PART I – Course Information

Course Type
☒ Existing/Restructured
☐ New Course Proposed Fall 2013
If new, have you submitted a Form B to the SHSU Curriculum Committee? ☒ Yes  ☐ No

Course Prefix & Number: BIOL 1401 (1301 + 1101)

Texas Common Course Number (TCCN Matrix): 2306, 2106, 2406

Course Title: Environmental Science

Course Catalog Description (Copy and paste from online catalog for existing courses):

A general course designed to cover all areas relating to contemporary ecological problems. Topics include air, water, and soil pollution; radiation, limnology, climate, pesticides, wastes, and land conservation. This course is designed for non-science majors to help them meet their General Education science requirement. **Note: Fall 2013, 2 courses (BIOL 1301 and BIOL 1101) become 1 course (BIOL 1401).

Course Prerequisites: none

Available Online?
☒ Yes, currently developed in online delivery mode
☐ Anticipated development in online delivery mode (Semester, Year: ____________)
☐ No

Number of Sections to be Offered per Academic Year: 5

Estimated Enrollment per Section: 50

Course Level (freshman, sophomore): freshman

Designated Contact Person (for follow-up communication purposes): Chad W. Hargrave

E-Mail Address: cwhargrave@shsu.edu

Phone: 936-294-1538

Approvals

Department Chair: [Signature]  18 Oct 2012  Date

Academic Dean: [Signature]  10 Nov 2012  Date
PART II – THECB Foundational Component Areas

See Appendix for full description of each component area.

Select Component Area: III. Life and Physical Sciences

In one paragraph, describe how the proposed course will fulfill the core and skill objectives of the component area:

Students in BIOL1401 will learn specific principles and general theories dominating the field of environmental science. Students will apply these general principles and theories to contemporary environmental issues relevant to modern society. Several approaches will be used to meet these core goals. First, students will gain factual knowledge such as definitions and explanations of the current theories and principals in a traditional lecture format and from assigned readings. Second, students will be guided through graphical interpretation of published data and will quantitatively analyze data generated in lab and collected from external sources. These activities will take place during lecture using a small team format and in a laboratory setting. Third, students will combine their knowledge of principles and theories with the quantitative and empirical techniques learned in lecture and lab to critically evaluate specific environmental questions dominating the current media. Students will offer a justified mechanism for the problem based on environmental principles, and will propose a theoretically justified solution to the problem. They will complete these critical thinking activities in small groups and will communicate their analysis of the problem in written format or orally to the class. They will be expected to defend their work against questions from the class.

PART III – Course Objectives & Student Learning Outcomes (SLO)

Insert the applicable course objectives stated as student learning outcomes (e.g., Students completing the course will be able to...) that support the core component area objectives. Please reference the component rubric for additional information on core component area objectives.

Objective/SLO 1: To provide students with biological principles and theories involved in environmental science issues.

How will the objective be addressed (including strategies and techniques)?
This objective will be met using a combination of traditional lecturing & reading. To start the semester, a general overview of "what is environmental science" will be given to provide students with a working vocabulary/knowledge of the general themes of environmental science. The fact that environmental science is an interdisciplinary endeavor (including social, economic, ecological, political, etc.) will be highlighted. Next, a broad overview of the background of general ecology and global ecosystem distribution will be addressed. This information will provide students with the ability to understand how different ecosystems (wetlands vs. grasslands for example) function and how the pressures of environmental science issues can shift how ecosystems function.
Describe how the objective will be assessed:
This objective will be assessed in two ways. First, this objective will be assessed through the use of pre/post tests consisting of multiple choice questions. The faculty will develop and agree upon a set of 20 multiple choice questions which will test students' knowledge of environmental science issues. The pre-test will be administered during the first week of class and the post-test will be administered the week before the final examination. Second, this objective will be assessed using 3 unit exams, 10 pop-quizzes and 1 final exam. These quiz and test grades will be evaluated across all members of the class. An expected average of ~75% and a normal grade distribution will indicate that the class is progressing at an acceptable and expected rate. Specific questions within each quiz or test will be analyzed across the class to identify any weak areas for the class as a whole.

Objective/SLO 2: To provide students with the ability build predictions from real-world observations on general principles and theories of environmental science.

How will the objective be addressed (including strategies and techniques)?
This objective will be met using a combination of lecture, reading, class discussions and laboratory exercises. Students will be provided real-world examples using a case study format. As a group, the class will discuss the theories and principals important for that case study. They will then use this theoretical knowledge to predict how specific actions will ultimately affect ecosystems. This link between foundational knowledge and predictions will be further emphasized in the laboratory setting. For each laboratory experiment, students will use the scientific method and develop a set of specific predictions based on the foundation of theory learned from lecture. They will work in groups to gather and analyze data under the direction of the instructor. The class will then discuss the implications and limitation of their study. They will explore the potential their study has for predicting more complicated real-world problems.

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Objective/SLO 3: To understand the biological, economic, political, civic and or social factors that influence environmental change and shape our response to it.

How will the objective be addressed (including strategies and techniques)?
This topic will be assessed by direct observation and scoring by the instructor. For example, the instructor will create a rubric and score each student's participation in the group activities and final discussion. The goal will be to document growth in environmental literacy for each student. Furthermore, homework assignments, group write-ups and oral presentations will be graded to evaluate class progress on this student learning objective.
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Objective/SLO 4: 

How will the objective be addressed (including strategies and techniques)?

Describe how the objective will be assessed:
Objective/SLO 5:

How will the objective be addressed (including strategies and techniques)?

Describe how the objective will be assessed:

PART IV – THECB Skill Objectives

Address each of the THECB skill objectives required within the component area. Explain how the skill is addressed, including specific strategies to address the skill(s). Address ALL skill objectives associated with the selected Component Area. (See Appendix)

1. Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information

How will the skill be addressed (including specific strategies, activities, and techniques)?
To successfully understand environmental science issues, one must think critically about the topic. Each topic is too dynamic and multidisciplinary to fully understand in a superficial fashion. To achieve this, students will evaluate key steps in the critical thinking process and will investigate, using this approach, contemporary issues/problems facing environmental science. First students will be taught how to gather pertinent information related to an issue. Second, students will identify necessary terms and search for definitions of terms that are not understood. Third, students will identify the information source and evaluate whether the source has an inherent bias. Fourth, the students will outline the methodology used by the source to generate their claim. The student will then evaluate the validity of the data. Fifth, students will independently evaluate the data and draw their own conclusions. They will identify the conclusions/claims made by the source and compare their conclusions to those from the source. Finally, students will identify potential sources of uncertainty, decide whether to tolerate these sources of uncertainty and reexamine their stance and relevance on the issue (the 'big picture').

2. Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication

How will the skill be addressed (including specific strategies, activities, and techniques)?
Written Communication: In both the lecture and laboratory setting, students will have the opportunity to communicate in written format. Short essay quizzes will be given periodically throughout the semester. These quizzes will test a student's understanding of general theory and principles as well as their ability to build upon these concepts within a novel framework. Students will develop this written communication skill through peer review, instructor review, and rewrites.

Visual and Oral Communication: In both the lecture and laboratory setting, students will have the opportunity to communicate in visual and oral format. Periodically throughout the semester, students will be given questions and a corresponding dataset. They will graph the data in a manner that helps them address the question. They will interpret the graphed data to answer
the corresponding question. They will then prepare a short (2-min) oral presentation of their graphed data and corresponding question. This oral presentation will be given to the class. To help develop this skill throughout the semester, the instructor and student peers will provide feedback to the presenter. The presenter will use this feedback in preparing future presentations.

3. **Empirical and Quantitative Skills**: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

How will the skill be addressed (including specific strategies, activities, and techniques)? Theories and principles taught in this course are built upon empirical data. Therefore, students will be expected to understand, analyze and interpret empirically-derived material to evaluate current environmental science issues and possible solutions to them. A combination of exercises in lecture and laboratory will be designed to help students develop in this area. These exercises will begin with a specific question and a dataset designed to address that question. Students will then be given background on the data (e.g., how it was collected, experimental design, etc.). They will then be taught how to graph the data in a manner meaningful to the question. The students will be divided into groups and will discuss the graphs with respect to the original question. After discussions related to the graphical interpretations, students will be led through a statistical analysis of the data. The results from these statistical analyses will then be explained by the instructor and students will reconvene as small groups. In those groups the students will revisit the graphs and the question but now from a quantitative statistical perspective and draw conclusions based on this empirical foundation. They will make a final presentation regarding their conclusion in either written or oral format.

4. **Teamwork**: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

How will the skill be addressed (including specific strategies, activities, and techniques)? Students will work together to solve a specific question or environmental problem. Many of the quantitative analyses will be used for this goal-oriented group work. For these exercises, the class will be broken into small groups of 3 students. These students will work together to graph data, analyze data, draw conclusions and ultimately answer a specific question. The group will work together for a common goal and will prepare a written or oral presentation of their conclusions. In addition to goal-oriented group work, students will explore solutions to less concrete problems. For these exercises, students will be assigned to larger groups of 6. These groups will be given a single environmental issue; however, this issue will have two equally plausible solutions. Each solution will be biased toward a particular special interest (e.g., waste treatment and water purification plants on the same river). The team will be divided into two groups and each group will side with one of the two special interests. The two groups will work together as a team to develop a compromise acceptable to both groups within each team. Detailed notes will be kept by a group secretary, and the group will write out the final agreement while accounting for the compromises each group made to meet the overall goal of solving the problem. Groups will present their problem and solutions to the class and a discussion of the fairness of the compromises will ensue among members of the class.
5. **Personal Responsibility**: to include the ability to connect choices, actions and consequences to ethical decision-making

How will the skill be addressed (including specific strategies, activities, and techniques)?
Not Applicable

6. **Social Responsibility**: to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities

How will the skill be addressed (including specific strategies, activities, and techniques)?
Not Applicable

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**PART V – SHSU Core Curriculum Committee Requirements**

1. Using a 15-week class schedule, identify the topics to be covered during each week of the semester. Provide sufficient detail to allow readers to understand the scope and sequence of topics covered.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Introduction to Environmental Science</td>
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<td>Week 2</td>
<td>The Pace, Scale and Nature of Environmental Change - Why Waiting Won't Work</td>
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<td>Week 3</td>
<td>Introduction to Ecology and Ecosystems</td>
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<td>Week 4</td>
<td>Defining Ecosystem Types and Identifying Ecosystem Goods and Services</td>
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<td>Week 5</td>
<td>Introduction to Climate Change</td>
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<td>Week 6</td>
<td>Global Climate Shifts</td>
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<td>Week 7</td>
<td>Energy: True Costs, Conservation, Renewable Sources and Alternatives</td>
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<td>Week 8</td>
<td>Global Populations and Demographics</td>
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<td>Week 9</td>
<td>Agriculture</td>
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<td>Week 10</td>
<td>Conventional Farming and Sustainable Practices</td>
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<td>Week 11</td>
<td>Sustaining Biodiversity: Species and Ecosystem Approaches</td>
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<td>Week 12</td>
<td>Industrial Ecology</td>
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<td>Week 13</td>
<td>Environmental Toxicology</td>
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<td>Week 14</td>
<td>Sustainability</td>
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<td>Week 15</td>
<td>Green Building and Engineering</td>
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2. **Attachments (Syllabus Required)**

Syllabus Attached? ☒ Yes ☐ No

Other Attached? ☐ Yes ☒ No If yes, specify:
Appendix: THECB Component Area Descriptions and Skill Requirements

I. Communication (Courses in this category focus on developing ideas and expressing them clearly, considering the effect of the message, fostering understanding, and building the skills needed to communicate persuasively. Courses involve the command of oral, aural, written, and visual literacy skills that enable people to exchange messages appropriate to the subject, occasion, and audience.)

II. Mathematics (Courses in this category focus on quantitative literacy in logic, patterns, and relationships. Courses involve the understanding of key mathematical concepts and the application of appropriate quantitative tools to everyday experience.)

III. Life and Physical Sciences (Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.)

IV. Language, Philosophy, and Culture (Courses in this category focus on how ideas, values, beliefs, and other aspects of culture express and affect human experience. Courses involve the exploration of ideas that foster aesthetic and intellectual creation in order to understand the human condition across cultures.)

V. Creative Arts (Courses in this category focus on the appreciation and analysis of creative artifacts and works of the human imagination. Courses involve the synthesis and interpretation of artistic expression and enable critical, creative, and innovative communication about works of art.)

VI. American History (Courses in this category focus on the consideration of past events and ideas relative to the United States, with the option of including Texas History for a portion of this component area. Courses involve the interaction among individuals, communities, states, the nation, and the world, considering how these interactions have contributed to the development of the United States and its global role.)

VII. Government/Political Science (Courses in this category focus on consideration of the Constitution of the United States and the constitutions of the states, with special emphasis on that of Texas. Courses involve the analysis of governmental institutions, political behavior, civic engagement, and their political and philosophical foundations.)

VIII. Social and Behavioral Sciences (Courses in this category focus on the application of empirical and scientific methods that contribute to the understanding of what makes us human. Courses involve the exploration of behavior and interactions among individuals, groups, institutions, and events, examining their impact on the Individual, society, and culture.)

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<tr>
<th>Foundational Component Areas</th>
<th>Skill Objectives</th>
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Communication
Mathematics
Life and Physical Sciences
Language, Philosophy & Culture
Creative Arts
American History
Government/Political Science
Social and Behavioral Sciences

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Submit completed, signed form to Core Curriculum Committee - Box 2478 or Fax 4-1271
INSTRUCTOR: Dr. Jeffrey R. Wozniak  
  email: wozniak@shsu.edu; phone: 936-294-3759 (office)
  • Office Hours (LDB 146): Tues & Thurs 9:30-11:00 and by appointment
  • Please email me to set up meeting times outside of scheduled office hours

TEXT (required):
    - Book will be also offered electronically through the publisher

COURSE DESCRIPTION:
This class will go beyond simply qualifying the interrelationships between human activities and the environment, a
traditional objective of many environmental science courses, and will provide students with a true interdisciplinary
approach to assess, understand, and take action on current and future environmental issues.

Issues in the field of environmental science are constantly changing and the forward thinkers in the field must have
the ability to critically assess new issues/problems from multiple perspectives (including: chemistry, biology,
ecology, earth sciences, physics, economics, social science, sustainability science and political science).

Students will be required to apply their knowledge to examine real world issues/case studies which will span
multiple spatial scales (endangered species to global warming) and will consider both short (current) and long-term
(multi-generational) temporal trends.

A major portion of environmental science is communication your findings, concepts and principles to others. This
course will include a community outreach/group project where groups will be paired with local community
partners to conduct a sustainability/environmental assessment of a local organization, business or facility. These
projects will work to synthesize the environmental science concepts presented in class, with groups presenting a
final report to their community partners highlighting how the community partner can modify their business plan/operations to function in a more environmentally friendly manner. In this course, you will not only learn
knowledge and skills, but also actively use them to make a difference in our community to improve the quality of
life. This experience, it is hoped, will help you see yourself as a positive force in this world and deepen your
understanding of your role as a citizen in our community and a steward of our environment.

Students will analyze environmental science issues with the following method:
1. Assess environmental issue
2. Understand how and why issue is occurring from a scientific point of view
3. Consider broader impacts (socio-economics, politics, sustainability, etc.)
4. Formulate multi-disciplinary opinion on topic (considering all points of view)
5. Communicate well thought out comments on the issue in hopes of driving future positive changes

The overarching goal of this course is that at the end of the semester, students will be empowered to look beyond
the politics and media-driven mindsets surrounding environmental issues and will be able to successfully
communicate the current key scientific and social themes in the field environmental science.

COURSE OBJECTIVES:
(1) Understand fundamental principles and theories behind real world environmental science, and
(2) Consider the economic, political, civic and or social factors that influence environmental change and shape
our response to it.
COURSE POLICY & EXPECTATIONS:
Attendance to class is required due to the volume of material covered each class and the importance of your feedback and discussion in the classroom. I expect each of you to be present and prepared for each and every class. This will involve having critically read the assigned text and completing the written assignments BEFORE EACH CLASS! The success of this class hinges on each of you being prepared and ready to engage in a discussion in each class session. All written assignments will be due at the start of the prescribed class session—NO LATE ASSIGNMENTS WILL BE ACCEPTED! Random pop quizzes will also be given throughout the semester. These quizzes will be given at the start of class and will have a set time limit (determined by length of quiz). Once this time has elapsed, the quizzes will be due and the class lecture/discussion will begin. There will be NO quiz make-ups for tardiness or class absences. There will be no extra credit offered in the course beyond the definition of the acceptable points in this course.

GRADING:
Your grade in this class will be a result of six components:

1. Class Attendance, Preparation & Participation: 100 points
2. Pop Quizzes: 10 @ 10pts each 100 points
3. Homework Assignments: 10 @ 10pts each 100 points
4. Lecture Exams: 3 exams @ 100pts each 300 points
5. In class Group Assignments: 10 @ 10pts each 100 points
6. Final Exam: 100 points

Total Points = 700 points

*Grading scale: A ≥ 90%; B ≥ 80%; C ≥ 70%; D ≥ 60%; F < 60%*

CLASS ASSIGNMENTS SPECIFICS:
*Homework Assignments and worksheets* will be due at the start of the class session. Please see course calendar for assignment due dates and the point break-down for each assignment.

*Several pop quizzes* will be given throughout the semester. These quizzes will occur at the beginning of class, will have a time limit and will not be re-administered—so please show up to class on time!! There will be no more than 10 quizzes.

*There will be 3 lecture exams and 1 final exam* that will be cumulative. Make-up exams will not be given.

*This course will include 10 In-class Group Assignments.* Groups of 3 or 6 students will be created to complete these assignments. There will be two types of in-class group assignments. The first will involve collecting, graphing, analyzing and interpreting empirical data. Students will work together to use these empirical techniques to answer a specific environmental question or lend credence to a debate over an environmental issue. The second type of group assignment will involve discussion, debate and compromise between two opposing environmental viewpoints. A specific topic, question or problem will be given to a group. The group will be divided into two by the instructor and each opposing side will be assigned to a special interest for the environmental issue to be addressed. The group will debate the problem and settle on a compromise that benefits both parties. For both types of group assignments, the groups will present their findings to the class in either written or oral format.

*If you have questions or concerns during the semester, I urge you to contact me immediately so that we can set up a time to meet. A large portion of this class will be discussion based and you participation is critical. If you do not understand a concept or have questions that will preclude you from participating in discussions, it is your responsibility to seek the answers to those questions. Please know that I will be more than happy to meet with you and will do my best to make sure each student understands all the material presented—please know I do need you to tell me if and when you have questions to assure this occurs!*

*Most class assignments, worksheets and other materials will be available on BlackBoard (Bb). PowerPoint lectures will not be posted on Bb.*
CLASSROOM RULES OF CONDUCT: Students are expected to assist in maintaining a classroom environment that is conducive to learning. Students are to treat faculty and students with respect. Students are to turn off all cell phones while in the classroom. Under no circumstances are cell phones or any electronic devices to be used or seen during times of examination. Students may tape record lectures provided they do not disturb other students in the process.

ACADEMIC DISHONESTY:
All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials. For a complete listing of the university policy, see: http://www.shsu.edu/administrative/faculty/sectionb.html#dishonesty

STUDENT ABSENCES ON RELIGIOUS HOLY DAYS POLICY:
Section 51.911(b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. Section 51.911 (a) (2) defines a religious holy day as: “a holy day observed by a religion whose places of worship are exempt from property taxation under Section 11.20...” A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence. University policy 861001 provides the procedures to be followed by the student
and instructor. A student desiring to absent himself/herself from a scheduled class in order to observe (a) religious holy day(s) shall present to each instructor involved a written statement concerning the religious holy day(s). The instructor will complete a form notifying the student of a reasonable timeframe in which the missed assignments and/or examinations are to be completed. For a complete listing of the university policy, see: http://www.shsu.edu/~vaf_www/aps/documents/861001.pdf

STUDENTS WITH DISABILITIES POLICY:
It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the University. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance are expected to visit with the Office of Services for Students with Disabilities located in the Counseling Center. They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired. SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Counseling Center and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Counseling Center. For a complete listing of the University policy, see: http://www.shsu.edu/~vaf_www/aps/811006.html

VISITORS IN THE CLASSROOM:
Only registered students may attend class. Exceptions can be made on a case-by-case basis by the professor. In all cases, visitors must not present a disruption to the class by their attendance. Students wishing to audit a class must apply to do so through the Registrar’s Office.