Proposal for a New Course

NOTE: All gray text boxes must be completed (even if you just put N/A into them), otherwise the committee must consider the form incomplete.

1. Department: Geology and Environmental Geosciences

2. Course Number and Title: GEOL 357 Oceanographic Research - The Transect Program
   Number of Credits: 4   Total hrs/week: 6
   Lecture: ☒  Lab: ☐  Recitation: ☐  Seminar: ☐

For Independent study courses:
   Research: ☐  Field experience: ☐
   Clinical Practice: ☐  Internship: ☐
   Practicum: ☐  Independent Course Work: ☐

3. Semester and year when course will first be offered: Fall 2010

4. Catalog Description (please limit to 50 words):
   This course engages students in actual multidisciplinary research, focused on the southeast continental shelf. Students participate in a 5-day research cruise, then conduct independent and collaborative research in the laboratory. Students present their research results in poster and oral form, and prepare a manuscript for publication in an online journal.

5. Check if appropriate: Humanities: ☐  Social Science: ☐ (meets minimum degree requirements)

6. Check if appropriate: ☒
   This course will be cross listed with: BIOL 357
   Rationale for cross listing: This course is truly multi-disciplinary. Lecture material covers the biological, geological, physical and chemical content related to continental shelf environments, with emphasis made on the biological and geological aspects. The course is co-instructed by a biology professor and a geology professor. The class includes both Geology and Marine Biology majors who work together on collaborative studies. Students share their knowledge with one another throughout the course and study the interdependence of geology and biology in the marine ecosystem being investigated.
   Please attach letters of support from the chairs of each department indicating that the department has discussed the proposal and supports it.

7. a) Could another department or program also be a logical originator of this course (i.e. History of American Education could originate in both the Teacher Education and the History departments)? If yes, what department/program? Please contact

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the department chair/program director and request a note or email that they are aware of the proposed new course and include that note with the proposal.

**Only Biology, but a cross-listed course is being requested (BIOL 357).**

b) Please explain overlap with any existing courses.

This course includes research that relates to content taught in other geology courses, primarily Marine Geology (GEOL 257) and Stratigraphy and Sedimentation (GEOL 272). The proposed course is an extension of the content learned in these courses and students conduct actual, viable and publishable research.

8. Prerequisites (or other restrictions):

Marine Geology lecture and lab (GEOL 257) and permission of the instructor. Students apply for acceptance into the "Transect Program". The entire program includes the 5-day research cruise and the semester-long Oceanographic Research course proposed herein. Because of the limited number of spaces available on board the research vessel (10 to 12 berths for students, of which half are reserved for Geology students), and the rigorous nature of the course, the application process is critical. Highest priority is given to geology majors, with second priority given to geology minors. Students are selected based on their potential success in conducting research and dedicating themselves toward achieving a high level of quality in their work.

9. Rationale/justification for course (consider the following issues):

a) What are the goals and objectives of the course?

We aspire to establish an at-sea oceanographic research and education experience for College of Charleston geology and marine biology students, using collaborative teamwork that promotes hands-on learning and rigorous scientific methodology for conducting viable research.

b) How does the course support the mission statement of the department and the organizing principles of the major?

The Geology Department is committed to providing opportunities for our majors to engage in hands-on, experiential learning in the field. We strongly encourage our majors to devote at least one semester of their undergraduate career to conducting viable research in the laboratory. Our students are also encouraged to present their research at local, state-wide and national professional meetings.

10. a) For courses in the major, how does the course enhance the beginning, middle, or end of the major?

This course is an excellent introduction to publishable research. It is well-suited for the Senior who is considering graduate school or working in a laboratory, and who wants to have experience conducting research.
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However, it is most beneficial to students who are in their Junior year, those who have had one or more upper level geology courses. Truly, students learn oceanography by doing oceanography, and the research is the medium through which they learn. Juniors who have completed the program have another year in which to continue their continental shelf research, or to move into other areas of research. These students have shown great success in acceptances for internships, jobs and graduate schools in the marine sciences.

b) For courses used by non-majors, how does the course support the liberal arts tradition including linkages with other disciplines:

This course is not recommended for non-majors.

11. Method of teaching:

The course is the follow-up component of a 5-day research cruise that is offered in the fall semester. Students meet 6 hours/week and learn basic oceanographic concepts that are relevant to their data collections on the continental shelf. During the first half of the course, approximately 1.0 to 1.5 hours of each 3-hour session (2 sessions/week) are devoted to lecture and discussion, and the remaining time is spent on the students' individual research projects. During the second half of the course, less time per week is devoted to lectures and more time is allotted for the research. Students present their results in the second half of the course, in poster and oral presentation formats to peer audiences. At the end of the semester, students submit a draft manuscript of their research results and interpretations. This manuscript follows the guidelines to the journal “Continental Research.”

12. a) Address potential enrollment pattern shifts in the department or college-wide related to the offering of this course:

Because the course is so selective, is only available to 5 or 6 geology students (depending on the number of berths available on the ship), and it is offered only once during the academic year, it is unlikely to cause pattern shifts anywhere at the College. The co-listing with Biology is likely to cause some Marine Biology majors to either minor or major in Geology (this has occurred during the pilot phase).

b) Address potential shifts in staffing of the department as it relates to the offering of this course:

Although Dr. Sautter will have only 5 to 6 geology students enrolled in the course, there will be 10-12 students total (5 to 6 students from the Biology Dept. will be enrolled). Drs. Sautter and Sancho will co-teach the 6 contact-hour course, while each will receive only 3 contact hours of workload credit.

c) Frequency of offering:
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each fall: □  each spring: ☑
every two years: □  every three years: □
other □ (Explain): n/a

13. Requirements for additional resources made necessary by this course:

a) Staff:
   Two instructors co-instruct the Transect Program (one from Geology
teaches GEOL 357 and one from Biology teaches BIOL 357). Project
Oceanica provides additional staff support for the logistical planning of the
cruise. Students who have previously completed the Transect Program are
asked to assist at sea and as Assistant Scientists and mentors to the new
students. If funds are available, one Assistant Scientist will be hired as a
teaching assistant for the course.

b) Budget:
   Offering this course each spring semester is contingent on acquisition of
ship time during the previous fall semester. Ship time is available for Fall
2009 (Spring 2010 course), and has been tentatively approved for Fall 2010
and 2011 with NOAA funding. Ship time is acquired either through grant
funding or by contributions of days at sea aboard the NOAA Ship Nancy
Foster by the NOAA Coastal Services Center. Lab fees will be required to
support shipboard and laboratory expendable supplies and for poster
printing. Departmental funding for insurance on the borrowed shipboard
equipment (approximately $500/year) may also requested if grant funds are
insufficient.

c) Library:
   none

14. Is this course to be added to the Degree Requirements of a Major, Minor,
Concentration or List of Approved Electives?
   a) □ yes  ☑ no

   b) If yes, complete the Change Degree Requirements form(s) and list the name(s) of
the major, minor, concentration and/or list of approved electives here:

   n/a

15. Paste syllabus, reading lists, or any additional documentation that can help the
committee evaluate this proposal (a syllabus is mandatory).

   see attached

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14. Signature of Department Chair or Program Director: [Signature]

Date: 8/31/08

15. Signature of Dean of School: [Signature]

Date: 1/7/09

16. Signature of Provost: [Signature]

Date: 1/9/2009

17. Signature of Business Affairs Official: not needed

Date: [Signature]

18. Signature of Curriculum Committee Chair: [Signature]

Date: [Signature]

19. Signature of Faculty Senate Secretary: [Signature]

Date Approved by Senate: [Signature]

Completed form should be sent by the Faculty Senate Secretary to the Registrar. After implementation, information concerning the passed course and program changes will be provided by the Registrar to all faculty and staff on campus.

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Instructors
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Dept. of Geology and Environmental Geosciences
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Office: SCIC 334A

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College of Charleston
Department of Biology
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Fax: (843) 953-9199
Email: sanchog@cofc.edu
Office: GRICE 206

Office Hours
Dr. Sautter: Thursdays, 2:00 – 4:00 PM, and, certainly, by appointment.
Dr. Sancho: At my office in the Grice Marine Laboratory by appointment.
There are no excuses for not coming by our offices to discuss any issues related with this course.

Course Description
This is a multidisciplinary course focusing on training undergraduate students in practical and applied oceanographic research. Students conduct multidisciplinary research on the southeast continental shelf during a 5-day data collection cruise which is followed by a semester-long Oceanographic Research course. Together, the cruise and course comprise, the Transect Program (Project Oceanica, Dept. of Geology and Environmental Geosciences, College of Charleston), first piloted for two years (2003-2005) using funds from the National Science Foundation (Sautter and Sancho, Principal Investigators).

Students collect large number of geological, biological, and physical samples at sea aboard a research vessel that sails on transect lines across the continental shelf off Charleston, SC. The Oceanographic Research course follows the cruise and consists of lectures on oceanographic content related to sample material collected, analytic methodologies, sample processing, data processing and presentation techniques. As part of the laboratory section of the course, students process and analyze the data collected during the cruise, identify a specific research area of study to develop a pertinent research question, and carefully analyze and document results. Each student presents his/her results in both a poster and oral presentation format. Students also write a complete manuscript, using guidelines for submission to the online undergraduate marine science research journal, MarSci (edited by University of South Carolina).

Course Objectives
Students will:
• Gain an understanding of the interactions among several biological, physical and geological processes involved in continental shelf oceanography.
- Immerse themselves in oceanographic research: developing hypotheses; designing research methodology; collecting field data and using oceanographic instrumentation/technology; analyzing data; summarizing, documenting and presenting results.
- Develop individual research projects.
- Benefit from all studies conducted in the class by being part of a Collaborative Team.

**Policies and Requirements**
1. This course will be conducted strictly in accordance with the honor system of the College of Charleston (http://www.cofc.edu/studentaffairs/HonorBoard.htm). All work turned in for this course (whether for a paper, exam or quiz) must be your own, and may not have been used, partially or totally, to fulfill requirements for other classes. Any form of plagiarism (intentional and unintentional), cheating, or presenting someone else’s work as one’s own will be treated as a serious academic transgression and will be communicated accordingly by the instructor as an honor code violation to the Division of Student Affairs.

2. Students are expected to attend all meetings of the class (two 3-hour sessions/week), unless you have a legitimate excuse (extreme illness or emergency), which should be approved by the instructor. Attendance will be recorded, but if you miss classes you will have great difficulties passing this course.

3. All students are expected to turn in the papers and assignments by the beginning of the class period on the dates scheduled. Late papers will be marked down one full letter grade for every day of delay (so, you receive an F for an assignment that is 4 days late). You should hold onto copies of all graded assignments until the final grade has been turned in.

**Required Textbook:** No specific text-book will be employed. Primary scientific literature will be provided by the instructors and class participants. Manuscripts from previous Transect Program research will also be assigned.

**Field activities:** *Been there, done that!* (cruise, held in November, 2009)

**Grading:**

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<tr>
<th>Component</th>
<th>Contribution</th>
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<tbody>
<tr>
<td>Monitoring Data Analysis</td>
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<tr>
<td>General Examination</td>
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<td>Independent Project Poster</td>
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<td>Oral Presentation of Research</td>
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<td>Final Manuscript</td>
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<td>Web-Based Science Resource</td>
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**Grading Scale:**

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<tr>
<th>Grade Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>94-100</td>
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<td>90-93.9</td>
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<td>87-89.9</td>
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<td>LECTURE TOPICS</td>
<td>LAB WORK</td>
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<td>General Topics</td>
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<td>Developing Research Questions</td>
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<td>Statistical analyses</td>
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<td>Data presentation techniques</td>
<td>Technology</td>
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<td>Data entering – shipboard data</td>
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<td>Writing a research manuscript</td>
<td>Transect GIS/Database</td>
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<td>Side scan sonar interpretation</td>
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<td>Databases and Metadata</td>
<td>Multibeam sonar interpretation</td>
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<td>GIS in Oceanographic Studies</td>
<td>ROV video analysis</td>
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<td>Acoustic seafloor mapping techniques</td>
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<td>Coastal Ocean Observatories and real-time data</td>
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<td>Other undersea technology (ROVs, AUVs, etc.)</td>
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<tr>
<td><strong>Geology</strong></td>
<td>Geology</td>
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<td>Geology of the SAB continental margin</td>
<td>Sediment grain size analysis</td>
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<td>Lithogenic and biogenic sediments</td>
<td>Point-count technique, sediment i.d.</td>
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<td>Benthic foraminifera as environmental indicators</td>
<td>Benthic foraminifera ident./quantification</td>
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<td>Coastal nutrient/geochemical cycling</td>
<td>Chlorophyll analyses</td>
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<td><strong>Physical</strong></td>
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<tr>
<td>Water column physical properties</td>
<td>CTD analyses</td>
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<td>Phytoplankton identification</td>
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<td>Phytoplankton ecology</td>
<td>Plankton identification/quantification</td>
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<td>Zooplankton ecology</td>
<td>Neuston identification/quantification</td>
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<td>Benthic organism ident./quantification</td>
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<td>Hard-bottom benthic communities</td>
<td>Larval fish identification/quantification</td>
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<tr>
<td>Demersal fish essential habitats</td>
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To: Jim Deavor, Dean  
From: Mitchell Colgan, Chair  
Subject: GEOL 357  
Date: 8/31/09

Dear Dr Deavor

Dr. Leslie Sautter is proposing a new course, “Oceanographic Research” (GEOL 357). Our department has voted to approve the class and I am also in favor of adding this course to our curriculum. The course (co-listed with Dr. Gorka Sancho’s proposed course of the same name, listed as BIOL 357) is part of Dr. Sautter’s NSF and NOAA funded Transect Program. Drs. Sautter and Sancho have piloted the course/program as a special topic and it has proven to be a rigorous, challenging, and highly effective curriculum. Student testimonials and their success in acquiring internships, jobs and graduate opportunities have shown that the Program is of great benefit to our students.

“Oceanographic Research” will be offered each spring semester, provided the ship time is secured through external funding sources.