



**SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS**

Revisions to General Education Requirements

Use this form to request any change to the General Education Requirements specified in Policies 2:7 – Baccalaureate General Education Curriculum and 2:26 – Associate Degree General Education Requirements. This includes any changes to the System General Education Requirements, Institutional Graduation Requirements, Globalization/Global Issues Requirement, and Writing Intensive Requirement.

NOTE: This process does not include approval for the development of a new course. If the proposal does include the development of a new course, the new course process must be completed before the course will be considered for inclusion in any set of the General Education Requirements

USD Meghann Jarchow Michael Kruger 9/14/17
Institution Form Initiator Dean’s Approval Signature Date

USD Arts & Sciences Elizabeth M. Freeburg 10/2/2017
Institution Division/Department Institutional Approval Signature Date

Indicate (X) the component of the General Education Curriculum that the proposal impacts.

 X System General Education Requirements

Indicate (X) the revision(s) that is being proposed (more than one may be checked).

 Revision to an approved course

 X Addition of a course to the set of approved courses

 Deletion of an approved course from the set of approved courses

Section 1. Provide a Concise Description of the Proposed Change

To include SUST 103: Sustainable Environment and SUST 103L: Sustainable Environment Lab as an option in meeting System General Education Requirement (SGR) #6 (Natural Sciences).

Section 2. Provide the Effective Date for the Proposed Change

Fall 2018

Section 3. Provide a Detailed Reason for the Proposed Change

USD began an undergraduate major and minor in sustainability in August 2012. Currently there are two core courses for the major: Sustainability and Society (SUST 201) and Sustainability and Science (SUST 203). When we began the sustainability major, we designed SUST 201, which addresses the social science of sustainability, to fulfill SGR #3. We did not design SUST 203 to have an associated laboratory, which meant that it did not fulfill the learning outcomes for SGR #6. Now that we have been offering the course for the past 5 years, it is clear that the course would be improved if it had a laboratory. Additionally, we are doing some revisions to the undergraduate major curriculum, so this is a good time for us to re-evaluate the structure of SUST 203. We are currently proposing a major modification to SUST 203:

- we are renumbering the course from SUST 203 to SUST 103,
- we are renaming the course from Sustainability and Science to Sustainable Environment,
- we are adding a required co-requisite laboratory to the course, and
- we are increasing the number of credits of the course from 3 credits to 4 credits.

After we make these changes to the course (hereafter SUST 103), it will meet all of the learning outcomes for SGR #6. We believe that this course will be a useful and desirable course for many

students. Framing science within the context of societal issues, as would be done in SUST 103, has been found to be more effective in engaging students in science, especially students who are underrepresented in STEM fields.¹ By making SUST 103 a course that fulfills SGR #6, we will be promoting science to a broad audience.

Section 4. Provide Clear Evidence that the Proposed Modification will Address the Specified Goals and Student Learning Outcomes

With the revisions to SUST 103, it will meet all of the student learning outcomes (SLO) for SGR #6.

SLO A: Students will demonstrate the scientific method in a laboratory experience.

Sustainability draws heavily upon the natural sciences, and a sustainability education requires that students have a solid foundation of the natural sciences, especially biology, earth science, and chemistry. SUST 103 will provide students with the natural-science foundations that underlie sustainability through the discussion and laboratory portions of the course. The course will begin with an introduction to sustainability and the scientific method and how science can be used as a tool in sustainability fields. Beyond discussing the scientific method, students will apply the scientific method within the course, especially in the laboratory portions of the course. In the laboratory sessions students will conduct experiments, use data to test predictions, and use modeling tools to evaluate alternative scenarios. For example, the students will learn about the hydrologic cycle, will collect (or retrieve) streamflow data, and will use that data to model the effects of land-use change on the hydrology of a watershed. The students will write laboratory reports where the course instructors will be able to evaluate students' understanding of the scientific method and data collection, analysis, and interpretation.

SLO B: Students will gather and critically evaluate data using the scientific method.

Students will use the scientific method during the discussion and laboratory portions of the course. The students will gather and analyze data that they collect from field trips and analyze data that they obtain from public sources using computer models, such as the EPA National Stormwater Calculator. Students will be assessed on their ability to evaluate data using the scientific method in the laboratory reports, and they will apply that knowledge in the group projects.

SLO C: Students will identify and explain the basic concepts, terminology, and theories of the selected natural sciences.

SUST 103 will focus on earth science and biology. The course will be divided into modules, all of which will identify and explain basic concepts, terminology, and theories of the natural sciences. The modules of SUST 103 will evaluate climate change, energy production and use, hydrologic ecosystem services, and biodiversity and ecosystem function. Student learning of the concepts, terminology, and theories will be assessed through the individual and group quizzes, the group projects, and the laboratory reports.

SLO D: Student will apply selected natural science concepts and theories to contemporary issues.

The earth science and biology concepts addressed in the course will be framed within the context of contemporary issues because we are using sustainability as a framework through which to understand these concepts. Students will take conduct an in-depth evaluation of a scientific topic framed within a contemporary issue through the multi-part research paper assessment.

Section 5. Provide a Copy of all Course Syllabi and Other Supporting Documentation

See below for an example of the course syllabus.

¹ InTeGrate (2017) Why should undergraduate education include a focus on sustainability and earth-centered societal issues? Available online at http://serc.carleton.edu/integrate/why_integrate.html.

Sustainable Environment
SUST 103, Spring 2019
4 credits
University of South Dakota

Instructor

TBD

Course meeting times and location

TBD, but will include discussion (3 hr/week) and laboratory (2 hr/week)

Course prerequisites

None

Course textbook

Possible textbook = *Sustainability Principles and Practice* by Margaret Robertson (ISBN 978-0-415-84018-7)

Additional course materials will be made available through the course Desire to Learn (D2L) site.

Course overview

Science offers a powerful way to learn about the world that can help us discover how the world works. Science is a *method* for understanding the world – not a set body of knowledge – that uses a systematic and logical approach to test and observe components of the physical world. In this course we will examine four, interrelated topics that impact the sustainability of the planet: climate change, energy production and use, hydrologic ecosystem services, and biodiversity and ecosystem function.

Desired learning outcomes

I have five course-specific desired learning outcomes. These learning outcomes span knowledge acquisition to application and integration of that knowledge to learning how to be a more effective learner.

Learning outcomes	Assessments evaluating outcomes
Describe what climate change and ecosystem services are	Quizzes, laboratory reports
Describe the geological, atmospheric, and biological processes that drive and affect climate change, energy production and use, hydrologic ecosystem services, and biodiversity and ecosystem function	Quizzes, laboratory reports
Utilize a systems-thinking approach in assessing scientific topics	Projects
Appraise group/team dynamics and personality styles better	Team-member evaluations
Identify appropriate sources of natural science information	Research paper, laboratory reports

This course also partially fulfills a general education requirement in the natural sciences. There are four desired learning outcomes related to fulfilling this general education requirement.

Learning outcomes	Assessments evaluating outcomes
Demonstrate the scientific method in a laboratory experience	Laboratory reports
Gather and critically evaluate data using the scientific method	Laboratory reports, projects
Identify and explain the basic concepts, terminology, and theories of the selected natural sciences	Quizzes, laboratory reports, projects
Apply selected natural science concepts and theories to contemporary issues	Projects, research paper

Course structure

I will be using a strategy called team-based learning in this course. Team-based learning is centered on small-group learning where students gain foundational knowledge largely outside of class and use in-class time to apply the knowledge in teams. The structure of team-based learning courses is different from more traditional lecture courses. *Some students will find this type of course easier than lecture-based courses, while other students may find team-based learning to be more difficult.*

Because team-based learning emphasizes working in teams, a significant proportion of your grade will be determined by the scores that your team receives and feedback from your team members (see the “Assessments” section below for more information).

Assessments:

You will be assessed using a variety of methods. The tentative assessments and point totals are listed below. More detailed descriptions of the assessment are available on D2L.

Attendance (100% individual; discussion & laboratory)	100 points
Quizzes (50% individual, 50% group; discussion)	90 points
Projects (25% individual, 75% group; discussion)	160 points
Research paper (100% individual; discussion & laboratory)	
Proposal	20 points
Annotated bibliography	20 points
Peer edits	20 points
Research paper presentation	40 points
Final paper	100 points
Team-member evaluations (33% individual, 67% group; discussion)	30 points
Laboratory reports (100% individual; laboratory)	120 points
Extra credit (per approved event) (100% individual)	5 points
TOTAL	700 points

Grades for the course will be assigned using the following scale:

A (100-90%)	D (69-60%)
B (89-80%)	F (59-0%)
C (79-70%)	

No make-ups will be allowed for the individual and group quizzes unless you have made arrangements with me prior to the quizzes. Points will be deducted from other late assignments. Please talk with me about specific incidences for late assignments.

Attendance:

This course is based on group discussion and data collection and analysis. Therefore, your attendance is critical for maximizing your learning experience. If you will be missing a class, please inform me BEFORE the absence. You will be allowed **three absences** in the discussion portion of the course and **one absence** in the laboratory portion of the course. Beyond those absences, *ten points* will be deducted from your attendance grade for each absence (unless additional absences are excused as described by the “Excused Absence Policy” – <http://link.usd.edu/243>).

Diversity and Inclusive Excellence:

The University of South Dakota strives to foster a globally inclusive learning environment where opportunities are provided for diversity to be recognized and respected.

Academic integrity:

The College of Arts and Sciences considers plagiarism, cheating, and other forms of academic dishonesty inimical to the objectives of higher education. The College supports the imposition of penalties on students who engage in academic dishonesty, as defined in the “Conduct” section of the University of South Dakota Student Handbook.

No credit can be given for a dishonest assignment. A student found to have engaged in any form of academic dishonesty may, at the discretion of the instructor, be:

- a. Given a zero for that assignment.
- b. Allowed to rewrite and resubmit the assignment for credit.
- c. Assigned a reduced grade for the course.
- d. Dropped from the course.
- e. Failed in the course.

I will also report the incident to the Office of Student Rights and Responsibilities.

Freedom in learning:

Under Board of Regents and University policy student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Students who believe that an academic evaluation reflects prejudiced or capricious consideration of student opinions or conduct unrelated to academic standards should contact the dean of the college that offers the class to initiate a review of the evaluation.

Disability accommodation:

Any student who feels s/he may need academic accommodations or access accommodations based on the impact of a documented disability should contact and register with Disability Services during the first week of class or as soon as possible after the diagnosis of a disability. Disability Services is the official office to assist students through the process of disability verification and coordination of appropriate and reasonable accommodations. Students currently registered with Disability Services must obtain a new accommodation memo each semester.

Please note: if your home institution is not the University of South Dakota but one of the other South Dakota Board of Regents institutions (e.g., SDSU, SDSMT, BHSU, NSU, DSU), you should work with the disability services coordinator at your home institution.

Ernetta L. Fox, Director
Disability Services, Room 119 Service Center
(605)677-6389
Web Site: www.usd.edu/ds
E-mail: disabilityservices@usd.edu

Course schedule

An up-to-date course schedule will be available on D2L. Discussion class periods are written in black. Laboratory sections are written in blue.

Module	Date	Topic	Before class preparation
	9 Jan	Couse goals & introductions	
	11 Jan	Assign teams & syllabus quizzes	Read syllabus (S19 SUST 103 syllabus)
	12 Jan	Scientific method	
	13 Jan	What is sustainability	What is sustainability (pg. 3-8), A brief history of sustainability (pg. 10-20)
	16 Jan	No class – MLK Jr. Day	
	18 Jan	Measuring sustainability, research paper	Putting sustainability into practice (pg. 59-60), read research paper description
	19 Jan	Sustainability metrics & ecological footprints	
	20 Jan	Science & sustainability	
Climate change	23 Jan	Climate change quizzes	Climate (pg. 73-90), <i>An Inconvenient Sequel</i> (documentary), <i>Extreme Realities</i> (documentary), <i>This Changes Everything</i> (documentary)
	25 Jan	What is a system?	
	26 Jan	Modeling systems (STELLA introduction)	
	27 Jan	Dr. Mark Sweeney guest lecture	
	30 Jan	Picturing complexity	
	1 Feb	Modeling a system	
	2 Feb	Drivers of climate/climate change	
	3 Feb	Feedbacks in a system	
	6 Feb	Ms. Shelie Vacek guest lecture (Research paper)	Research paper proposal due
	8 Feb	Climate systems	
	9 Feb	Modeling South Dakota climate	
	10 Feb	Analyzing complexity	
13 Feb	Adapting to a changing world	Lab report #1 due	
15 Feb	Group project #1		
Energy	16 Feb	Hydroelectric power on the Missouri River	
	17 Feb	Mr. Bob Oehler guest lecture	Project #1 reflection
	20 Feb	No class – Presidents' Day	
	22 Feb	Energy quizzes	Energy (pg. 158-180), <i>Switch</i> (documentary), South Dakota energy (webpage), Powering the Future – Solutions (article)
	23 Feb	Modeling current South Dakota energy use	
	24 Feb	Analyzing energy use & efficiency	

	27 Feb	Renewable energy & distributed generation	Research paper annotated bibliography due
	1 Mar	Carbon stabilization	
	2 Mar	South Dakota renewable energy future	
	3 Mar	Group project #2	Lab report #2 due , formative team-member evaluations due
	6-10 Mar	No class – Spring break	
	13 Mar	Mr. Paul Ellingstad guest lecture	Project #2 reflection
Hydrologic ecosystem services	15 Mar	Ecosystem services quizzes	Water (pg. 94-113), Pollution (pg. 135-157), <i>Living Downstream</i> (documentary), <i>Blue Gold</i> (documentary),
	16 Mar	Vermillion watershed	
	17 Mar	Ecosystem services	
	20 Mar	Mapping ecosystem services	Download Google Earth and National Stormwater Calculator
	22 Mar	Exploring the hydrologic cycle	
	23 Mar	EPA National Stormwater Calculator	
	24 Mar	Understanding perturbations to hydrologic systems	
	27 Mar	Hydrologic impact of land use change	
	29 Mar	Mr. Alan Witmuss guest lecture	
	30 Mar	Modeling land-use change	
	31 Mar	Using an ecosystem services approach to civic engagement	Full draft of research paper due
		3 Apr	Group project #3
	5 Apr	Giving scientific presentations	Project #3 reflection

Biodiversity & Ecosystem Function	6 Apr	Spirit Mound prairie restoration	
	7 Apr	Biodiversity & ecosystem function quizzes	The biosphere (pg. 22-40), Ecosystems and habitat (pg. 114-134), Solutions for a cultivated planet (article), State of the Planet's Wildlife (documentary)
	10 Apr	Sixth extinction	Peer review of research paper due
	12 Apr	Dr. Jake Kerby guest lecture	
	13 Apr	No lab – Easter recess	
	14 Apr	No class – Easter recess	
	17 Apr	Maintaining ecosystem functioning	
	19 Apr	Regional land-use change/agriculture	Final research paper due
	20 Apr	Spirit Mound biodiversity	
	21 Apr	Optimizing versus maximizing, course evaluations	
	24 Apr	Managing tradeoffs	Lab report #4 due
	26 Apr	Project #4	
	27 Apr	Research paper presentations	
	28 Apr	Synthesis	Project #4 reflection, summative team-member evaluations
1 May	Synthesis (Final exam period – 3pm-5pm)		