the study of sustainability
2. The integration of ethical thinking, systems thinking, critical thinking and analytical skills in all core courses and electives, along with a strong focus on written and spoken communication in some core courses.
3. The integration of service learning and hands-on engagement opportunities in multiple courses

The objectives specific to the minor would be as follows:

After completing the minor, the students will be able to:

1. Identify sociopolitical, ecological, technological and economic challenges and solutions to meeting the needs of current human generations without compromising the ability of future generations to meet their needs. [ELOs: Adapting to Change; Creativity and Innovation; Critical Thinking; Ethical Reasoning, Global Awareness, Program Competence]
2. Communicate the importance of understanding the complex interrelationships among economic, sociopolitical and ecological systems in creating current and future global conditions and be able to advocate for positive change in creating a healthier and more just society that acknowledges and works within the natural systems of the

planet .[ELOs: Communication Skills; Program Competence]

3. Use systems thinking, quantitative reasoning and critical thinking in decision-making [ELOs: Creativity and Innovation; Critical Thinking; Ethical Reasoning, Program Competence]
4. Apply the minor's disciplinary, intellectual, and empirical foundations to occupational field practices and/or post-graduate education. [ELOs: Critical Thinking; Ethical Reasoning; Creativity and Innovation; Program Competence]

These translate into curricular content that emphasizes the general content and principles addressing issues of society and polity, markets and resource use, sustainable technology, and functions of the natural world; information literacy; critical, systems and ethical thinking in multiple contexts; and the ability to communicate with multiple stakeholder groups using both written and oral formats. These objectives were meant to ensure that we as a program created a curricular content and structure that reflected current necessary skill sets and hiring trends in sustainability-related industries, and reflected best practices in the academic discipline.

Outcomes Assessment

Assessment for the minor will mirror those of the major. The following assessment instruments and methods are currently used as part of the assessment process: curriculum mapping/curriculum alignment matrix (used as indirect measure of student learning and to assess alignment with Stockton Strategic Themes (LEGS) and Essential learning Outcomes (ELOs); content analysis of syllabi (assessment of goals and objectives for curricular structure and content); focus groups of students completing minor (assessment of how well the minor is meeting student needs); alumni surveys of minor graduates (indirect summative assessment of specific objectives for curricular content and structure and of minor's ability to meet student needs outside of curricular content by imparting skills necessary to professionals in the field); Pre and Post-tests (direct summative assessments of student learning objectives in required courses for the minor).

e. Faculty

As students will be allowed to take two elective courses from all of the courses currently offered to Sustainability majors, the entire faculty of the Sustainability Program will be associated with the minor. No adjuncts are projected to be teaching courses for the minor.

The faculty members of the Sustainability program include the following:
David C. Burdick, Professor of Psychology
Michael Busler, Associate Professor of Business Studies
Christina Cavaliere, Assistant Professor of Hospitality and Tourism Management Studies
Tait Chirenje, Associate Professor of Environment Studies
Oliver D. Cooke, Associate Professor of Economics
Patrick Hossay, Associate Professor of Sustainability
Ronald Hutchison, Associate Professor of Biology
Maritza Jauregui, Associate Professor of Sustainability
Daniel A. Moscovici, Assistant Professor of Environmental Studies
Rodger L. Jackson, Associate Professor of Philosophy
Kristin J. Jacobson, Associate Professor of American Literature
Elizabeth Lacey, Associate Professor of Marine Science
John Russell Manson, Professor of Computational Science
Naz Onel, Assistant Professor of Business
Joseph Rubenstein - Professor of Anthropology
Ekaterina G. Sedia, Associate Professor of Biology
Mark Sullivan, Associate Professor of Marine Science
George Zimmermann, Professor of Environmental Studies

f. Courses-

The proposed minor would require a minimum of 24 credits of coursework, consisting of four required courses and two elective courses.

Stockton's Sustainability Program has defined a set of inherently interdisciplinary courses that serve at the core of the sustainability curriculum. These courses represent the key areas of sustainability; and each course is taught with an interdisciplinary approach that emphasizes systems-thinking, drawing connections and providing examples that offer a holistic understanding of the challenges and concepts in the field. These courses will serve as the basis for the program minor.

Required courses:

The following four courses would be required courses for the minor and are the same courses. No outside prerequisites will be required for these courses.

- Environmental Sustainability (SUST 2100) - This course examines the fundamental concepts and principles of sustainability. Informed by a review of key philosophical and ethical principles, the course incorporates sociopolitical, ecological, and economic aspects in an interdisciplinary survey of key challenges and solutions for sustainability. This course also emphasizes communication skills.

- Environmental Policy and Law (SUST 3300) - This course provides a rigorous review of the political and legal factors that shape the management and regulation of key sustainability challenges. Federal and state policies intended to deal with pressing environmental concerns are presented and evaluated in the context of constitutional, political, economic, ethical, scientific, and social factors.

- Ecological Economics (ECON 2200) – This course examines the interdisciplinary field of

research that integrates the study and management of human economies and natural ecosystems over time and space. The field treats the economy as a subsystem of the ecosystem and places heavy emphasis on preserving natural capital via sustainable practices and policies and is generally critical of the notion that natural and human-made capital are substitutable.

- Ecological Principles/Lab (ENVL 2200/2205)- this course examines principles of ecology, the structure and function of the biosphere, population dynamics, natural selection, energy flow and nutrient cycling in natural communities and ecosystems.

Elective Courses

In addition to required courses, students would complete two more courses within their area of interest in sustainability, at least one of which must be at the 3000 or 4000 level. Again, these courses are the elective courses normally offered within the major for Sustainability, and may be drawn from any of the four current concentrations within the major. Students in the minor will be required to discuss their area of interest with a SUST faculty member in order to determine the proper elective courses to be taken in that field of study. Below is a current list of elective courses:

- ENVL 3310– Environmental Planning and Policy
- SUST 3313– Natural Resource Policy and Law
- SUST 3400– Global Sustainability
- SUST 3330 – Green Finance and Accounting
- SUST 3320 –Business and Sustainability
- SUST 3675 – Sustainability Marketing
- SUST 3100– Environmental Risk Communications and Management
- SUST 3311– Energy Practicum
- ENVL 3443– Energy Planning

- SUST 3312 –Energy Management
- SUST 3450 –Plants and Agriculture
- SUST 3440 –Sustainable Food and Agriculture
- SUST 3201– Marine Conservation Ecology
- BIOL 3365 –Economic Botany
- BIOL 3413 –Population Biology
- ENVL 3302–Geographic Information Systems
- MARS 3306–Aquaculture
- MARS 3307 – Fisheries Science and Management
- SUST 2154 – American Literature and the Environment
- SUST 2232 – Sociology of the Environment
- ENVL 4500 – Northwest and Southwest Field Experience
- SUST 2701 – International Sustainable Development
- SUST 3315 – Natural Resources Engineering and Policy
- SUST 2401 – Environmental Psychology
- PHIL 3130 – Environmental Philosophy
- ENVL 3241 – Environmental Pollution and Regulation
- ENVL 3311 – Regional Planning
- POLS 3313 – The International Order
- ENVL 3419 – Ecological Forest Management
- POLS 3662 – International Political Economy
- SUST 4720 – Sustainable Design
- SUST 4710 – Green Vehicle Technology

For a description of these electives, please see Appendix C.

g. Resources

We do not anticipate the need for any additional resources for this minor, especially since it will be housed in the same area as SUST degree. This minor will not require a minor coordinator and all courses in the minor are already currently being offered.

h. Possible Concerns and Solutions

One possible concern is that the new minor may be perceived as too similar to the current minor in ENVL. A possible solution to this concern to make sure that the new minor is properly explained to students and other faculty in order to dispel any misperceptions. The ENVL minor is about human negative impacts on the natural environment and mitigating those impacts directly by working with and studying natural systems. The SUST minor is about studying and creating economic, social, and political environments and technology with the goal of helping humanity survive within a flourishing planet. It also accepts the fact that human systems rely on the natural environment and can impact this environment in positive and negative ways, so it is about interactions among all of these and not just about human /environment interactions. It is for these reasons that the ENVL minor consists of chemistry, biology, geology, physics and math courses with core courses in ENVL, whereas the SUST minor will consist of courses in economics, business, sociology, philosophy, literature, environmental science, biology, and marine science with core courses in sustainability. The SUST minor would service ENVL students who would like to have more training in sustainability. For those students, it would functionally take the place of the old sustainability concentration that used to exist within ENVL before the SUST program was created.

It is expected that the proposed minor within the pre-existing major in Sustainability may have a wider appeal to students from the social sciences, business and related disciplines. According to Institutional Research, only fifteen percent of all full-time undergraduate students at Stockton are enrolled in a minor of any type. The creation of another minor, especially one

within an established program, offers the opportunity to increase the total number of students enrolled in minors at Stockton. Completing or pursuing a minor in SUST would not preclude a student from also completing another minor. The structure of the minor deliberately avoids substantial overlap with other minor programs in both content and purpose, and is meant to supplement, rather than replace, the content in these other fields; thus, is not expected to impact the enrollments in other minors. (For a list of examples of applications of sustainability training within other fields and the related literature, please see Appendix A.)

A second possible concern might be that some of the advanced courses in Sustainability minor would require prerequisites, which sometimes can be problematic for students pursuing minors. We have solved this potential concern by making the required courses for the proposed minor the same courses that serve as prerequisites for most upper level courses.

The third possible concern is a perceived lack of faculty to teach the courses required for the minor. This concern is overcome by the interdisciplinary nature of the faculty associated with SUST (see faculty list), which allows for more flexibility in not just course offerings, but in scheduling. We do not anticipate any potential issues with demand for seats in courses or changes in coursework within SUST or across the university as a result of the implementation of the minor, as we do not expect the initial number of minors in the program to be large. Based on the total number of majors, which range between 60-70, we would expect approximately 5-10 new minors in the program each year, with a four year enrollment of approximately 20-40 minors. This estimate is based on current enrollments in both interdisciplinary are program minors. Should class enrollment size eventually become an issue, solutions will be sought such as teaching courses on an online basis if need be.

i. Housing and Timeline

This minor will be housed within the currently established Sustainability (SUST) program within the School of Natural Sciences and Mathematics (NAMS). We hope to launch the minor in Fall 2019. We see this timeline as feasible for a number of reasons. First, all courses listed in the minor's curriculum are already part of the regular course offerings within the SUST Program. Second, this minor will not require hiring new faculty, and therefore, is ready to be launched at any time.

Summary

Given the nature of this field, the proposed minor could be applicable to students from almost every possible major and school of the university. While the minor will not prepare them to be professionals in the sustainability field, it will help them to prepare for the expanding career opportunities in within their own professions.

Creating a sustainability minor is consistent with Stockton's Strategic Themes and other guiding documents, as it demonstrates our continuing and enduring commitment to what we have publically stated to value. The minor can provide more students across the campus with many ways to be engaged learners that use our campus as a "living-learning laboratory." In addition, external evaluators such as "The Princeton Guide to Green Campuses" evaluate our sustainability activities including academic programs, and adding a sustainability minor to the curriculum would help our recognition and marketing in those venues. In offering a minor in sustainability, we fulfill one of our strategic goals as a university of offering all students a strong foundation in sustainability, while at the same time enhancing student marketability in a world where a solid foundation in sustainability is becoming not just common, but necessary.

References

AASHE Campus Sustainability Hub Academic Program Database. https://hub.aashe.org/browse/types/academicprogram/. Accessed January, 10 2018.

Blandy, D. (2011). Sustainability, participatory culture, and the performance of democracy: Ascendant sites of theory and practice in art education. *Studies in Art Education*, 52 (3):243-255.

Board on Sustainable Development Staff. (2000). *Our common journey : A transition toward sustainability*. Washington: National Academies Press.

Bourn D, Sharma N. Global and sustainability issues for engineering graduates. *Proceedings of the Institution of Civil Engineers*. 2008 Jan; 161(3):199–206.

Cullen, J. G. (2017;2015;). Educating business students about sustainability: A bibliometric review of current trends and research needs. *Journal of Business Ethics, 145*(2), 429-439.

Figueiro, P. S., & Raufflet, E. (2015). Sustainability in higher education: A systematic review with focus on management education. *Journal of Cleaner Production, 106*, 22-33.

Goh, E., Muskat, B., & Tan, A. H. T. (2017). The nexus between sustainable practices in hotels and future gen Y hospitality students' career path decisions. Journal of Teaching in Travel & Tourism, 17(4), 237.

Hallenberg, Katja & Haddow, Christine. (2016). Beyond Criminal Justice: Connecting Justice and Sustainability. *The Law Teacher*. 50. 352-370.

Hamilton, James. *Is a Sustainability Career on Your Green Horizon?* U.S. Bureau of Labor Statistics, Department of Labor, 31 Aug. 2012.

Hawkins, C. (2010). Sustainability, human rights, and environmental justice: Critical connections for contemporary social work. *Critical Social Work*, 11(3), 68–81.

U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics. IPEDS Data Center. Accessed October 10, 2017.

Goodman, B. (2011). The need for a 'sustainability curriculum' in nurse education. *Nurse Education Today, 31*(8), 733-737.

Johnson, F. A., Eaton, M. J., Williams, J. H., Jensen, G. H., & Madsen, J. (2015). Training conservation practitioners to be better decision makers. *Sustainability, 7*(7), 8354-8373

Springett, D. (2005), ‘Education *for* sustainability’ in the business studies curriculum: a call for a critical agenda. *Bus. Strat. Env*. 14: 146–159.

Vemury, C. M., Heidrich, O., Thorpe, N., & Crosbie, T. (2018). A holistic approach to delivering sustainable design education in civil engineering. *International Journal of Sustainability in Higher Education, 19*(1), 197.

Vemury C, Heidrich O, Thorpe N. (2015) Sustainable Design Education to Meet the Ever-Changing Worlds of Civil Engineering and Urban Infrastructure Systems. *Indian Journal of Science and Technology*, 8(28), 1-6.

APPENDIX A

Examples from some Careers/Fields that would benefit from study of sustainability:

Health Science Professions: Nutritionist, Health Educator, Physician's Assistant, Nurse, Holistic Health Practitioner, Exercise Physiologist

- Knowledge of current food production and distribution systems and how they affect health and more sustainable and therefore, healthier alternatives to prevent undernutrition, malnutrition and over-nutrition. These careers would benefit from knowledge of sustainable food production methods and food distribution systems. Sustainable agriculture projects have been springing up all over the world as a response to these issues. People in the United States are turning to local and organic food. New systems are taking off, such as communities where people convert their rooftops into gardens and raise chickens in their suburban yards. Other programs focused on international development are providing resources and tools that allow impoverished communities to grow their own food, thus providing them with sustenance, a livelihood, and reducing pressure on other natural resources.
- Knowledge of policies for sustainable, healthy communities and health lifestyles would also benefit these professions.

Business and Economics Professions: Marketing, Accounting, Economist, Strategic Planning, Management, Tourism and Hospitality

- In the age of globalization, businesses are expanding across the globe, connecting with new cultures and bringing us exotic products and services. While there are many benefits to the rise of global business, traditional economic models fail to account for the full social and environmental costs associated with resource extraction, pollution, and habitat destruction. Recognition that traditional economic models encourage this destruction has prompted the growth of newer economic disciplines such as ecological economics and ideas such as that of a functional service economy.

Businesses are changing their behaviors to conserve resources, source sustainably-harvested materials, and work within local markets. Even more are shifting their investments to be environmentally friendly.

Education: Teachers, Administrators

- Topics concerning sustainability are being incorporated into classrooms at all levels: kindergarten to graduate school. Effective educators need to communicate issues and topics in a clear and simple way while cutting across multiple disciplines. Sustainability educators are also critical thinkers that can teach students to examine all sides of an issue.

Wilderness Conservation/Marine Biology

- Old methods of conservation mandated that large tracts of land be put aside, but as the world continues to change, people are coming into increasing conflict with protected areas and endangered species. Biologists are coming to the realization that protecting wild places and species requires them to work with communities and recognize that economic needs also need to be met. Marine ecosystems are also losing biodiversity, putting our own food chain and environmental stability at risk. Throughout the world, conservationists are working with poor and rural communities to educate them about the value of protected areas while also working with them to access alternative markets. Some communities have even initiated eco-tourism operations as a way to make money while protecting unique wildlife.

Urban Planning

- The world's population is expected to become increasingly urbanized, causing increasing pressures on both natural and social systems. Consequences that are normally dealt with as separate problems, such as energy use, food needs, water, waste, homelessness, crime, and poverty, don’t just occur together in urban settings; they are interrelated. Some current cities have started creating more sustainable

plans for their development and use as a result. Increased commitments to public transit, green roofs, open spaces, minimization of energy needs, water conservation, and local production are all part of this, as is increasing the resiliency of the local economy. New and innovative solutions are needed to create cities that are both livable and environmentally friendly.

Architecture/Building Design/ Engineering

- Recent changes in the architecture, construction and engineering fields include the creation of building sustainability certification, the practice of sustainable conservation of historic buildings, and the creation of buildings that use zero net water, energy and create zero net waste. Some designers are even creating buildings that function like ecosystems. Human interactions within these buildings are also considered in the design. Sustainability encourages the creation of environmentally friendly or green buildings while improving the quality of life for inhabitants.

For a full description of a perceived need for sustainability training and why it is important wiithin these fields, please see:

- Nursing (Goodman, 2011)
- Engineering (Bourn, 2008; Vemury, et al. 2015, 2018)
- Social Work (Pillai and Gupta, 2015; Hawkins, 2010)
- Art Education (Blandy, 2011)
- Criminal Justice (Hallenberg and Haddow, 2016)
- Business Studies (Springett, 2005; Cullen, 2017)
- Management (Figueiro and Raufflet, 2015), and Hospitality and Tourism (Goh, et al. 2017)
- Marine Science and Environmental Studies (Johnson, et al., 2015)

APPENDIX B

Students studying sustainability learn about finding solutions that help us to create a better global future and get practical, hands-on experience in their field of interest.

They learn about:

- practices that support ecological and human health and economic vitality by managing food systems, energy systems, business and industry in ways that don't deplete our natural resources and create a better quality of life for everyone.
- designing new technologies, economic systems and policies to help us a create a healthier world.

- *If there were to be a <u>minor</u> in sustainability, would you be interested in it?* YES NO
- Why or why not?

_____
_____
_____

<u>List of Respondent Major Programs of Study</u>

Accounti	Mathe	Health science
Anthropo	Nursin	History
Biology	Occup	Hospitality
Biochem	Philos	Instructional
Business	Physic	LIBA
Commun	Politic	Literature
Compute	Psych	Marketing
Criminol	Public	
Dance	Social	
Economi	Undeci	
Educatio	Visual	
English	Writing	
Environmental		
Finance		

APPENDIX C

Electives

SUST 2154 - AMERICAN LITERATURE AND THE ENVIRONMENT

This survey of twentieth-century American environmental literature covers the fundamentals of reading poetry, fiction, and nonfiction, the criterion by which a text is included or excluded from the genre of “environmental literature,” and an introduction to ecocritical theory and criticism. The class explores how literature addresses environmental issues, especially the representation of nature and wilderness. This course may be offered in sections with a W2 designation.

SUST 2232 - SOCIOLOGY OF THE ENVIRONMENT

This course presents a basic understanding of environmental sociology, or how we talk and learn about how the environment connects to who we are socially. Each week we will discuss the major concepts of the discipline and learn how the social world takes place in both large (macro) social systems and small (micro) everyday experiences that make us who we are.

ENVL 4500 - NORTHWEST AND SOUTHWEST FIELD EXPERIENCE

This course focuses on water, energy and natural resource management and stewardship issues in the US Northwest. The impact of urban and agricultural development on water and energy demand and natural resource management in the US Northwest will be discussed. The three week field trip covers Colorado, Utah, Wyoming, Montana, Idaho, Oregon and Washington

SUST 2701 - INTERNATIONAL SUSTAINABLE DEVELOPMENT

The objective of this tutorial is to engage students in hands-on sustainability experiences in different parts of the world. These experiences may include: population studies, energy supply and conservation, forestry and wildlife resources management, water supply and quality, and

urbanization and poverty. Countries visited will vary depending on the semester but include Brazil, Ecuador, and others.

SUST 3201 - MARINE CONSERVATION ECOLOGY

Prerequisites: BIOL 2100 and ENVL 2200. This course focuses on coastal zones as ecosystems of global significance. Material will focus on the development of a knowledge base and the critical thinking skills necessary to understand, analyze and critique the most important conservation and management issues concerning the Earth's coastal realm and the natural resources it contains. The course attempts to draw students into thinking about conservation issues, tools and the linkages between science and policy.

SUST 3315 - NATURAL RESOURCES ENGINEERING AND POLICY

Natural resource engineering is the design of practices and infrastructure that modify soils, water, biota and/or the air for the purpose of mitigating human impacts. Natural and anthropogenic problems are solved using quantitatively justified practices and designs. Connection to policy will also be covered.

SUST 2401 - ENVIRONMENTAL PSYCHOLOGY

This course explores the interplay between psychological aspects of humans (including behavior, emotion, cognition and perception) and the natural and manufactured environments of humans.

PHIL 3130 - ENVIRONMENTAL PHILOSOPHY

This course explores such topics in environmental philosophy as beauty, faith, the treatment of animals, economics, and ethical activism.

ENVL 3241 - ENVIRONMENTAL POLLUTION AND REGULATION

This class looks at the pollution of various environmental media, including air, soil and water. Topics to be discussed include: release of pollutants by various natural and anthropogenic

processes, the transport and residence time of pollutants in the three environmental media (soil, air and water), and potential human health and ecosystem impact. The most important federal environmental regulations and how they are used in compliance monitoring and the clean-up of contaminated sites will be discussed.

MARS 3307 - FISHERIES SCIENCE AND MANAGEMENT

An introduction to the study of exploited aquatic resources, this course will include a survey of commercially significant organisms, the ecology and management of these organisms, survey methods, fishing and stocking effects, and our efforts in sustaining harvestable yields. Some time is devoted to developing mathematical models.

ENVL 3311 - REGIONAL PLANNING

This course will explore innovative approaches to the management of land development given the pressures of population growth, climate change and other environmental stressors, and concerns about the quality of life. We will consider current federal, state, and local statutes, economic incentives, and consumer preferences that create urban sprawl. The course is relevant to those considering a career in environmental or regional planning. A5-6 day field trip to study the Adirondack Park and Preserve in NY is required.

POLS 3313 - THE INTERNATIONAL ORDER

This course on global governance and international law addresses issues and principles related to the development of international challenges regarding the use of force, humanitarian law, human rights, arms control, environmental security, and international political economy. While there is no prerequisite, a background in international relations is strongly recommended. The overarching goal of the course is to allow students to recognize the complex character of transnational social, political, and economic issues and to develop a critical understanding of the threats and opportunities raised by global governance and international law regarding these issues.

BIOL 3365 - ECONOMIC BOTANY

This course examines the economically valuable members of the plant kingdom including fungi, algae and higher plants. This survey includes food and agriculture, industrial feedstock, cloth and dye, plant based medicines, building materials psychoactive drugs and alternative fuels. The relationships of the economically useful products to the structure and function of the plant will also be explored. This course meets the plant requirement for BIOL major.

ENVL 3419 - ECOLOGICAL FOREST MANAGEMENT

Students will explore how to manage forested lands using sound ecological and conservation principles in an adaptive management context. The campus environment and field trips will be used to allow students to develop management plans for individual stands as well as the landscape. Multiple uses such as T and E species, water resources, wood fiber, fire/disturbance regimes will be used to formulate different management schemes.

SUST 3440 - SUSTAINABILITY: FOOD AND AGRICULTURE

The information covered in this seminar style course includes sustainable soil methods, an overview of global issues about food availability and farming methods and a philosophical perspective on sustainable versus conventional agriculture methods. This course also includes a hands-on project of growing transplants from seed in a greenhouse.

SUST 3450 – PLANTS AND AGRICULTURE

This course provides a foundation for understanding how plants work. The physiology of plants as it relates to agronomy and sustainable agriculture are examined. In addition, global land use patterns and agroecology, agricultural policy, and related topics are discussed. This course includes a significant hands-on component.

POLS 3662 - INTERNATIONAL POLITICAL ECONOMY

This course provides an overview of the field of International Political Economy (IPE). Central topics in IPE include the expansion of multinational corporations (MNCs), financial and economic crises, the global monetary system, international trade, economic development, and global governance.

SUST 3675 - SUSTAINABILITY MARKETING

Sustainability Marketing focuses on ways the marketing function can be performed to maintain or enhance societal well-being and also on how to market sustainability to bring about desired global cultural change.

SUST 4720 – SUSTAINABLE DESIGN

This course provides a comprehensive examination of the practices, processes, technology and materials with which we can create a more sustainable built environment. The course is project based; and students apply CAD and engineering technology in the conceptualization, design and manufacture of projects, from basic building materials and structures to a complete green building.

SUST 4710 – GREEN VEHICLE TECHNOLOGY

This course provides a comprehensive examination of the engineering, technology, and design characteristics of contemporary green vehicles, including electric drive, alternative fuels, efficiency, and sustainable material. Meetings focus on practical exercises and problem-based assignments, with students challenged to design, construct and evaluate alternative vehicle technologies.

APPENDIX D

Jauregui, Maritza

From: Burdick, David
Sent: Thursday, October 11, 2018 3:04 PM
To: Jauregui, Maritza; SUST Faculty
Subject: RE: Minor in SUST

I, too, strongly support the idea of creating a minor

in SUST. David C. Burdick, Ph.D.
Professor of Psychology; Director, Stockton Center on Successful Aging (SCOSA) Stockton University, 101 Vera King Farris Drive, Galloway, NJ 08205-9441 Office – F231, School – H201, P – 609–652-4311, E – burdickd@stockton.edu

---

Jauregui, Maritza

From: Busler, Michael
Sent: Friday, October 12, 2018 11:03 AM
To: Jauregui, Maritza; SUST Faculty
Subject: Re: Minor in SUST

Hi Maritza,

I am in complete support of creating a minor in SUST.

Michael Busler,
Ph.D. Professor
of Finance
Finance Program
Coordinator Stockton
University
michael.busler@stockton.edu
Phone: 609-626-6878
@mbusler
www.facebook.com/fundingd
emocracy

Jauregui, Maritza

From: Cavaliere, Christina T.
Sent: Thursday, October 11, 2018 2:44 PM
To: Jauregui, Maritza; SUST Faculty
Subject: RE: Minor in SUST

Dear Maritza and Colleagues,

I also strongly support the creation of a SUST minor! Woo Hoo!

Looking forward to the work ahead ☺

Warm wishes,
Christina

Dr Christina T. Cavaliere
Assistant Professor
Stockton University
Hospitality and Tourism Management Studies
Sustainability Program
Office: +1 609.626.3491
Mobile: +1 610.209.0084
Skype: christina-ecotourism
Email: christina.cavaliere@stockton.edu

Global Sustainable Tourism Council (GSTC)
Education and Training Working Group
Madrid, Spain
www.gstcouncil.org

Jauregui, Maritza

From: Cooke, Oliver
Sent: Thursday, October 11, 2018 2:25 PM
To: Jauregui, Maritza; SUST Faculty
Subject: RE: Minor in SUST

I strongly support a minor in SUST!

Oliver Cooke, Ph.D.
Associate Professor of Economics
Stockton University
Galloway, NJ 08205
oliver.cooke@stockton.edu
609.652.4782

Jauregui, Maritza

From: Jackson, Rodger
Sent: Thursday, October 11, 2018 2:35 PM
To: Rubenstein, Joseph; Cooke, Oliver
Cc: Jauregui, Maritza; SUST Faculty
Subject: Re: Minor in SUST

I strongly support the addition of a SUST minor Take care,
Rodger

Rodger L. Jackson, Ph.D.
Professor, Philosophy
President, Stockton Federation of Teachers, Local 2275 Stockton University
Galloway NJ
08205 609 626 6016
jacksonr@stockton.edu
author of: The Logic of Our Language

Jauregui, Maritza

From: Moscovici, Daniel
Sent: Thursday, October 11, 2018 2:27 PM
To: Jauregui, Maritza
Subject: Re: Minor in SUST

Yes I support.
Will get back to you when I hear from ENVL folks too.

Thanks Dan

Jauregui, Maritza

From: Rubenstein, Joseph
Sent: Thursday, October 11, 2018 2:27 PM
To: Cooke, Oliver
Cc: Jauregui, Maritza; SUST Faculty
Subject: Re: Minor in SUST

I strongly support a minor in

SUST. Joseph Rubenstein
Professor of
Anthropology
Stockton University

Jauregui, Maritza

From: Sedia, Kathy
Sent: Friday, October 12, 2018 11:08 AM
To: Busler, Michael; Jauregui, Maritza; SUST Faculty
Subject: Re: Minor in SUST

I support it as well

Ekaterina Sedia, PhD
Associate Professor of
Biology
Coordinator of Cannabis Studies Interdisciplinary Minor

Jauregui, Maritza

From: Zimmermann, George
Sent: Thursday, October 11, 2018 3:04 PM
To: Jauregui, Maritza; SUST Faculty
Subject: RE: Minor in SUST

I support the SUST minor!

zm

Dear Maritza,

I am writing to let you know that I fully support the creation of the Sustainability Minor at Stockton.

The Sustainability Minor will allow students to get a crucial insight into the social, economic, ethical, and scientific endeavors that help bring human existence into balance with the natural world. This is a timely and important endeavor that I wholeheartedly support.

All the best,

Gorica

Gorica Majstorovic, Ph.D. Professor
of Spanish
Coordinator, Latin American and Caribbean Studies

Stockton University
101 Vera King Farris Dr.

Galloway, NJ 08205
Office: F-137 / Ph: 609 626 5566
https://blogs.stockton.edu/lacs/
https://stockton.academia.edu/GoricaMajstorovic

Jauregui, Maritza

From: Moscovici, Daniel
Sent: Friday, October 12, 2018 11:32 AM
To: Jauregui, Maritza
Subject: Re: Minor in SUST

Hi Maritza,
I sent my support (with my SUST hat on) directly to you, but this one is from the ENVL Program.

The ENVL Program has reviewed the proposal and the majority decision is to support the creation of a new SUST minor. In addition to the benefits we see of a SUST minor for those studying in Business and other majors outside of NAMS, we are certain that some ENVL students will also minor in SUST. We look forward to working together over the next few years to encourage SUST majors to minor in ENVL and vice versa. Good luck.

Dan

Daniel Moscovici, PhD
Associate Professor of Environment &
Sustainability Coordinator of Environmental
Science/Studies Program Stockton University
Pinelands National Reserve, NJ 08205
+1-215-688-2910
daniel.moscovici@sto
ckton.edu
www.stockton.edu/~m
oscovid