Comprehensive Program Proposal for a Bachelor of Arts in Global Environmental Sustainability

The School of Global Environmental Sustainability

A Special Academic Unit reporting to the Provost

SCHOOL OF GLOBAL
ENVIRONMENTAL SUSTAINABILITY
COLORADO STATE UNIVERSITY

SHAPING A SUSTAINABLE FUTURE
10
YEARS
ESTABLISHED
2008

I. Brief Overview of Proposed Program

1. **Department Head/Chair's name and signature indicating approval of the proposal**
   - Diana Wall: _____
2. **Dean's name and signature indicating approval of the proposal**
   - Rick Miranda: _____
3. **Contact person's name, phone and email**
   - Kathleen Galvin; 970.491.5784; Kathleen.Galvin@colostate.edu
   - Suellen Melzer; 970.491.1323; Susan.Melzer@colostate.edu
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4. **Type of degree:** BA
5. **If Master's, indicate plan:** N/A
6. **Program instructional format:** Resident Instruction and CSU Online
7. **Name of degree:** Major in Global Environmental Sustainability
8. **Proposing unit:** School of Global Environmental Sustainability (SoGES)
9. **Total number of credits required for degree:** 120
10. **Length of program in semesters**: 8 semesters
11. **Admission plan**: first two years, fall entry only; subsequent years, fall and spring entry
12. **Do you expect full or part- time students to enroll?** Full time
13. **Expected total number of students enrolled in the program (five years post implementation):** ca. 300.
14. **Summary of Program and Rationale:**

List existing and new courses anticipated in the program
Major plans include seven (7) GES classes (two (2) existing, five (5) new) along with elective courses from SoGES and other colleges across the university.

- Existing courses
  - GES 101 Foundations of Global Environmental Sustainability
  - GES 192 Global Environmental Sustainability Seminar
- New courses anticipated in the program
  - GES 201 Systems Thinking in Sustainability
  - GES 210 Ways of Knowing Sustainability
  - GES 310 Facilitation and Negotiation in Sustainability
  - GES 462 Life Cycle Analysis
  - GES 475 Implementation of Sustainability

Description of Academic Area
A new cross-disciplinary BA major in Global Environmental Sustainability housed in the School of Global Environmental Sustainability (SoGES) will 1) address student interest in the discipline of sustainability, 2) create a degree program in sustainability that is flexible and allows for unique elective focal areas, and 3) provide training in the systems thinking necessary to compete in industries in any sector and across the job market.

Students will be broadly trained in a suite of sustainability concepts and tools. They will develop the ability to address global environmental, economic, and social sustainability topics across multiple disciplines, career sectors, and diverse communities. Students will analyze, interpret, and communicate sustainability issues from a variety of perspectives. Critical-thinking, systems-thinking, creative-thinking, and problem-solving are essential to student success in this field (Lewis et., 2014). Graduates of this program will be equipped with the competencies/skills for a variety of sustainability-related jobs and careers across industries, sectors and organizations (Table 1).

Table 1: The competencies/ skills that GES graduates will be equipped with to prepare them for future career.

Observational	• Identify relevant information Record relevant information
Descriptive Skills	• Effectively describe systems and associated problems, strategies, and solutions
Quantitative Skills	• Analyze system models using algebra, logarithmic and exponential functions, and statistical analyses
Analytical Skills	• Logic • Draw conclusions from facts • Interpret evidence • Identify data gaps • Ethical analysis
Communication Skills	• Express information concisely, clearly, and appropriately in the written, visual and verbal form • Structure ideas clearly
People/ Professional Skills	• Listen • Motivate • Negotiate • Making connections • Manage conflict • Work collaboratively • Demonstrate leadership • Be Responsible • Be accountable • Promote civic responsibility • Demonstrate inclusivity and diversity • Act with integrity and mutual respect
Planning Skills	• Define objectives • Strategize • Develop action plans
Creativity/ Innovation	• Synthesize relevant facts to generate creative solutions to sustainability challenges

Rationale for offering this program at the present time
Currently, SoGES at CSU offers a broad and flexible minor degree program for students who major in any of the 8 colleges across campus. The minor program was first offered in 2009 with an entering class of 47 students and has now grown to include 301 minors. The vision for SoGES has been to be among the leaders in sustainability education.

The 2012 National Council for Science and the Environment (NCSE) report indicates that the number of sustainability programs in the United States increased from 13 to 141 between 2008 and 2012. The 2017 NCSE report indicates that the number of sustainability degrees increased 89% from 2012, and was the 4th most common name for a degree among all cross-disciplinary environmental, sustainability and energy degrees.

Given local and national levels of interest in sustainability training and expertise, SoGES acknowledges the demand to expand programmatic capacity by preparing students to holistically understand sustainability issues today and in the future. This will be achieved through the development of systems thinking, and communication and negotiation skills. The proposed Bachelor of Arts degree (Figure 1) encompasses the broader discipline of sustainability, and will allow students to concentrate their studies in two of the following areas:

- Energy Production and Use
- Physical Systems
- Biological Systems
- Human Systems
- Food Systems
- Economic Systems
- Organizational Systems
- Technological Systems
- Political Systems
- Health

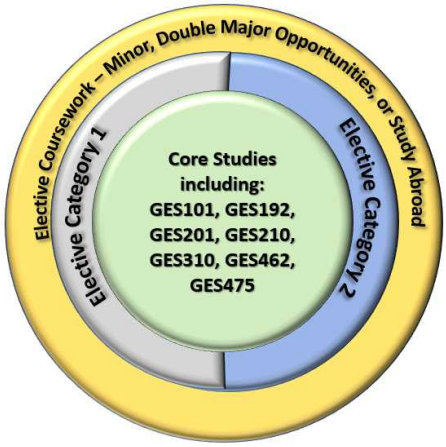


Figure 1. Diagram displaying the relationships among the various components of the major.

This new program proposal reflects a cross-disciplinary approach to sustainability education that offers students interested in sustainability a home. Colleges and universities from around the country were queried regarding whether they offer sustainability programs (e.g. programs, schools, certificates, minors, majors, and/or graduate training). Eighty-seven schools responded to this query and of the 87, 10 offer BA degrees comparable to the proposed major at CSU. The wide-ranging occupational pathways in sustainability are well-suited to a Bachelor of Arts instead of a more narrowly focused Bachelor of Science degree, which tends to focus on ecosystem science and/or engineering.

The proposed program is complementary to others at CSU. As a Special Academic Unit, SoGES plans to work across campus to ensure multiple discipline contributions. Currently, SoGES has ~ 125 affiliate faculty from across campus. Further, SoGES offered 12 courses in resident-instruction and online during the 2017-18 academic year and served 585 students during 2018-2019 thus far. SoGES also expects enrollment increases for participating in All- University Core Curriculum (AUCC).

15. **Accreditation:** No current accreditations apply
16. **Proposed funding mechanism(s). Check all those that you intend to utilize**:
    - ___x_____ Base funding from sponsoring department/college
    - ___x_____ Undergraduate Programs only: 2-3-6 funds
    - ___x_____ Undergraduate Differential Tuition (DT). DT is a charge in addition to the regular University tuition. DT provides a funding mechanism to assist in covering program costs. It is funded through charges based on students enrolled in 60 or more credits with the exception of first year freshmen.
    - _____ Graduate Differential Tuition (DT)
    - _____ Provost's tuition sharing program for Graduate Programs
    - _____ Other

II. Fit with CSU Role and Mission and University's Most Current Strategic Plan

Objectives of the program

1. Provide CSU with a degree program that will attract new students
2. Offer students the opportunity to receive a BA degree at CSU that emphasizes the analytical and interpretive aspects of sustainability
3. Prepare students for roles in the private sector, public sector and non-governmental organizations focused on sustainability
4. Train students in a variety of disciplines to be effective leaders in the field of sustainability
5. Meet the needs of students who plan to attend graduate school and/or pursue professional opportunities that require sustainability studies

How does the proposed program support the mission of the University?

Sustainability is a priority for CSU; we are a national leader in sustainability scholarship, research, and operations. This program will align with the mission of SoGES and CSU to fill a unique role at the University by providing cross-disciplinary sustainability studies. SoGES has a strong track record of developing successful cross-disciplinary programs, including the GES minor; thus, making it the natural home for a truly cross-disciplinary major centered on environmental, economic, and social sustainability issues. The success of these

programs is based on the ability of SoGES to blend expertise from across the University and to remain dedicated to the land grant mission of the University.

How does the proposed program support the most current University Strategic Plan (http://provost.colostate.edu/strategic-plan/) of the institution? How does the program contribute to attaining long-term goals and directions of the institution and department/unit?

Goal 1: inclusive access

- The proposed major will utilize all the inclusion programs followed by CSU. Students with disabilities will have the opportunity to learn and succeed in general classrooms with accommodations made by instructors and the office of student services.
- Affordable course material will be made available through digital and other resources.

Goal 2: high quality access and co-curricular programs

- The proposed major is housed with SoGES. The mission of SoGES includes the development of outreach and co-curricular programs. The Student Sustainability Center within SoGES, provides students at all levels with access to volunteer, research, creative, and leadership opportunities. SoGES works with Housing and Dining to provide support to the EcoLeaders program as another important co-curricular opportunity.

Goal 3: student learning success

- Major advisors will implement an early performance input check to help all students achieve success. To do this, teachers need to systematically and routinely use data to guide instructional decisions and meet students' learning needs. Interpreting data allows teachers to identify the strengths and weaknesses of an entire class as well as individual students. To gain a deeper understanding of students' learning needs, major advisors need to collect data from multiple classes to identify student learning gaps as well as successes.
- Faculty will be encouraged to engage in the Master Teacher Initiative and the professional development offered by The Institute for Learning and Teaching (TILT) to learn about best teaching practices. Students will also see TILT as a resource for tutoring and study groups.

Goal 4: research and discovery

- Faculty from multiple colleges across campus will instruct courses in the proposed major. The designed breadth and depth of course work within the major will allow students to be exposed to and find opportunities in faculty research and discovery.

Goal 5 and 6: engagement/ public interaction/ strategic partnerships

- SoGES actively engages with various stakeholders locally, regionally, and globally. For example, SoGES' Global Challenge Research Teams work with city and regional governments, non-profits and other groups. SoGES also provides students with engagement opportunities on-campus through student organization, like the student sustainability club, and off-campus outreach programs, like the Student Sustainability Center.

- SoGES faculty have an established record of working with area schools and programs

Goal 7: excellence in hiring, professional development, and employee engagement

- SoGES values and fosters the growth mindset within the teaching and learning culture of the school
- Faculty will be encouraged to engage in the Master Teacher Initiative and the professional development offered by The Institute for Learning and Teaching (TILT) to learn about best teaching practices. Students will also see TILT as a resource for tutoring and study groups.

Goal 8: diversity, equity, campus climate

- SoGES events, initiatives, and clubs are widely advertised to solicit participation from a diverse group, including students, faculty, staff, and community members.

Goal 9: financial resources

- The program will be financed through incoming freshman students; increasing enrollment of resident, nonresident and international students.

Goal 10: physical resources

- The SoGES SAU will provide offices for administrative staff and advisors

How does the proposed program meet the needs of Colorado and enhance the state's capacity to respond effectively to social, economic, and environmental challenges and opportunities?

The proposed major in Global Environmental Sustainability will help meet the needs of Colorado and enhance the state's capacity to respond effectively to social, economic, and environmental challenges and opportunities. Specifically, the state's 2015 commitment to sustainability established support in the culture around resource sustainability and stewardship. The implementation of plans, programs, and policies that incorporate sustainability practices into decision making across all Colorado agencies is one of these executive goals. Consistent with the land grant mission of CSU and in support of the long-term efforts developed by the State of Colorado, this program aims to engage and train students to ready them for careers that will be waiting for them. The curriculum prepares students to holistically understand the environmental issues facing society and Colorado today, and in the future, to solve problems using systems thinking approaches as well as effectively communicate and negotiate solutions among various sectors of society. The future leaders of Colorado will face challenges and opportunities in the areas of natural resource conservation, land use, transportation and mobility, economic development, public health, cultural preservation, food systems and policy, energy efficiency and renewables, all of which need to be addressed by a cross-disciplinary workforce.

III. Quantitative Data Supporting Evidence of Need for the Program and Student Demand

Identify statewide and nationwide employment supply and demand data the proposed program would assist in filling. Provide evidence of need for additional qualified individuals the proposed program would produce.

Identify the same information for nationwide employment supply and demand. Identify anticipated salary range for program graduates.

According to data from the 2018 U.S. Bureau of Labor Statistics, occupations related to the environment and conserving natural resources are increasingly becoming a critical part of industry operations. While big companies such as Apple and Walmart are showing their commitment to sustainability through resource conservation, recycling, waste elimination and human rights and community development, these organization and others alike are profiting from this movement and propelling the trend forward. In 2018, the fastest employment growth has been in the area of energy efficiency; however, workers in sustainability or "green" occupations focus on the environment in diverse ways, including agriculture, product development and improvement, community development, and local government and public policy.

Many sustainability professionals do not have "sustainability" in their job title; however, this has changed over the last two decades. According to the 2015 Harvard Business Review, the number of companies with full-time sustainability officers doubled between 2003 and 2015. This increase in sustainability jobs includes titles such as 'Sustainability specialist,' 'Sustainability consultant,' and 'Sustainable design coordinator.' Over the last half-decade, we have begun to see a rise in jobs specifically tailored for a sustainability specialist where the professional is placed in a managerial role and tasked with a) helping organizations lessen their environmental impact by developing initiatives, b) putting these initiatives into action and c) evaluating their impact. Therefore, employers now seek qualified professionals with the sustainability skills that allow them to think in systems, implement and manage sustainable business practices, budget to the triple-bottom line, understand life-cycle analysis, and promote sustainable strategies. According to the 2017 GlobeScan-SustainAbility Survey, "professionals with sustainability skills have a competitive advantage in the job market and are in prime position to be hired to develop sustainable practices." Selected web sites project increases of 100,000 or more sustainability job openings between 2016-2026 (University of Wisconsin Sustainable Management, n.d.). Further, many Higher Ed institutions have developed certificate programs and degree programs offering associate, bachelor, and graduate degrees in sustainability (e.g., Arizona State University, University of Louisville, University of Florida, University of Wisconsin).

Colorado State University has for the first time, over the 2017-2018 graduation cycle, begun to collect data on student interest in various industry clusters. These data show that 10.4% of CSU students are interested in the sustainability and environmental industry which was the highest of any of the 15 industry clusters identified. What kind of jobs are awaiting these students post-graduation? A recent (April 2019) search for "sustainability jobs" in LinkedIn resulted in 51,000 job postings, with job titles of sustainability-coordinator, manager, specialist, engineer, analyst, and officer. Sustainability has grown into a core business issue with companies aligning sustainability with their overall goals, mission, and values. For this reason, we expect to see continued growth of sustainability jobs in the job market. Anticipated salary ranges for program graduates, according to the above, job searches, are between $19,500 and $124,000 with the 25th percentile at $40,500

and the 75th percentile at $83,500. Local salary data (ZipRecruiter) indicates a mean of $63,657.

Provide quantitative data from surveys, interviews, or other sources that indicates students would actually enroll in this program. Include as much detail as possible. These numbers are the basis for fiscal and curricular planning and, therefore, must be thoroughly developed and accurate.

The minor in Global Environmental Sustainability (GES) provides students with a program of study that broadly encompasses sustainability topics and aims to augment their majors with cross-disciplinary courses offered from departments across campus.

The GES minor has increased steadily over the last seven years (Figure 2). Statistics regarding the GES minor, available only since 2011, show that current student enrollment (as of Spring 2018) is more than 5 times greater than the initial student enrollment of 47. The largest growth in student enrollment has occurred between years two and three. Growth is still occurring, but has started to level out at 15% over the 2018-2019 year.

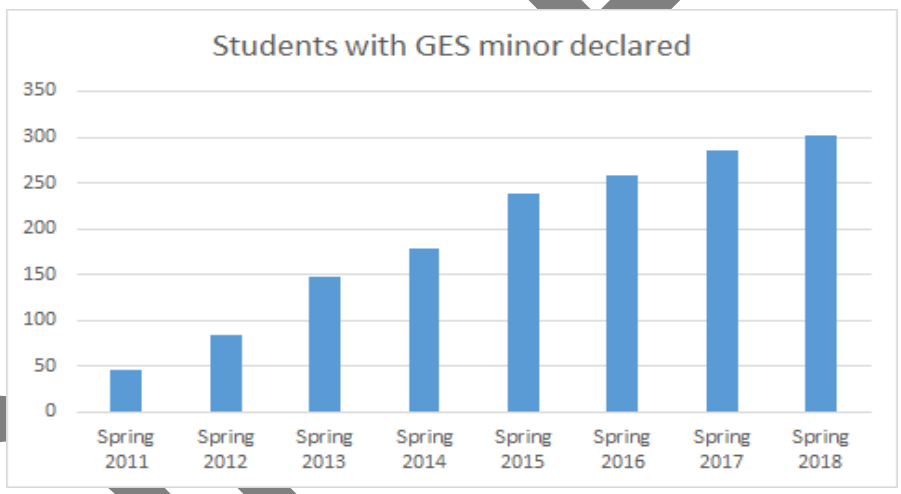


Figure 2: Trend in numbers of students with the GES minor declared. Each value shows the total number of students who were enrolled in the GES minor during the academic year.
It is projected that the proposed Global Environmental Sustainability major would follow a similar trend as it will fill a niche, reaching those students interested in a cross-disciplinary major which covers all aspects of sustainability. As a Bachelor of Arts degree, this major program will attract a cohort of students who otherwise would not have a major of study in sustainability with which to align themselves.

Identify any of the department's current program areas that are "controlled" or "capped"?

SoGES currently does not have any controlled or capped programs.

What is the annual estimated number of graduates of the proposed program over the first five years? On what information are these projections based?

We anticipate that the percentage of students graduating from the proposed program will reflect CSU's overall rates. CSU has four- and six-year graduation rates of 40% and 70%, respectively. The GES major estimates to be in line with these numbers with a 5- year graduation rate of 55%. According to SoGES, 25% of enrolled students graduate each academic year from the GES minor program.

We conservatively expect approximately 46 students graduating within the first 5 years based on the following assumptions: a) all students start in the program as new incoming students, b) a first-year class of 28 students and a second- year class of 81 students. Accounting for transfer students and those transitioning from other majors and the GES minor entering the program, a more realistic estimate of graduates in the first five years is likely in the mid 40's.

4. Duplication/ Similar Programs in the State and Nation

Identify other closely related programs in the same academic domain in Colorado. Please include closely related programs within the CSU System (Global and Pueblo) and ideas about collaborating within the system where possible. For each, provide the following:

1) **Identify other closely related programs in the same academic domain in Colorado**
   a) **Title of Program:** Bachelor of Arts in Sustainability Studies
   b) **Name of Institution (particular campus if relevant):** Colorado Mountain College
   c) **Focus of other program's curriculum:** Broad and applied program of study
   d) **Current enrollment and number of graduates per year over the past three years:** May 2019: 3 graduates in sustainability studies of ~1000 graduates across CMC district.
   e) **Compare/contrast CSU's proposed program to the other programs**
      i) **Program focus:** Sustainability studies is the focus of the program. Students are only able to have an emphasis in Business. The program is very interdisciplinary, pulling from various departments, but without a clear connect to systems science. There is a strong applied component to this program through required coursework.
      ii) **Program features (cohort, internship, etc.):** Career and professional skills development; internships; case studies.
      iii) **Program costs. Provide cost of tuition to complete this program and compare the cost to the tuition for the proposed program. Include differential tuition in the cost if applicable.** Tuition costs per credit hour are $80 in district, $180 in state; $435 out of state

2) **Identify other closely related programs in the same academic domain in Colorado**
   a) **Title of Program:** Sustainability Minor
   b) **Name of Institution (particular campus if relevant):** University of Colorado-Denver
   c) **Focus of other program's curriculum:** Natural Science / Social Science / Arts and Humanities
   d) **Current enrollment and number of graduates per year over the past three years**
   e) **Compare/contrast CSU's proposed program to the other programs**
      i) **Program focus:** Not systems focused and lacks courses in the social sciences such as Sociology/Anthropology/Political Science
      ii) **Program features (cohort, internship, etc.)** Interdisciplinary minor
      iii) **Program costs. Provide cost of tuition to complete this program and compare the cost to the tuition for the proposed program. Include differential tuition in the cost if applicable.** Tuition costs are $1,372 per credit hour. The sustainability minor requires a minimum of 24 credit hours.

3) **Identify other closely related programs in the same academic domain in Colorado**
   a) **Title of Program:** Ecosystem Science and Sustainability
   b) **Name of Institution (particular campus if relevant):** Colorado State University
   c) **Focus of other program's curriculum:** understanding and managing natural resources
   d) **Current enrollment and number of graduates per year over the past three years:** Similarly, the ESS major started with 75 enrolled students in 2012 and currently has 369 students. The largest growth in student enrollment has occurred between years two and three, where growth was 73% for ESS. Growth is still occurring, but has started to level out at 15% over the 2018-2019 year
   e) **Compare/contrast CSU's proposed program to the other programs**
      i) **Program focus:** social science is less of a required focus in the coursework. Strong focus on natural resources, management, and ecological dimensions of sustainability. Humanities perspectives are minimal.
      ii) **Program features (cohort, internship, etc.):** Natural sciences and Ecology
      iii) **Program costs. Provide cost of tuition to complete this program and compare the cost to the tuition for the proposed program. Include differential tuition in the cost if applicable.** Tuition and fees per credit hour-resident ~$642; nonresident ~$1600

4) **Identify other closely related programs in the same academic domain in Colorado**
   a) **Title of Program:** Global Environmental Sustainability Minor
   b) **Name of Institution (particular campus if relevant):** Colorado State University

c) **Focus of other program's curriculum:** Social Processes / Biological and Physical Sciences / Economics and Profitability / Skills

d) **Current enrollment and number of graduates per year over the past three years:** Enrollment past three years: 250, 280, 300. Graduates: 65, 73, 79

e) Compare/contrast CSU's proposed program to the other programs

i) **Program focus:** Systems based with strong focus on communications/leadership skills. Major as opposed to minor.

ii) Program features (cohort, internship, etc.)

iii) **Program costs. Provide cost of tuition to complete this program and compare the cost to the tuition for the proposed program. Include differential tuition in the cost if applicable.** Costs are a function of the student major.

5) Identify other closely related programs across the country

a) Title of program: ASU Julie Ann Wrigley School of Sustainability

b) Name of institution: Arizona State University

c) Current enrollment and number of graduates per year over past three years: From 2009-2014: 300-600

d) Compare/contrast CSU's proposed program to other program

i) Program focus

(1) Systems thinking
(2) Futures thinking
(3) Normative thinking
(4) Strategic thinking
(5) Collaborative thinking

e) Program features (cohort, internship, etc.): Program level learning outcomes; E-Portfolios; Solutions-based learning; Informal education"

f) Program costs: In-state tuition alone, makes up $10,104, and books, supplies, and other fees make up an additional ~ $1,125.

6) Identify other closely related programs across the country

a) **Title of program:** Sustainability Undergraduate Major (B.S.)/ Double degree

b) Name of institution: Oregon State University

c) Current enrollment and number of graduates per year over past three years

i) Current enrollment: Corvallis 62; Cascade Campus 7; E-Campus 29

ii) Graduates: 2016-20; 2017-19; 2018-28

d) Compare/contrast CSU's proposed program to other program: This program is not explicitly "systems" focused and carries less emphasis on social science approaches.

i) Program focus: Environmental and natural science dimensions of sustainability

e) **Program features (cohort, internship, etc.)**
f) **Program costs:** Estimated in-state tuition costs $10,366 (tuition and fees per term ~%3,905) and out-of-state $28,846 (tuition and fees per term ~%10,405).

7) **Identify other closely related programs across the country**
   a) **Title of program:** Sustainability Studies
   b) **Name of institution:** University of California-Riverside
   c) **Current enrollment and number of graduates per year over past three years**
   d) **Compare/contrast CSU's proposed program to other program**
      i) **Program focus:** B.S. curriculum offers a comparative, interdisciplinary, transnational feminist approach to the theories and practices of building a sustainable future. Social and environmental justice.
   e) **Program features (cohort, internship, etc.):** internship; feminist paradigms and methodologies associated with intersectionality, dialogue, and relation.
   f) **Program costs:** Tuition and fees: resident ~$4,100; non-resident ~$9,600

Students

5. Student Body

Table 2: Progression of student enrollment and graduates over the first five-years on the Global Environmental Sustainability major.

Students	Year 1	Year 2	Year 3	Year 4	Year 5
New	30	55	70	90	99
Continuing	0	28	81	147	207
Attrition	2	2	4	4	6
Total enrolled	28	81	147	233	300
# graduating after completing year	0	0	0	26	46

What is the ideal number of students in terms of total student enrollment (after program has been in place for five years)? What number would be ideal for the "entering class?" Present a time line explaining the expectation of growth as you build toward the first graduating class. How many students are expected to graduate in a given year once the program is at ideal size? Tie this information to evidence of student demand.

The ideal number of total student enrollment after five years is ~300. Incremental acceptance to slowly grow the program will proceed in accordance with funds/resources. Thirty students would be accepted into the entering Freshman class. During the second year of offering the major, 55 new incoming students will be accepted in addition to the 30 who continue to their Sophomore year. Year three will include 70 new incoming students, 81 students comprised of continuing students, students transferring from other institutions, students converting from the GES minor to the major, and students seeking double majors (Table 2). Years four and five will follow in a similar progression as shown in figure 3. Approximately 46 students are expected to graduate in a given year once the program is at full enrollment.

Enrollment	Continuing		28	81	147	207
	Incoming	30	55	70	90	99
	Year	**1**	**2**	**3**	**4**	**5**
GES courses	GES 192					
	GES 101					
	GES 110					
	GES 201					
	GES 210					
	GES 310					
	GES 462					
	GES 475					

Figure 3: Progression of student enrollment and course offerings over the first five-years of the Global Environmental Sustainability major.

Explain how the proposed program will draw students who would not otherwise come to Colorado State University.

Colorado State University does not currently offer a cross-disciplinary BA program in sustainability for undergraduate studies. This degree program aims to train students to be leaders with the technical and interpersonal skill sets needed to pursue professional opportunities in the private sector, public sector, and non-governmental organizations focused on sustainability.

Is the proposed program intended to provide another program option to a significant number of students who are already being attracted to or attending CSU? Provide explicit detail.

The proposed Global Environmental Sustainability degree is intended to complement, not replace, other programs at CSU, and to draw new students to CSU, not to divert students from existing majors. Although there is a topical overlap between global environmental sustainability and many existing programs at CSU, this is a result of the broad nature of the discipline of global environmental sustainability and is true for all universities with such sustainability programs. It is notable that universities with some of the strongest sustainability programs in the country also have strong programs in areas of overlap. Arizona State University is an example. The sustainability program is recognized as one of the best in the country, and the university has top-rated programs in business, engineering, health, and cross-disciplinary arts and sciences. There is considerable collaboration and cross-pollination among these programs, including cross listed courses and joint hires, and a persuasive argument can be made that this atmosphere of collaboration, in contrast to competition, has been beneficial for all of these programs.

In the context of thematic overlap with other departments at CSU, the global environmental sustainability program will differentiate itself by taking a unique sustainability perspective on topics. Moreover, whereas courses in the global environmental sustainability program will overlap with many other existing programs on campus, the overlap with any one program will be extremely limited. For example, the major requires students to choose course across two groups (e.g. Health Systems and Human Systems; Biological Systems and Economic Systems) to build a highly flexible and individualized curriculum plan (see section 8; page 42). Figure 4 demonstrates how such a curriculum plan would impact the affected colleges by the distribution of courses contributing to a students' four-year graduation plan.

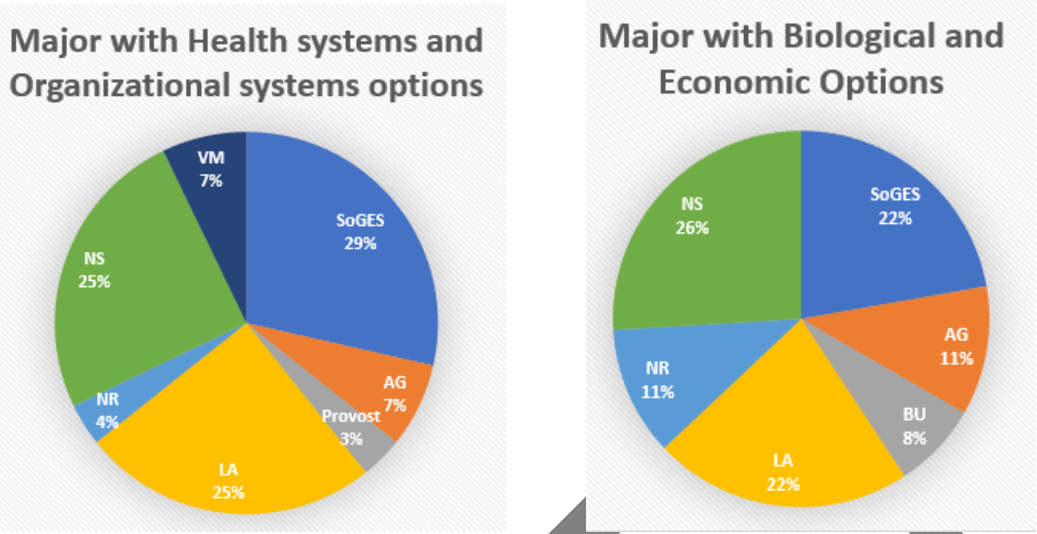


Figure 4: Distribution of courses in the GES major by college. The structure of the major is flexible with respect to the students' choices of options and there are a wide range of possible courses the students can take from different colleges. Two example sets of choices are displayed.

If the program is expected to attract students from other majors or programs, attach a letter from the relevant department head and dean indicating their support (or lack thereof) for the new program in terms of shift of student enrollment from that particular department.

N/A

Describe how new freshmen, transfer students, and students changing their major would be transitioned into the new program in the first and subsequent years of the program.

New freshmen will be assigned to an advisor who will meet with students to discuss the program requirements and opportunities. Given the disciplinary nature of the program and the flexibility of courses based on student interest, advising will be a strong component of the undergraduate experience. Transfer students will meet with advisors and transfer credits will be analyzed to determine what work will count toward program requirements. Students changing their major will be required to complete the core GES courses. Classes that students have taken which overlap with program courses and further requirements will likely reduce the total credits needed to meet the major degree requirements.

What are the projected numbers and characteristics (e.g., index scores, residency status, diversity) of the students to be served? Are any admission requirements to the proposed program being recommended that are higher than CSU's minimum requirements? If so, what are the recommendations? What is the rationale for the higher standards?

We anticipate that the index scores, residency status, and diversity of the students served by the proposed Global Environmental Sustainability major would be similar to the characteristics of the general student body at CSU. The admission requirements for the proposed program are not higher than CSU's minimum requirements.

What is the student profile in other programs that the department currently offers (e.g., mean index score; residency compared to nonresident numbers; diversity). Is there any reason to believe that the profile of the students in the new program would be any different than the existing profile? Please explain.

The GES Minor is the only comparable program currently offered by SoGES. In Spring of 2019, the minor is composed of 62% female and 38% male students. The distribution of ethnicity among the students is: 75% White, 14% Hispanic, 4% Multi-Racial, 3% Asian and less than 2% each Black and Native American. Thus, a slightly higher percentage of students in the GES minor would be classified as 'minority' than in the CSU undergraduate population (19% as of the 2016-17 FactBook).

Provide detailed plan for recruiting students including staff and faculty responsibilities, annual timeline, etc.

SoGES currently markets the GES minor, the Sustainable Water minor, the Sustainable Energy Minor and the Sustainable Peace and Reconciliation minor along with three graduate certificates. This involves staff and faculty time attending on-campus events, meeting with Admissions staff, campus tour guides and local and regional high school events. CSU has brand reputation nationally for sustainability through the numerous rankings and awards which strongly supports the recruiting effort for the major. The School will actively reach out to regional high schools that have high enrollments of underrepresented students to bring the program to the attention of the schools and students.

Are any admission requirements to the proposed program being recommended that are higher than CSU's minimum requirements?

N/A

Student Learning

6. *Program Learning Goals*

- **Define meaningful, measurable Student Learning Outcome (SLO) goals that specify the disciplinary knowledge, competencies, skills, and values that students will be expected to attain in the new program.**

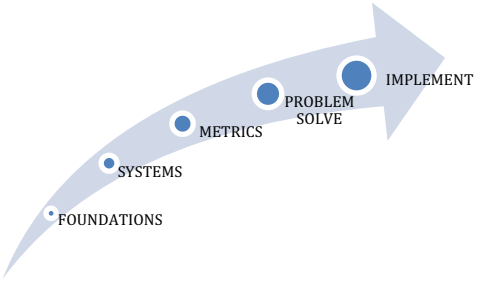
- **Student Learning Outcomes must be sufficiently specific to differentiate the program from all other programs and degree levels on campus.**

- **A minimum of four (4) Student Learning Outcomes are required for the program.**

- **Identify the specific courses in which each Student Learning Outcome is introduced, practiced, and mastered.**

Student Learning Outcomes: Upon completion of the proposed major, students will have successfully completed the following student learning outcomes (SLO):

1. Describe important environmental sustainability challenges from multiple perspectives.
2. Apply basic knowledge of natural, social, and economic processes to the analysis of sustainability issues.
3. Analyze sustainability issues using systems thinking models.
4. Evaluate alternatives for solving environmental sustainability problems.
5. Communicate environmental sustainability issues and solutions.
6. Implement sustainability solutions.



The sequence of courses is designed to support students' progress toward mastery of the SLOs. For example, the content and skills required at the junior level, in courses like 'Facilitation and Negotiation in Sustainability' and 'Life Cycle Analysis', rely on the foundation of freshman and sophomore level courses such as 'Logic and Critical Thinking' and 'Ways of Knowing'. These will advance students toward the capstone, senior-level course (GES 475) where students will implement sustainability solutions (cognitive highest level). The traditional stairway model helps us view student goals and expectations as a progression from acquiring foundational content knowledge and systems thinking approaches to utilizing metrics, to problem-

solving and implementing solutions. However, a matrix translation of this linear model more accurately represents student learning in the proposed Global Environmental Sustainability major. These courses progress students from an introductory- to a mastery-level of proficiency as demonstrated by successful completion of the SLOs. A combination of courses introduces and reinforces the targeted SLOs. Table 3 lists the new courses in the proposed major in which students will attain mastery- level proficiency of each SLO. Additionally, the CSU-level competency areas are addressed in the major program.

Table 3: Mastery- level student learning outcomes achieved by each new course in proposed Global Environmental Sustainability major.

Proposed Major Courses	Mastery-Level of Student Learning Outcomes (SLO's)	University Competency Areas
Foundations of Global Environmental Sustainability (GES 101)	(1) Describe important environmental sustainability challenges from multiple perspectives.	Stewardship
Global Environmental Sustainability Seminar (GES 192)	(1) Describe important environmental sustainability challenges from multiple perspectives.	Communication
Systems Thinking in Sustainability (GES 201)	(3) Analyze sustainability issues using systems thinking models.	Reasoning
Ways of Knowing Sustainability (GES 210)	(1) Describe important environmental sustainability challenges from multiple perspectives. (4) Evaluate alternatives for solving environmental sustainability problems.	Creativity
Facilitation and Negotiation in Sustainability (GES 310)	(1) Describe important environmental sustainability challenges from multiple perspectives. (2) Apply basic knowledge of natural, social, and economic processes to the analysis of sustainability issues. (3) Analyze sustainability issues using systems thinking models. (4) Evaluate alternatives for solving environmental sustainability problems. (5) Communicate environmental sustainability issues and solutions.	Communication Reasoning Collaboration
Life Cycle Analysis (GES 462)	(3) Analyze sustainability issues using systems thinking models. (4) Evaluate alternatives for solving environmental sustainability problems.	Reasoning Collaboration Stewardship
Implementation of Sustainability (Capstone; GES 475)	(4) Evaluate alternatives for solving environmental sustainability problems. (5) Communicate environmental sustainability issues and solutions. (6) Implement sustainability solution.	Creativity Reasoning Collaboration

7. Continuing Assurance of Student Success and Learning

- **Identify the processes for determining that program Student Learning Outcomes (Section 6) are attained through direct and indirect assessment where direct methods require students to demonstrate skills/knowledge (e.g., projects, examinations, papers, portfolios, performances, etc.) and indirect methods capture proxy signs of learning (e.g., job placement, student surveys, graduation rates, course grades, etc.)**

- **Describe the processes for using Student Learning Outcome evidence to continuously improve the program.**

- **Describe placement outcome goals (for graduate programs, career enhancement when relevant) for students graduating from the program. Explain how this evidence will be used to continuously improve the program.**

- **Describe High Impact Practices (curricular and co-curricular) that will be integrated into the program to enhance student learning, provide transformational experiences, and promote graduation by helping students to achieve Student Learning Outcomes. Briefly explain how the placement and nature of High Impact Practices will help students to master the Student Learning Outcomes.**

- **Provide certification from the Vice Provost for Undergraduate Affairs that these measures of assurance are satisfactory.**

- **Address and detail accreditation per fit with existing, intending to seek (with timeline) and standards which apply and impact the offering of this program**

Student Learning Outcomes will be assessed by several methods and instruments unique to the respective SLO (Table 4). Assessments will be meaningful, manageable, sustainable and iterative. Direct and indirect methods of assessment that demonstrate student achievement in each learning outcome is expressed below:

Table 4: Direct and indirect methods of assessing mastery- level student learning outcomes.

	Methods of Assessment	
Student Learning Outcome	Direct	Indirect
Describe important environmental sustainability challenges from multiple perspectives.	• Scoring rubric • Classroom assessment (projects; exams)	• Exit interview • Surveys • Monitoring graduation rates (with the intent of maintaining a 55% five-year graduation rate) • Completion of capstone experience
Apply basic knowledge of natural, social, and economic processes to the analysis of sustainability issues.	• Capstone course • Collective portfolios	
Analyze sustainability issues using systems thinking models.	• Case studies: using real-world case studies, assess student interaction with material from multiple perspectives	
Evaluate alternatives for solving environmental sustainability problems.	• Content analysis of issues and problems. • Define problem, Set objectives, constraints, strategies, experiments	
Communicate environmental sustainability issues and solutions.	• Reflective essays • Classroom assessment	
Implement sustainability solution.	• Capstone course • Collective portfolios	

A committee will be formed to review assessment findings and make timely recommendations for improvements. The evidence/data gathered by the above assessment methods will be evaluated by this committee who will have predetermined what form the raw data must be in for analysis. In cases where multiple assessments are used, relationships will be identified that apply to specific SLO's. Inconsistencies will serve as evidence that warrant change for improvement. The committee will convene with the entire faculty, administrators, and staff to discuss assessment results and make recommendations for program (curricular or other) changes.

High Impact Practices that include active, engaged learning will take place by offering a first-year seminar course and many opportunities to engage in common intellectual experiences. Students will be embraced into a learning community and be provided multiple opportunities (first year seminar, common intellectual experiences, learning communities, writing intensive courses, collaborative assignments, undergraduate

research, diversity/global learning, service learning, internships, and capstone experiences) to engage in high impact practices such as those listed above.

There is no separate, standardized accreditation process for environmental sustainability programs.

8. Curriculum

List all courses comprising the program's curriculum. Please provide the following information for each course: subject code, course number, title, credits, prerequisites, catalog description. (Please BOLD entries for each NEW course being proposed.)

Provide a discussion of all learning formats to be utilized in the courses.

Subject code	Course number	Title	Cr.	Prereq.	Catalog Description	Learning Format	AUCC Cat
GES	101	Foundations of Global Environmental Sustainability	3	N/A	An interdisciplinary analysis of the issues associated with applying the concepts, foundations, and metrics of global environmental sustainability applied to global challenges within the fields of environmental sciences in agricultural, urban and rural contexts of the developing and developed world.	F2F	
GES	**192**	**Introductory Seminar**	**1**	**N/A**	Freshman inquiry course in sustainability. Information and skills necessary to succeed in the Global Environmental Sustainability major.	**F2F**	
GES	**201**	**Systems thinking in sustainability**	**3**	**PHIL 110; GES 101**		**F2F**	

GES	**210**	**Ways of knowing in sustainability**	**3**	**PHIL 110; GES 101**		**F2F**	
GES	**310**	**Facilitation and Negotiation in sustainability**	**3**	**GES 210**	Problem solving	**F2F**	
GES	**462**	**Life Cycle Analysis**	**3**	**AUCC Math; GES 201**		**F2F**	
GES	**475**	**Implementation of Sustainability**	**3**	**GES 310**	Capstone. Students will combine the course work and practicum experience into a reflective learning environment to demonstrate growth of knowledge and skills in the field of sustainability. Students will develop a comprehensive portfolio as a compilation of their undergraduate major and as a tool to prepare them to move forward in their careers.	**F2F**	
AREC/ ECON	340	Introduction-Economics of Natural Resources	3	AREC 202 or ECON 202	Concepts, theories, institutions; analytical methods for economic evaluation of alternative resource use patterns and land use plans.	F2F; online	Note: AREC/ DARE 340 or 341 count as an elective if not used to fulfill core requirement
AREC	341	Environmental Economics	3	AREC 202 or ECON 202	Economic theories and analytic frameworks are developed and applied to contemporary problems of the use and protection of the natural environment.	F2F; online	Note: AREC/ DARE 340 or 341 count as an elective if not used to fulfill core requirement
JTC	210	Newswriting	3	None	Theory and practice in newswriting	F2F; online	
JTC	300	Professional and Technical Communication	3	CO 150 or HONR 193	Professional writing and presentation skills applied to students' major fields	F2F; online	

JTC	301	Corporate and Professional Communication	3	CO 150 or HONR 193	Principles and practice of effective corporate communication with emphasis on written professional reports	F2F; online	
JTC	419	Food and Natural Resources Communication	3	None	Natural resources issues and the role of news media, PR, and advertising and how people form beliefs about food and natural resources in communication	F2F	
JTC	461	Writing About Science, Health, and Environment	3	JTC210 or JTC 300 or LB 300	Writing about science, health, and the environment for lay audiences from a journalistic perspective	F2F	
CO	300	Writing Arguments	3	CO 150 or HONR 193	Reading, analyzing, researching, and writing arguments	F2F; online	
CO	301 (A,B,C,D)	Writing in the Discipline: Arts and Humanities (A) Sciences (B) Social Sciences (C) Education (D)	3	CO 150 or HONR 193	Learning writing strategies for addressing general audiences in (A,B,C,D)	F2F; Online	
CO	302	Writing in Digital Environments	3	CO 150 or HONR 193	Writing strategies, patterns and approaches for online materials	F2F	
LB	300	Specialized Professional Writing	3	CO 150 or HONR 193	Emphasizes specialized writing skills used in professional letters, resumes, manuals, critiques, complaints, and interest-specific research projects	F2F	
CO	150	College Composition	3	CO 130	Understanding and writing for rhetorical situations; critical reading and response; writing source-based argument for academic and public audiences.	F2F; online	**CAT. 1.A.**

MATH or STAT	Any Math course higher than MATH 117		3	None			**CAT. 1.B.**
COMP	300 OR 301 (A,B,C,D)	Writing arguments OR Writing in the Disciplines (A,B,C,D)	3	CO 150 OR HONR 193	Reading, analyzing, researching, and writing arguments. OR Learning writing strategies for addressing general audiences in (A,B,C,D)	F2F; online	**CAT. 2**
CHEM	103, AND 104 OR 107, AND 108	Chemistry in Context AND Chemistry in Context Lab OR Fundamentals of Chemistry AND Fundamentals of Chemistry Lab	3 AND 1 OR 4 AND 1	None OR MATH 117 or MATH 141, or MATH 155, or MATH 160, or MATH 161, or MATH 229, or MATH 261,.	Chemistry, chemical principles from more conceptual, less mathematical perspective; how chemical substances, chemical reactions affect our daily lives.	F2F; online OR F2F	**CAT. 3.A.**
LIFE	102	Attributes of living systems	4	None	Levels of organization, stability, and change in living systems.	F2F	**CAT. 3.A.**
LIFE	220	Fundamentals of Ecology	3	(BIO 100 to 199 or BZ 100 to 199 or LIFE 100 to 199 or HORT 100) AND (MATH 100 to 199)	Interrelationships among organisms and their environments.	F2F; online	**CAT. 3.A.**
GEOL	120 OR 122	Exploring Earth-Physical Geology OR The Blue Planet-Geology of our environment	3	None	Develops scientific understanding through introduction to earth processes, materials, resources, and hazards. OR Develops scientific understanding through introduction to geological processes, natural hazards, earth resources, and their impacts on society.	F2F	**CAT. 3.A.**

PHIL	110	Logic and critical thinking	3	None	Identify, analyze, and evaluate real arguments in everyday life, politics, the sciences, and the professions.	F2F; online	**CAT. 3.B.**
Arts and hum	Any 3 credit course within this category		3				**CAT. 3.B.**
AREC	202	Agricultural and Resource Economics	3	None	Introduction to decision-making by consumers, firms, and government and the resulting allocation of resources through markets.	F2F	**CAT. 3.C.**
Historical perspectives	Any 3 credit course within this category		3				**CAT. 3.D.**
Global and cultural awareness	Any 3 credit course within this category		3				**CAT. 3.E.**

* F2F= Face to Face

Include total curriculum as discussed at the University Curriculum Committee. Use the appropriate UCC forms -- course and program --, found on the UCC website (http://curriculum.colostate.edu).

- A minimum of 120 credits,
- 42 of which need to be upper-division.
    - 30 of the 42 upper-division need to be taken "in residence" or at CSU. 15 of the last 30 credits need to be taken "in residence."
- Major Requirements
    - Must complete the requirements for a major and the All-University Core Curriculum
    - A minimum of 27 semester credits constitutes a major

Freshman Year	**Cr.**	**Sophomore Year**	**Cr.**
Fall Semester		*Fall Semester*	
CO 150: College Composition (AUCC 1A)	3	GES 201: Systems Thinking in Sustainability	3
GES 101: Fnds. of Global Env. Sustainability	3	AREC 202: Agri. and Resource Economics (AUCC 3C)	3
GES 192: Global Env. Sustainability Seminar*	1	LAND/LIFE 220: Fundamentals of Ecology (AUCC 3A)	3
MATH 117: College Algebra in Context I (AUCC 1B)	1	GEOL 120: Expl. Earth-Physical Geology (AUCC 3A)	3
MATH 118: College Algebra in Context II (AUCC 1B)	1	Global and Cultural Awareness (AUCC 3E)	3
MATH 124: Log. and Exp. Functions (AUCC 1B)	1	Electives	3
Electives	6		
Spring Semester		*Spring Semester*	
PHIL 110: Logic and Critical Thinking (AUCC 3B)	3	GES 210: Ways of Knowing in Sustainability	3
CHEM 103: Chemistry in Context (AUCC 3A)	3	CO 300 or CO 301 (A,B,C,D) (AUCC CAT.2)	3
AND		Historical Perspectives (AUCC 3D)	3
CHEM 104: Chemistry in Context Lab (AUCC 3A)	1	STAT 201: General Statistics	3
OR			
CHEM 107: Fundamentals of Chemistry (AUCC 3A)	4		
AND			
CHEM 108: Fundamentals of Chemistry Lab (AUCC 3A)	1		
LIFE 102: Attributes of Living Systems (AUCC 3A)	4		
Art and Humanities (AUCC 3B)	3		
	30		**30**
Junior Year	**Cr.**	**Senior Year**	**Cr.**
Fall Semester		*Fall Semester*	
JTC 419: Food and Natural Resources Communication	3	GES 462: Life Cycle Analysis	3
Program GROUP Courses	6	Program GROUP Courses	6
Upper Division Electives	6	Upper Division Electives	6
Spring Semester		*Spring Semester*	
GES 310: Facilitation and Negotiation in Sustainability	3	GES 475: Implementing Sustainability	3
AREC/ECON 340 or ECON 341 (Fall course offering)	3	Program GROUP Courses	6
Program Group Courses	6	Upper Division Electives	6
Upper Division Electives	3		
	30		**30**
		Program Total	**120**

*GES 192 is currently a 3-credit seminar course. A request will be submitted to change this to a 1-credit seminar course.

Program courses are found across two groups “Biological and Physical Perspectives” and “Societal and Economic Perspectives,” each of which has five focal areas. Students must choose 12 credits from each group, of which, 9 credits must come from one focal area in each group and 3 credits from a second focal area within each group. For example, a student may choose to take 9 credits in ‘Biological Systems’ (GROUP 1B.) and 9 credits in ‘Economic Systems’ (GROUP 2B). They may take an additional 3 credits from ‘Food Systems’ (GROUP 1D.) and 3 credits from ‘Human Systems’ (GROUP 2A.). This will total to 24 program credits, (12 credits from each Group).

GROUP 1:

Biological and Physical Perspectives

A. Physical Systems
B. Biological Systems
C. Energy Production and Use
D. Food Systems
E. Health

GROUP 2:

Societal and Economic Perspectives

A. Human Systems
B. Economic Systems
C. Organizational Systems
D. Technological Systems
E. Political Systems

CSU Global Environmental Sustainability: GES course Selection/ Major Program Groups

- **Students must choose 12 credits from Program Group 1 with 9 credits from one focal area in the group.**
- **Students must also choose 12 credits from Program Group 2 with 9 credits from one focal area in the group.**

Subject Code	Course Number	Title	Cr.	Prereq.	Catalog Description	Learning Format
GROUP 1.						
A. Physical Systems						
ATS	150	Science of Global Climate Change	3	N/A	Physical basis of climate change. Energy budget of the earth, the greenhouse effect, carbon cycle, paleoclimate, projections of 21st Century climate	F2F
ATS	350/351	Intro to Weather and Climate and lab	2+1	N/A	Behavior of atmosphere and its influence upon human activities	F2F
CHEM	338	Environmental Chemistry	3	CHEM113 and (CHEM245 or CHEM341 or CHEM345)	Processes that control the fate of chemicals in the environment. Focus on the chemistry of the atmosphere, hydrosphere, and soils, especially as it pertains to pollution of these environmental compartments. Topics covered in the course may include smog and air pollution, ocean acidification, acid mine drainage, pesticide chemistry, and heavy metal contamination.	F2F

ERHS	448	Environmental Contaminants Exposure and Fate	3	LIFE102 and (CHEM245 or CHEM341 or CHEM345)		F2F
GR	210	Physical Geography	3	None	Energy, mass budget, and human impacts on atmosphere, hydrosphere, and continental land surfaces.	F2F
GR	304	Sustainable Watersheds	3	AUCC1B requirement	Effects of climate, land use, and water use on the sustainability of water quantity and quality.	F2F
GR	333	Glaciers and Climate Change	3	GR100 or GR210 or GEOL120 or GEOL122 or GEOL124 or GEOL150	Glacier mass balance, dynamics, past fluctuations, and glaciers' relation to climate change	F2F
POLS	364	Air, Climate, and Energy Policy Analysis	3	POLS101	Discussion and analysis of air quality, climate, and energy nexus, with a focus on policy impacts on the economy and the environment under future scenarios.	F2F and Online
B. Biological Systems						
LIFE	320	Ecology	3	(BZ101 or BZ104 or BZ110 or BZ120 or LIFE102) and (MATH141 or MATH155 or MATH160)	Interrelationships among organisms and their environments using conceptual models and quantitative approaches.	F2F
BZ	415	Marine Biology	4	LIFE320	Marine organisms, habitats, and communities	F2F
BZ	471/472	Stream Biology and Ecology (and lab)	3+1	LIFE220 or LIFE320	Biology and ecology of running waters	F2F

FW	304	Conservation of Marine Megafauna	3	BZ101 or BZ110 or LIFE103	The ecology, systematics, behavior and conservation of large marine animals including giant squid, bony fishes, sharks, sea turtles, seabirds, and marine mammals. Examines the relations between ocean dynamics and large marine animals, and provides insights in the roles that marine megafauna species play in ocean ecosystems. Study impacts of human activities, such as bycatch and climate change, and their effect on ocean species.	F2F
FW	467	Wildlife Disease Ecology	3	LIFE320	Ecological, epidemiological, and evolutionary principles of disease in fish and wildlife populations; contemporary issues in disease ecology	F2F
F	311	Forest Ecology	3	LIFE320 or LIFE220	Relationships of ecological concepts to the dynamics of forest ecosystems	F2F
GR	348	Biogeography	3	At least 3 credits GR	Species distribution of plants and animals in relation to earth history and environments, evolution and ecology.	F2F
GR	448	Forest Biogeography and Climate Change	3	ESS 211 or ESS 311 or F311 or GR 100 or GR210 or ESS 210 or GR303 or GR 348 or GR 410	Forest adaptation and conservation in relation to global change with a focus on climate change	F2F
NR	300	Biological Diversity	3	NR120A or NR120B or three credits of BZ or three credits of LIFE	Biological diversity examined in context of species; extinction. Principles, techniques of conservation biology utilized to understand and resolve issues.	F2F

RS	478	Ecological Restoration	3	(BZ450 or LIFE220 or LIFE320) and (SOCR240)	Analysis of environmental factors influencing restoration of disturbed lands and practices for successful restoration of disturbed ecosystems.	F2F
SOC	321	Soil, Environment, and Society	3	SOC100 or SOC105	Role of soil in our environment and its value as it relates to the social and economic well-being of society	F2F
C. Energy Production and Use						
GES	141	Introduction to Sustainable Energy	3	N/A	Fossil, nuclear, and renewable energy sources. Energy conversion, distribution, and storage. Energy and the environment. Energy economics and policy.	F2F
GES	441	Analysis of Sustainable Energy Solutions	3	GES141	Methods of evaluating sustainable energy technologies, including life cycle assessment, energy return on investment, technoeconomic analysis, and political ecology.	F2F
POLS	364	Air, Climate, and Energy Policy Analysis	3	POLS101	Discussion and analysis of air quality, climate, and energy nexus, with a focus on policy impacts on the economy and the environment under future scenarios.	F2F and Online
D. Food Systems						
AGRI/IE	270	World Interdependence – Population and Food	3	N/A	Survey of world population and food; emphasis on understanding the problems and opportunities in a world context.	F2F
FTEC	110	Food-From Farm to Table	3	N/A	Commercial food processing, related to preservation and enhancing food quality, safety, and value	F2F
HORT	171	Environmental Issues in Agriculture	3	N/A	Historical development of agriculture, environmental consequences of modern food production and other cultural approaches to agriculture.	F2F

SOCR	240	Introductory Soil Science	4	CHEM107 or CHEM111	Formation, properties and management of soils emphasizing conditions that affect plant growth	F2F; online
SOCR	341	Microbiology for Sustainable Agriculture	1	SOCR240	Functional roles and management of soil organisms in organic agriculture, emphasis on ecological interactions w/ plants and plant pathogens	F2F
SOCR	400	Soils and Global Change: Science and Impacts	3	SOCR240 and (LIFE220 or LIFE320)	Foundations on the science of global change and its impact on soil processes and biota	F2F
SOCR	455	Soil Microbiology	3	SOCR240 or MIP300	Microbial activities in agricultural, forest, and grassland soils; in soil-plant relationships; and in maintenance of environmental quality	F2F
PHIL	330	Agricultural and Food System Ethics	3	CO150	Basic concepts in ethics and their application to agriculture and the food system.	F2F
FSHN	455	Food Systems: Impact on Health/food Security	3	FSHN350 or FTEC447	Conventional and alternative food systems and their impact on nutrition, health, food security and the environment.	F2F
GR	331	Geography of Farming Systems	3	GR100	Geographic analysis of farming systems worldwide and by region; their development over time, human-land relationships, and spatial patterns.	F2F
SOC	321	Soil, Environment, and Society	3	SOC100 or SOC105	Role of soil in our environment and its value as it relates to the social and economic well-being of society	F2F

SOC	324	Food Justice	3	SOC100 or SOC105	Food justice strives to eliminate exploitation and oppression by challenging the structural drivers within and beyond the food system. As a practice, food justice advocates for the right to healthy food that is justly and sustainably produced, recognizes diverse cultural food-ways and histories, and promotes democratic participation and equitable distribution of resources in the food system.	F2F
SOC	364	Agriculture and Global Society	3	SOC100 or SOC105	Analysis of relationships between global agriculture and social change.	F2F
E. Health						
GES	450	Sustainability and Health	3	N/A	Impact of anthropogenic environmental change on human, animal and environmental health	F2F
ANTH	340	Medical Anthropology	3	ANTH100 or ANTH200	Cultural adaption to disease; non-Western theories of health and disease; categories, causes, cures; learned roles of patients and healers	F2F
ANTH	343	Applied Medical Anthropology	3	ANTH100 or ANTH200	How and why we get sick and what sickness means from biological, social, and cultural perspectives	F2F or Online
ANTH	417	Indigenous Environmental Stewardship	3	ANTH100 or ANTH200	Sustainability and environmental stewardship are not necessarily modern day concepts. Indigenous peoples of North America have established traditions and beliefs about harmony and kinship with nature. Focus upon stories and belief systems and their influence upon culture, economics, politics, American history, environmental justice and law	F2F or Online

ERHS	220	Environmental Health	3	BZ101 or BZ104 or BZ110 or BZ120 or LIFE102	Impact of people on the physical and biological environment as well as impact of the environment on people; emphasis placed on human health	F2F
ERHS	320	Environmental Health – Water and Food Safety	3	MIP300	Water quality and food safety for practice of environmental health	F2F
ERHS	332	Principles of Epidemiology	3	(STAT301 or STAT307) and MIP300	Use of epidemiological methods in studying distribution of diseases in human populations.	F2F
BZ	418	Ecology of Infectious Diseases	4	LIFE320	Ecological perspectives of infectious disease outbreaks in wildlife and human populations	F2F
GR	305	Geography of Global Health	3	ANTH200 or GR100 or INST200	Study, research and practice of global health using an ecological approach that integrates health with spatial thinking. Focuses on a common set of issues which transcends boundaries, both domestic and international, and a set of actions to address the geographic burden of disease. Key principles and concepts, history of global health transitions, common and emerging health issues.	F2F
GROUP 2.						
A. Human Systems						
GES	460	Law and Sustainability	3	N/A	Introduction to the domestic and international laws that influence and interact with the implementation of sustainability in the U.S. and abroad.	F2F
ANTH	330	Human Ecology	3	ANTH 100 or ANTH 200 and ANTH 120 or	Roles of technology, economics, social organization, and ideology in human adaptations to and survival in natural and cultural environments	F2F; online

				BZ 101 or LAND 22 or LIFE 220		
PHIL	320	Ethics of Sustainability	3	N/A	Ethical and conceptual issues surrounding creation of sustainable societies and lifestyles.	F2F
AREC	342	Water Law, Policy, and Institutions	3	N/A	Legal water issues within the context of historical, social, and economic development with emphasis on the southwestern U.S.	F2F; online
SPCM	429	Environmental Discourse	3	N/A	Environmental communication in advocacy campaigns, media representations of science, encounters with nature, public policy.	F2F
E	339	Literature of the Earth	3	CO150	Non-fiction, fiction, and poetry on landscape, climate, animality, ecology, place.	F2F
GR	345	Geography of Hazards	3	GR210	Causes, effects, distributional patterns, and human adjustments to environmental hazards.	F2F
GR	410	Climate Change: Science, Policy, Implications	3	At least 3 credits GR	Implications and consequences for earth systems including the cryosphere, hydrosphere, biosphere, and human systems.	
HIST	355	American Environmental History	3	3 credits of HIST and Junior standing	Interaction of humans and nature in American history with emphasis on relationships between environmental,	F2F or Online

					social, and cultural change	
HIST	439	Environmental History of the Middle East	3	HIST 100 to 499X (at least 3 cr.)	Explores the social, political, and ecological consequences of past human interactions with the environment in the Middle East and North Africa.	F2F
HIST	470	World Environmental History	3	HIST 100 to 499X (at least 3 cr.)	World environmental history since 1500, emphasizing the dynamic interaction of nature, culture, and human activity	F2F
IE/ANTH	479 / 479	International Development Theory and Practice	3	Junior Standing	Contemporary issues in international community and economic development with practical and theoretical analysis from interdisciplinary perspectives.	F2F
NR	310	Ecosystem Services and Human Well-Being	3	AREC202 or ECON202 or LAND220 or ESS211	Life-supporting and life-fulfilling benefits that nature provides to humans; theory, case studies, and policy.	F2F
PSY	316	Environmental Psychology	3	PSY 100	Social psychological theory and research on effects of behavior on the environment; environmental influences on behavior.	F2F

SOC	321	Soil, Environment, and Society	3	SOC100 or SOC105	Role of soil in our environment and its value as it relates to the social and economic well-being of society	F2F
SOC	460	Society and Environment	3	SOC100 or SOC105	Technology as a social phenomenon interacting with social organization and the natural environment.	F2F
B. Economic Systems						
AREC/ ECON	340	Introduction-Economics of Natural Resources Note: AREC/ DARE 340 or 341 count as an elective if not used to fulfill core requirement	3	AREC202 or ECON202	Concepts, theories, institutions; analytical methods for economic evaluation of alternative resource use patterns and land use plans.	F2F; online
AREC	341	Environmental Economics	3	AREC202 or ECON202	Economic theories and analytic frameworks are developed and applied to contemporary problems of the use and protection of the natural environment.	F2F; online
BUS	201	Foundations of Sustainable Enterprise	1	None	Basics of sustainability in business and implications for business decision making	F2F
ECON	101	Economics of Social Issues	2	None	Economic analysis of poverty, crime, education, and other social issues. Basics of micro, macro, and political economy	F2F
ECON/ AREC	240	Issues in Environmental Economics	3	None	Discussion and economic analysis of current environmental issues	F2F; online

					with special emphasis on the impact of economic growth.	
ECON	304	Intermediate Microeconomics	3	ECON 204 and MATH 141 or MATH 155 or MATH 160	Theory of national income, its measurement and determinants; analysis of inflation, growth, debt, and public policy	F2F; online
ECON	460	Economic Development	3	ECON 304	Economic problems of underdeveloped nations	F2F; online
F	322	Economics of the Forest Environment	3	AREC202 or ECON202 or AREC240 or ECON240	Economic principles and techniques applied to forested environments	F2F
GR	415	The Geography of Commodities	3	GR100 and Junior Standing	Social relations, international trade, and environmental impacts surrounding the production, transportation, exchange, and consumption of commodities.	
IE/ ANTH	479 / 479	International Development Theory and Practice	3	Junior Standing	Contemporary issues in international community and economic development with practical and theoretical analysis from interdisciplinary perspectives.	F2F
MGT	360	Social and Sustainable Venturing	3	Junior Standing	Entrepreneurship and economic opportunities in the transition to a socially and ecologically sustainable global economy.	F2F
C. Organizational Systems						

ANTH	330	Human Ecology	3	(ANTH100 or ANTH200) and (ANTH120 or BZ101 or LIFE220)	Roles of technology, economics, social organization, and ideology in human adaptations to and survival in natural and cultural environments	F2F
GR	320	Cultural Geography	3	GR100	Geographic analysis of cultural phenomena, elements emphasizing human-land relationships and spatial patterns of agriculture, cities, language, religion	F2F or Online
GR	330	Urban Geography	3	GR100	Spatial distribution of urban areas and the geographic similarities and contrasts that exist between and within them.	F2F or Online
IE/ ANTH	479 / 479	International Development Theory and Practice	3	Junior Standing	Contemporary issues in international community and economic development with practical and theoretical analysis from interdisciplinary perspectives.	F2F
D. Technological Systems						
SOC	460	Society and Environment	3	SOC100 or SOC105	Technology as a social phenomenon interacting with social organization and the natural environment.	F2F
HIST	463	Science and Technology in Modern History	3	HIST100-HIST49X	Impact of science and technology on industry, agriculture, medicine, education, etc. Issues in science and technology policy	F2F
GES	465	Sustainable Solutions for E-Waste	3	None	Trans-disciplinary overview of the electronics industry, with an emphasis on	F2F

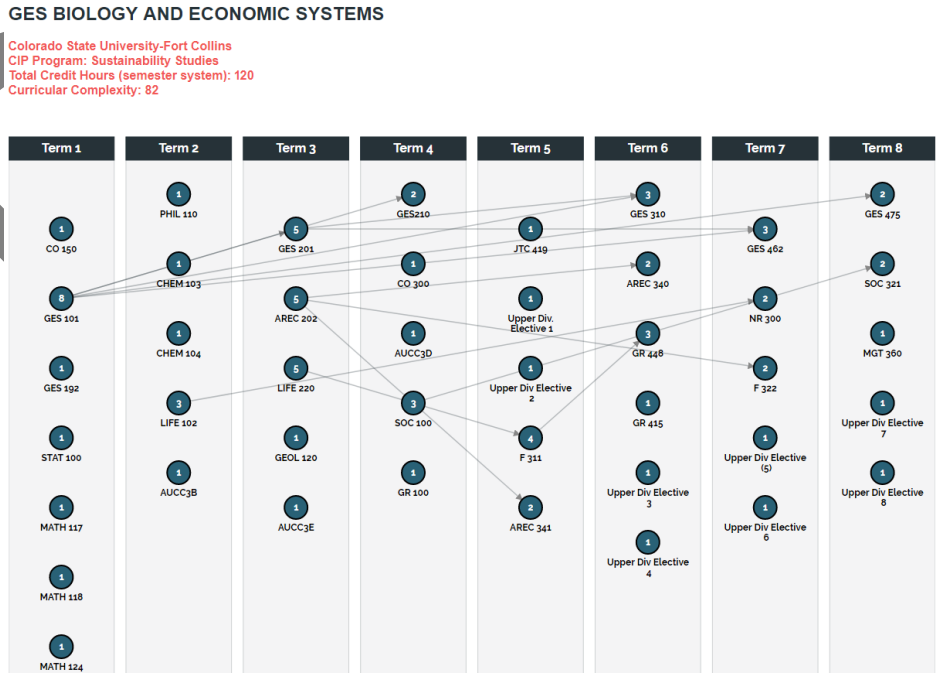
					sources and impacts of e-waste on human & natural systems. Systems approaches to mitigating environmental and social impacts of electronics--from product design, materials and manufacture to use, re-use, recycle and disposal. Apply learnings in trans-disciplinary project teams to evaluate opportunities for improving the sustainability of the industry and its products	
E. Political Systems						
SPCM	429	Environmental Discourse	3	None	Environmental communication in advocacy campaigns, media representations of science, encounters with nature, public policy.	F2F
GR/ POLS	440	Political Geography	3	GR 100 or POLS 101	Examines the meaning of political space; states and nations; competition for territory, including methods and justifications; the structure of political space focusing on states; geopolitics; and the state in an era of globalization.	Online; mixes F2F
IE/ ANTH	479 / 479	International Development Theory and Practice	3	Junior Standing	Contemporary issues in international community and economic development with practical and theoretical analysis from interdisciplinary perspectives.	F2F

NR	320	Natural Resources History and Policy	3	Junior Standing	History, values and institutions, and policy process guiding natural resources management and conservation	F2F and Online
POLS	361	US Environmental Politics and Policy	3	POLS101	Public and contemporary issues relating to US environmental policy	F2F and Online
POLS	362	Global Environmental Politics	3	POLS232	Cross-national and international contexts of environmental politics and policy	F2F
POLS	364	Air, Climate, and Energy Policy Analysis	3	POLS101	Discussion and analysis of air quality, climate, and energy nexus, with a focus on policy impacts on the economy and the environment under future scenarios.	F2F and Online
POLS	382A	Study Abroad: Global Environmental Politics in the Amazon	3	POL232	Explores global environmental politics in the Brazilian Amazon. Through lectures, site visits, and meetings with local decision-makers, stakeholders and activists, apply international relations theories and concepts to understand various social, economic, political and ecological dimensions of global environmental problems such as biodiversity loss and climate change and efforts to address these problems from the global to local levels.	F2F

POLS	442	Environmental Politics in Developing World	3	POLS241	Examines environmental politics in developing countries and evaluates climate change, natural resource governance and environmental justice.	F2F
POLS	462	Globalization, Sustainability, and Justice	3	POLS232 or POLS241	Public and private policies to promote sustainability and social justice in a globalizing world.	F2F
SOC	323	Soc. Of Environmental Cooperation & Conflict	3	SOC100 or SOC105	Roles of government and civil society in creating environmental problems and in developing effective responses to those problems	F2F

The students' curriculum progression plan is highly flexible and individualized (Figure 5). While students must choose program courses across two groups, curricular analytics suggest that most scenarios (Figure 5 a, b, c) are streamlined with curricular complexity of less than 100. Students may design a program tailored specifically to their interests and successfully complete the program within a four-year graduation plan.

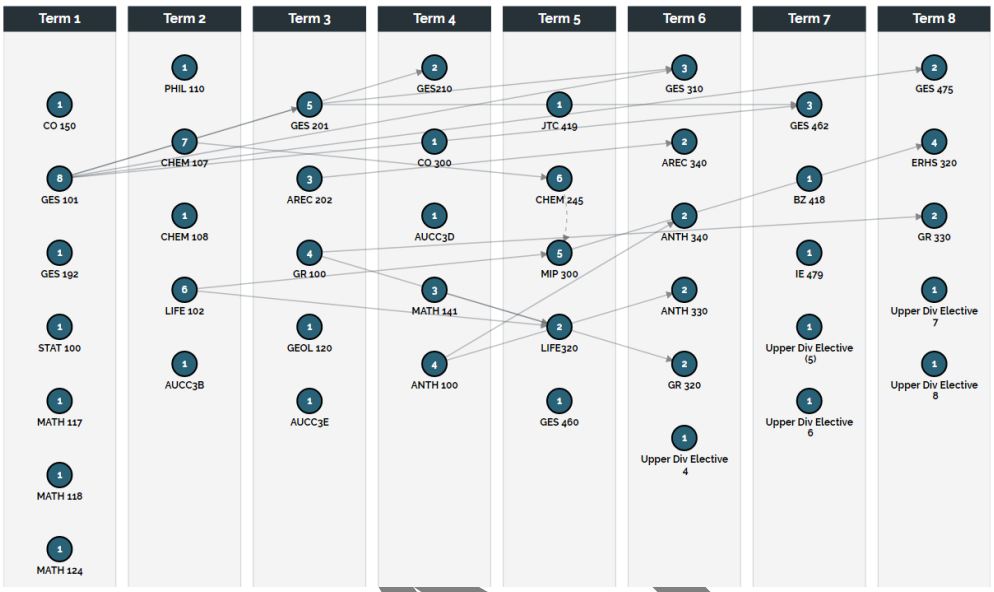
a.



b.

GES HEALTH AND ORGANIZATIONAL SYSTEMS

Colorado State University-Fort Collins
CIP Program: Sustainability Studies
Total Credit Hours (semester system): 120
Curricular Complexity: 99



c.

GES BIOLOGY AND HUMAN SYSTEMS

Colorado State University-Fort Collins
CIP Program: Sustainability Studies
Total Credit Hours (semester system): 120
Curricular Complexity: 79

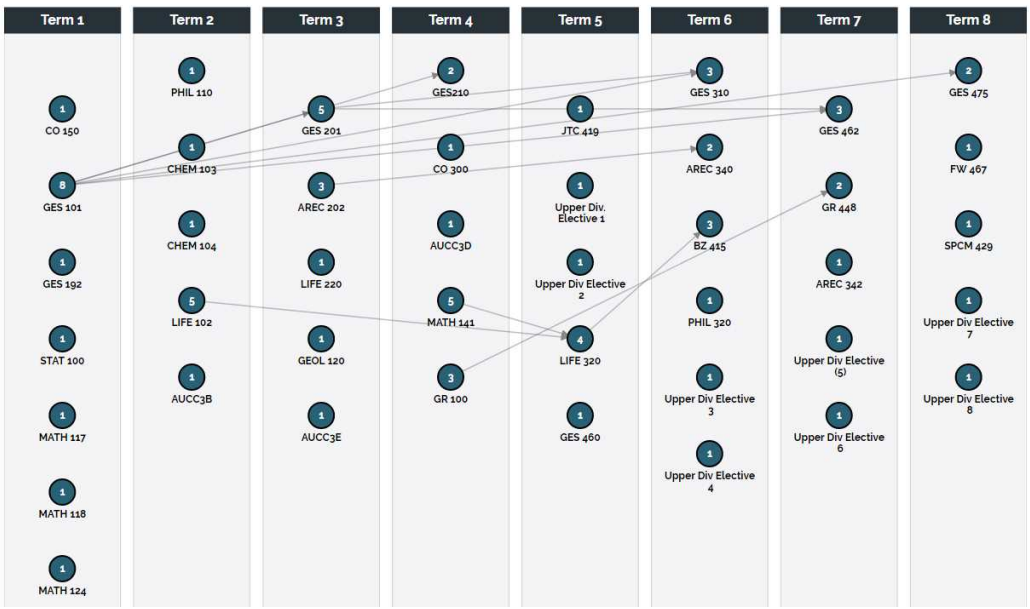


Figure 5: Three examples of an eight-term curriculum that bridges across two program groups, including a) Biology and Economic Systems, b) Health and Organizational Systems, and c) Biological and Human Systems.

- **Address supply and demand for placement in career development activities such as practica or internships. (Be sure to address this in the budget narrative and form.**

Placement in career development activities (practica and internships) will reflect the demand for sustainability employees detailed in Section 3.

- **Describe explicit activities that promote social justice, diversity, and inclusion.**

As part of our recruitment of students from Colorado high schools, we will particularly focus on schools with a high concentration of minority and underserved student groups.

9. Current Faculty Resources

Last, First Name	Appointment Type	Highest Degree Held	Area of Specialization
Dale Lockwood https://sustainability.colostate.edu/blog/people/dale-lockwood/	Continuing; Assistant Professor	PhD	Ecology and Sustainability
Susan Melzer https://soilcrop.agsci.colostate.edu/faculty-2/melzer-drinnen-suellen/	Continuing; Assistant Professor	PhD	Soil Science and Sustainability

10. Impact of Program on Faculty and Advising

Do you have plans to deactivate a program or courses in order to support this new degree program?

No Programs will be deactivated to support this program

Current capacity of the unit(s) to deliver the proposed degree N/A
Number of current students at level of degree and major N/A
Current ratio of students to faculty for teaching purposes N/A
Current ratio of students to faculty for advising purposes N/A

a) **Estimated ratio of students to faculty for teaching purposes with admits from new program**: 50:1
b) **Estimated ratio of students to faculty for advising purposes with admits from new program:** 30:1
c) **Will these ratios be adequate to support teaching and advising needs?**
   i) **If so, explain**. These numbers assume four new faculty lines for the beginning of the program. The program is interdisciplinary thus, there are faculty from multiple colleges that will be teaching students but will not hold SoGES faculty appointments and thus effectively lower the ratio. Advising staff will be hired to manage much of the student guidance for academic issues. SoGES faculty will provide advising for students regarding issues outside of the mechanics of major completion. Thus, this will be an adequate ratio.
   ii) **If not, estimate the number, rank, and background of new faculty lines needed to be added to initiate the proposed program in each of the first five years of operation (assuming the program develops as anticipated)**
   (1) Indicate the number of faculty in FTE
   Four new lines will be needed (4 FTE). It is anticipated that these will involve joint appointments with departments in different colleges across campus with specific MOUs created to define teaching, research and advising roles determined by the department and SoGES collaboratively.
   (2) Describe teaching and advising responsibilities for each
   With 4 FTE as joint appointments, the result will be for SoGES to gain eight faculty, each with a 50% appointment. Six of these will teach the new courses in the minor and the other two appointments will support additional sections of GES 101
   (3) What resource commitment is required and how will it be provided?
   The resource commitment will require costs of the equivalent of 4 FTE faculty. Since the program is new, initial costs must be provided from the Provost until 2-3-6, differential tuition and other funding streams are established.

2) **For undergraduate programs, indicate how the department will address undergraduate mentoring/advising loads of the new program within and outside the department.**
   a) **How will the proposed program affect undergraduate student access to faculty?**
      i) As a new program, the faculty will have no previous student mentoring and this will establish the baseline for faculty in the School.

b) How will knowledge of the new program be shared with the advising community (CSA, ASC, etc.)?

i) SoGES currently has staff and faculty who are in frequent contact with advisors, admissions officers and staff across the campus with respect to the minors managed by SoGES. With this established network, program news will be shared in the same manner. SoGES social media, e-mail lists, affiliate faculty and the Executive Committee and Curriculum Committee will all be informed of the major and provided details.

c) Does the department currently use Academic Success Coordinators? Please explain how advising is provided currently for you majors. With the addition of this new undergraduate program, how will the ASC's meet the increased advising needs?

i) SoGES currently has a faculty advisor for the GES minor. The School will be hiring 3 FTE ACS's during the first five years to meet the needs of the new major.

3) If approved, how will launching this new program impact the commitment already made to students in other program areas within or outside the unit?

a) For new undergraduate programs, provide a detailed plan as to how resources within the department would be re-allocated to contribute to the resource base needed for this proposed program (e.g., will the department need to "cap" another program? Would additional enrollment growth funding be necessary to meet current student demand for courses?)

The ASCs will take over the advising for the minor in addition to the major providing continuing advising for the current minor students.

b) For new undergraduate programs, what are the "additional expenses" that must be taken into account to offer this academic program? For example, other than AUCC 1-3 (core) courses, how will other department' teaching loads and facilities be affected by inclusion of their courses in the proposed curriculum. Provide a letter from other units indicating whether they will be able to "absorb" to projected number of students into existing sections or whether they will need to add sections. If extra sections must be added, how will this be financially supported?

11. Impact of Program on Staff and Graduate Assistants

1) Estimate the number and type of support staff needed in each of the first five years of the program. Indicate FTE

a) Indicate title and responsibilities for each FTE

i) 2 FTE – Academic Success Coordinators (1 in Year 1 and 2; 1.5 in Year 3 and 4; 2 total for year 5)
ii) 1 FTE – Undergraduate Coordinator (Starting in Year 1)

b) What resource commitment is required and how will it be provided?

2) How many graduate assistants are currently funded on Resident Instruction funds?

a) What are their teaching (for GTA's) support (for GSA's), and research (for GRA's) responsibilities?

i) 6 GRAs will be needed to support the academic program. The GTA's will be awarded to graduate students across multiple departments since SoGES does not have a graduate program.

b) **How many graduate assistants are currently funded on external grant funds?**
None

c) How many graduate assistants are currently funded on other sources?

i) Two GTA's are currently supported from Base funding.

3) How many additional funded assistantships are needed to support students in this proposed program?

a) Four new GTAs are needed

b) How do you propose they will be funded?

i) A combination of Base and Tuition

c) What responsibilities will these graduate assistants have?

i) Support in the larger lower division courses including grading, office hours and leading recitations.

12. Library Reference Sources

Books:
Sustainability is of interest to many programs on campus including, but not limited to, Department of Ecosystem Science and Sustainability and the School of Global Environmental Sustainability. Accordingly, CSU Libraries has a history of collecting books related to sustainability topics both in print and in electronic formats.

Current monograph collecting is primarily achieved through a demand-driven-acquisitions (DDA) program where records for books are added to the library catalog and the books are subsequently purchased when library users request them. In addition, librarians select a small number of books to acquire directly and encourage library users to suggest any books which may be of interest to the CSU community. The regional Prospector lending service and the Interlibrary Loan service offer further avenues for obtaining monographs not owned by CSU.

Due to the cross-disciplinary nature of the proposed program, it may be beneficial to review the Libraries' current monograph purchasing profiles to ensure that undergraduate-level books related to sustainability are acquired across the disciplinary spectrum, not just the sciences.

Journals:
CSU Libraries provides access to many journals that are directly related to sustainability. A review of the Green & Sustainable Science & Technology category in Journal Citation Reports (JCR) revealed that CSU Libraries subscribes to all but one of the top-quartile journals in this category when ranked by impact factor. The missing title, *Agronomy for Sustainable Development,* has also ranked in the top quartile by impact factor for the JCR Agronomy category since 2010. A subscription to this journal would benefit the proposed program and programs in the College of Agriculture as well. Table 5 below shows the current journal subscription price and the predicted price for the next three years.

Table 5: The current journal subscription price and the predicted price for the next three years.

Journal Title	**FY19**	**FY20 Cost (6% inflation)**	**FY21 Cost (6% inflation)**	**FY22 Cost (6% inflation)**
Agronomy for Sustainable Development	$899.00	$952.94	$1010.12	$1070.72

The journals in the JCR Environmental Studies category (which aligns more closely with the social science aspects of sustainability) were reviewed in February 2019 and CSU Libraries is already in the process of acquiring the one top-quartile journal missing from its collections, *Climate Policy*.

In addition, CSU subscribes to journals that support research and teaching in many other areas that are directly relevant to the proposed degree, such as political science, communication, business, anthropology, natural resources, and the life sciences. For journal articles that are not otherwise available at CSU Libraries, Interlibrary Loan provides an additional access option.

Databases:
The library database offerings at five institutions with sustainability bachelor's degrees (identified in the preliminary and comprehensive program proposals) were examined to determine core databases for this subject area. The recommended databases varied widely between institutions, possibly because of the interdisciplinary nature of the subject area. However, most institutions recommended a mix of subject-specific and multidisciplinary databases. Frequently mentioned were *Web of Science*, *Academic Search Premier*, and *JSTOR* (all with very broad subject coverage), along with *GreenFILE*, *Business Source Complete*, and *Zoological Record* (subject-specific coverage.) CSU Libraries does not subscribe to all of the databases that were recommended, but does offer access to the

databases mentioned above, as well as many others that cover complimentary subject areas.

CSU Libraries' information resources are sufficient to support the information needs of the proposed B.A. in Global Environmental Sustainability. However, the proposed program's cross-disciplinary emphasis suggests that a review the Libraries' current monograph purchasing profiles may be warranted in order to ensure the collection of undergraduate-level books on sustainability topics in many disciplines. A subscription to the journal Agronomy for Sustainable Development would also be beneficial for the proposed program and the College of Agriculture. The current cost of a subscription is $899.00.

13. Facilities, Equipment, and Technology

At this time we are not requesting additional facilities, equipment, or technology

Appendix II. New Courses submitted to CIM

- GES 192 Global Environmental Sustainability Seminar
- GES 201 Systems Thinking in Sustainability
- GES 210 Ways of Knowing Sustainability
- GES 310 Facilitation and Negotiation in Sustainability
- GES 462 Life Cycle Analysis
- GES 475 Implementation of Sustainability