Term Information

Effective Term	Autumn 2018

General Information

Course Bulletin Listing/Subject Area	Earth Sciences
Fiscal Unit/Academic Org	School of Earth Sciences - D0656
College/Academic Group	Arts and Sciences
Level/Career	Graduate, Undergraduate
Course Number/Catalog	5797.10
Course Title	Study at a Foreign Institution: Antarctica
Transcript Abbreviation	StdyFrgn:Antarctic
Course Description	Two weeks of field studies in Antarctica and Ushuaia, Argentina. This course is a collaborative effort between Ohio State, American Universities International Programs, University of Canterbury, New Zealand, and Gateway Antarctica: Centre for Antarctic Studies and Research.
Semester Credit Hours/Units	Fixed: 3

Offering Information

Length Of Course	14 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Field Experience
Grade Roster Component	Field Experience
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Always
Campus of Offering	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	Concurrent enrollment in Earth Sci 5790.10
Exclusions	Not open to students with credit for ENR 5797.10. Cannot be used to satisfy M.S. or Ph.D. requirements in Earth Sciences. Within the Earth Sciences B.S. degree, this course can only be used in the Earth System Science subprogram to meet the requirements for credits taken outside Earth Sciences. This course cannot be used to meet any other requirements within the Earth Sciences B.S.
Electronically Enforced	Yes

Cross-Listings

Cross-Listings	Cross-listed in ENR

Subject/CIP Code

Subject/CIP Code	40.0601
Subsidy Level	Doctoral Course
Intended Rank	Junior, Senior, Masters, Doctoral

Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Develop an interdisciplinary understanding of the biophysical and human dimensions of life in Antarctica, as well as its history and potential future
- Develop specialized knowledge, through independent study, of the issues in a specific, chosen area of Antarctic inquiry
- Develop, through field study, critical appreciation of issues in exploration, exploitation, conservation, and sustainable tourism in the Antarctic region
- Enhance intellectual maturity and confidence through teamwork, cross-cultural engagement, and self-reflection.

Content Topic List

- Natural history, human history, and ecotourism effects on Ushuaia, Argentina and its surroundings
- Antarctic wildlife
- History of human activities along the Antarctic Peninsula
- Procedures of responsible tourism in Antarctica
- Geology and glaciology of the Antarctic Peninsula
- Conduct of independent research and presentation of its results

Sought Concurrence

No

Attachments

- Earth Sci 5797.10 draft syllabus.docx: syllabus

  (Syllabus. Owner: Krissek,Lawrence Alan)
- Curricular Map, Earth Sci B.S._July 2017.docx: Earth Sci B.S. Curricular Map

  (Other Supporting Documentation. Owner: Krissek,Lawrence Alan)

Comments

- OSU's Antarctic Study Abroad Program was developed by SENR, with an agreement that its 2 courses would be cross-listed with Earth Sciences. In addition, SENR has had difficulty staffing the Antarctic Study Abroad Program, and has agreed to shift its oversight to ASC. That shift is now in-place for AU 2017, although the cross-listing of ENR and Earth Sci courses is not expected until AU 2018. *(by Krissek,Lawrence Alan on 07/29/2017 01:42 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Krissek,Lawrence Alan	07/29/2017 01:43 PM	Submitted for Approval
Approved	Krissek,Lawrence Alan	07/29/2017 01:44 PM	Unit Approval
Approved	Haddad,Deborah Moore	07/29/2017 03:37 PM	College Approval
Pending Approval	Nolen,Dawn Vankeerbergen,Bernadette Chantal Oldroyd,Shelby Quinn Hanlin,Deborah Kay Jenkins,Mary Ellen Bigler	07/29/2017 03:37 PM	ASCCAO Approval

Study Abroad Antarctica: Humans and the Environment

Earth Sciences 5790.01 (cross-listed with ENR 5790.01)
and
Earth Sciences 5797.10 (cross-listed with ENR 5797.10)

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OVERVIEW

Study Abroad Antarctica includes 2 Autumn semester courses:

1) **Earth Sciences/ENR 5790.01 (Antarctica Study Abroad Seminar)** is a 1 credit course, and provides the background needed for the subsequent field experience and accompanying field research module;
and
2) **Earth Sciences/ENR 5797.10 (Study at a Foreign Institution: Antarctica)** is the 3 credit field experience, completed during a two week field excursion to Antarctica via Ushuaia, Argentina, over Winter Break, with completion of the field research module and other assignments by ~10 January.

This program is a collaboration among The College at Brockport, State University of New York (SUNY), Virginia Tech, and The Ohio State University (with the option of other U.S. universities joining the consortium in the future), as well as American Universities International Programs (AUIP), University of Canterbury, New Zealand, and Gateway Antarctica: Centre for Antarctic Studies and Research. Lectures are webcast in real-time from New Zealand on Wednesdays from 6-730pm Eastern Standard Time during Autumn Semester. Students and faculty in Earth Sciences/ENR 5790.01 meet together to view and discuss these lectures, as well as other OSU-specific material. Course assignments are submitted via Carmen and are graded by the participating OSU faculty.

The field course (Earth Sciences/ENR 5797.10) begins with a group overnight flight from Miami, FL on December XX and culminates with an overnight flight landing in Miami early morning on December YY. Group flight and booking instructions are provided after a student has been accepted into the program and enrolled into these courses. Activities during the field course include several days investigating the natural history, human history, and ecotourism effects on Ushuaia and its surroundings, and an 11 day cruise to the Antarctic Peninsula aboard a commercial tourist vessel. During the cruise, students participate in structured learning activities, and collect data for a field-based research module. Students complete the research module after the cruise, with their completed assignments submitted by ~10 January.

Earth Sciences 5797.10
(Study at a Foreign Institution: Antarctica [cross-listed with ENR 5797.10])
3 credit hours

Instructor: XXXXX
Office: YYYYY
E-mail: ZZZZZ
Phone: AAAAA
Office Hours: BBBBB

Course Meeting Time & Location:

This field course begins with a group overnight flight from Miami, FL on December XX and culminates with an overnight flight landing in Miami early morning on December YY. Group flight and booking instructions are provided after a student has been accepted into the program and enrolled into these courses. Activities during the field course include several days investigating the natural history, human history, and ecotourism effects on Ushuaia and its surroundings, and an 11 day cruise to the Antarctic Peninsula aboard a commercial tourist vessel. During the cruise, students participate in structured learning activities, and collect data for a field-based research module. Students complete the research module after the cruise, with their completed assignments submitted by ~10 January.

Format of Instruction:

Instruction in this course combines formal lectures with a significant experiential component. Student reflection about their experiences is motivated by journaling assignments, and requires that the student connect their experiences to information provided during the pre-trip course. Students also collect data, under the supervision of a faculty member, in order to complete a research module.

Course description
Antarctica is a wondrous place- the "coldest, windiest, driest, highest, quietest, most remote, and least understood continent on earth." It has been an object of human speculation for millennia and a prize for explorers, sealers and whalers, scientists, and geostrategists for more than two hundred years. The course examines this unique corner of the world and provides a broad overview of its human and natural history. Special attention is given to Antarctica's physical and ecological systems as well as human activity in the region, sustainable tourism, and use of polar resources. During the two-week Antarctic excursion via Ushuaia, Argentina, students work on a group field study project (with ship-board presentation and post-trip group paper submission), and submit journal entries (during the trip) and a post-trip synthesis essay and a media outreach assignment.

Course objectives-
Students will:
1. Develop, through lectures and assigned readings, an interdisciplinary understanding of the

biophysical and human dimensions of life in Antarctica, as well as its history and potential future.
2. Develop specialized knowledge, through independent study, of the issues in a specific, chosen area of Antarctic inquiry (e.g., history of science/exploration, environmental ethics, geology and global climate change, marine bird or southern forest conservation, etc.).
3. Develop, through field study, critical appreciation of issues in exploration, exploitation, conservation, and sustainable tourism in the Antarctic region.
4. Enhance intellectual maturity and confidence through teamwork, cross-cultural engagement, and self-reflection.

Texts and Required Materials
All readings and materials required for this course will be made available on the course Carmen webpage. See the list of assignments for readings and other materials.

NOTE: Internet access is not available during the cruise, so all students should both: 1) print a copy of required readings and other materials, and 2) download an electronic copy of required readings and other materials before leaving the U.S. If you do not take these materials with you, they will be very difficult-to-impossible to access during the cruise.

Assignments and Exams
1. Field research module (45% of your final grade)
Students choose one of several field research modules, depending on their area of interest. These in-depth group projects are based on field observations in Antarctica and Ushuaia. Module descriptions, readings, and support materials are posted in Carmen. The field course readings, course instructors, and ship-board field staff are resources to help you complete the modules- but not to provide you with the answers.

- Final group module/research project paper submitted via the Carmen *field module dropbox* using filename *"Student group name field module paper"* is due **January XX, 2018**.

2. Student field journal and course synthesis paper (45% of your final grade)
One of the objectives of this course is to enhance intellectual maturity and confidence through team work, cross-cultural interaction, and self-reflection. The field journal assignment includes directed reflection on the course as well as student experiences, observations, and interactions with the Antarctic environment and other ship passengers. Students submit their journal entries for review during the excursion to course instructors, and they use these entries to produce a post-trip 4-6 page course synthesis paper.

- Synthesis paper submitted via the Carmen *synthesis paper dropbox* using filename *"student lastname synthesis paper"* is due **January XX, 2018**.

3. Retrospective Media Outreach project (10% of your final grade)
Produce a media story (e.g., newspaper article, blog, video, public presentation, poster) or an educational outreach activity (~500 words) that describes how you benefited from the course, raises awareness of this study abroad course, or educates others about Antarctica. It must include details on <u>BOTH</u> your academic and personal experience related to both the pre-trip and field course components. The final product should (a) sufficiently professional so you could submit it to your

college newspaper or study abroad office and (b) explain how you plan on using your project for outreach.

- Retrospective Media Outreach project submitted via the Carmen *media paper dropbox* using filename *"student lastname media paper"* is due **January XX, 2018**.

Grading Scale

The anticipated grading scale is as follows:

90 – 100 %	A or A-
80 – 89 %	B-, B, or B+
70 – 79%	C-, C, or C+
60 – 69%	D or D+
<60%	E

The instructor reserves the right to adjust these grade boundaries down, and to set the boundaries for specific grades (e.g., A vs. A-) within these general grade ranges, as appropriate to align with student performance and the distribution of student grades.

Feel free to contact the instructor during the field experience with any questions about your estimated grade.

Field Course Attendance: Punctual attendance and active engagement are required for all scheduled, program–related activities (e.g. group meetings, field excursions, lectures and student presentations) unless student receives course instructor approval- students will lose 10% of their final grade for chronic lateness or for each day or part-day they fail to participate. Participation in voluntary field activities is at the discretion of the student (with consultation of course instructors). **Please note**, students must not leave the group without consent of faculty leaders.

Course Schedule/Itinerary:

Day 1 – individual travel to Miami; group flight departs Miami in evening

Day 2 – arrive Buenos Aires; transfer to domestic flight to Ushuaia. Arrive in Ushuaia; transfer to hotel. Orientation lecture (2 hours; formalized instruction); walking tour through downtown Ushuaia (2 hours; required structured educational experience); group dinner.

Day 3 – lecture by local university faculty on natural history and human history of Ushuaia area (3 hours; formalized instruction). Guided visit to historical farm and fishing operation (4 hours; required structured educational experience).

Day 4 – lecture by local university faculty on ecotourism and its effects on Ushuaia (3 hours; formalized instruction). Organizational meetings for field research modules (2 hours; formalized instruction). Board ship. Required safety briefing and abandon ship drill (1 hour; formalized instruction). Vessel leaves Ushuaia.

Day 5 – crossing the Drake Passage. Required safety briefings, IAATO protocol briefings, and

science lectures (4 hours; required structured educational experience).

Day 6 – crossing the Drake Passage. Required safety briefings, IAATO protocol briefings, and science lectures (4 hours; required structured educational experience). Students begin collecting data for field research modules (1 hour; required structured educational experience). Group meeting (1 hour; formalized instruction).

Day 7 – excursions from vessel (to shore or in Zodiacs; 6 hours, required structured educational experience). Students continue collecting data for field research modules (1 hour; required structured educational experience). Group meeting (1 hour; formalized instruction).

Day 8 -- excursions from vessel (to shore or in Zodiacs; 6 hours, required structured educational experience). Students continue collecting data for field research modules (1 hour; required structured educational experience). Group meeting (1 hour; formalized instruction).

Day 9 -- excursions from vessel (to shore or in Zodiacs; 6 hours, required structured educational experience). Students continue collecting data for field research modules (1 hour; required structured educational experience). Group meeting (1 hour; formalized instruction).

Day 10 -- excursions from vessel (to shore or in Zodiacs; 6 hours, required structured educational experience). Students continue collecting data for field research modules (1 hour; required structured educational experience). Group meeting (1 hour; formalized instruction).

Day 11 -- excursions from vessel (to shore or in Zodiacs; 6 hours, required structured educational experience). Students continue collecting data for field research modules (1 hour; required structured educational experience). Group meeting (1 hour; formalized instruction).

Day 12 -- excursions from vessel (to shore or in Zodiacs; 6 hours, required structured educational experience). Students continue collecting data for field research modules (1 hour; required structured educational experience). Group meeting (1 hour; formalized instruction).

Day 13 -- crossing the Drake Passage. Required science lectures (4 hours; required structured educational experience). Students complete collecting data for field research modules (1 hour; required structured educational experience). Group meeting (2 hours; formalized instruction).

Day 14 -- crossing the Drake Passage. Required science lectures (4 hours; required structured educational experience). Students complete collecting data for field research modules (1 hour; required structured educational experience). Group meeting, including group presentations (2 hours; formalized instruction).

Day 15 – arrive Ushuaia; transfer to hotel. Group meetings (2 hours; formalized instruction) and work on research module reports (4 hours; required structured educational experience). Group dinner.

Day 16 – depart Ushuaia for Buenos Aires; depart Buenos Aires for Miami on group flight.

Day 17 – arrive Miami on group flight. Individual travel home.

Day	Formalized Instruction (hrs)	Required Educational Experience (hrs)
1	0	0
2	2	2
3	3	4
4	6	0
5	4	0
6	5	1
7	1	7
8	1	7
9	1	7
10	1	7
11	1	7
12	1	7
13	2	5
14	2	5
15	2	4
16	0	0
Total	32	63
Credit Hour Justification	32/12.5 = 2.5 credit hours	63/25 = 2.5 credit hours

Academic Misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.

Disability Services

Students with disabilities (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614- 292-3307, slds@osu.edu; slds.osu.edu.

Sexual Misconduct/Relationship Violence Statement
Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at http://titleix.osu.edu or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu

Diversity Statement
The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

CURRICULAR MAP OF COURSES AVAILABLE IN EARTH SCIENCES B.S.
Revised July 2017 to include Earth Sci 4798 & proposed Earth Sci 5790.10 and 5797.10

	Course Number	Course Title	Read/ evaluate Earth Sci literature	Present Earth Sci info	Apply Earth Sci data	Apply appropriate techniques/ methods	Identify Earth Sci problems, develop solutions	Apply other sciences
Preparation for the Major								
Earth Sciences	1121	The Dynamic Earth	B	B	B	B	B	B
Earth Sciences	1122	Earth through Time	B	B	B	B	B	B
Earth Sciences	2245	Introductory Data Analysis for Earth and Environmental Sciences		B	B	B	B	B
Major Program								
Earth Sciences	4194	Group Studies	I	I	I	I	I	I
Earth Sciences	4194H	Honors Group Studies	I	I	I	I	I	I
Earth Sciences	4310	Remote Sensing in the Earth Sciences	I	I	I	I	I	I
Earth Sciences	4421	Earth Materials	I	I	I	I	I	I

	Course Number	Course Title	Read/ evaluate Earth Sci literature	Present Earth Sci info	Apply Earth Sci data	Apply appropriate techniques/ methods	Identify Earth Sci problems, develop solutions	Apply other sciences
Earth Sciences	4423	Introductory Petrology	I	I	I	I	I	I
Earth Sciences	4425	Energy Resources and Sustainability	I	I	I	I	I	I
Earth Sciences	4450	Water, Ice, and Energy in the Earth System	I	I	I	I	I	I
Earth Sciences	4501	Paleontology	I	I	I	I	I	I
Earth Sciences	4502	Stratigraphy and Sedimentation	I	I	I	I	I	I
Earth Sciences	4530	Structural Geology	I	I	I	I	I	I
Earth Sciences	4560	Applied Geophysics	I	I	I	I	I	I
Earth Sciences	4798	Environmental Sustainability in Costa Rica				I	I	I
			Can only be used in the Earth System Science track of the B.S.					
Earth Sciences	4880	Seminar in Geophysics	I	I	I	I	I	I
Earth Sciences	4998	Undergraduate Research in Earth Sciences	I - A	I - A	I - A	I - A	I - A	I - A

	Course Number	Course Title	Read/ evaluate Earth Sci literature	Present Earth Sci info	Apply Earth Sci data	Apply appropriate techniques/ methods	Identify Earth Sci problems, develop solutions	Apply other sciences
Earth Sciences	4998H	Honors Undergraduate Research in Earth Sciences	A	A	A	A	A	A
Earth Sciences	4999.01	Undergraduate Thesis in Earth Sciences	A	A	A	A	A	A
Earth Sciences	4999.01 H	Honors Undergraduate Thesis in Earth Sciences	A	A	A	A	A	A
Earth Sciences	4999.02	Undergraduate Research for Thesis in Earth Sciences	I - A	I - A	I - A	I - A	I - A	I - A
Earth Sciences	4999.02 H	Honors Undergraduate Research for Thesis in Earth Sciences	I - A	I - A	I - A	I - A	I - A	I - A
Earth Sciences	5160	Geomicro biology	I – A	I – A	I – A	I – A	I – A	I - A
Earth Sciences	5189.01	Field Geology I	I - A	I - A	I - A	I - A	I - A	I - A
Earth Sciences	5189.02	Field Geology II	I - A	I - A	I - A	I - A	I - A	I - A
Earth Sciences	5191	Internship in the Earth Sciences	I - A	I - A	I - A	I - A	I - A	I - A

	Course Number	Course Title	Read/ evaluate Earth Sci literature	Present Earth Sci info	Apply Earth Sci data	Apply appropriate techniques/ methods	Identify Earth Sci problems, develop solutions	Apply other sciences
Earth Sciences	5194	Group Studies	I - A	I - A	I - A	I - A	I - A	I - A
Earth Sciences	5203	Geo-environment and Human Health	A	A	A	A	A	A
Earth Sciences	5206	Advanced Oceanography	A	A	A	A	A	A
Earth Sciences	5550	Geomorphology	I-A	I-A	I-A	I-A	I-A	I-A
Earth Sciences	5600	Siliciclastic Depositional Systems	A	A	A	A	A	A
Earth Sciences	5601.01	Sedimentary Petrology: Sandstones	A	A	A	A	A	A
Earth Sciences	5601.02	Sedimentary Petrology: Carbonate Rocks and Shales	A	A	A	A	A	A
Earth Sciences	5602.01	Carbonate Depositional Systems I	A	A	A	A	A	A
Earth Sciences	5602.02	Carbonate Depositional Systems II	A	A	A	A	A	A
Earth Sciences	5603	Stratigraphy	A	A	A	A	A	A
Earth Sciences	5604	Sequence Stratigraphy	A	A	A	A	A	A

	Course Number	Course Title	Read/ evaluate Earth Sci literature	Present Earth Sci info	Apply Earth Sci data	Apply appropriate techniques/ methods	Identify Earth Sci problems, develop solutions	Apply other sciences
Earth Sciences	5605	Paleoceano graphy	A	A	A	A	A	A
Earth Sciences	5613	Micropaleon tology	A	A	A	A	A	A
Earth Sciences	5614	Paleobiology	A	A	A	A	A	A
Earth Sciences	5615	Paleoecology	A	A	A	A	A	A
Earth Sciences	5617	Petrology of Earth and Planets	A	A	A	A	A	A
Earth Sciences	5618	Advanced Historical Geology	A	A	A	A	A	A
Earth Sciences	5621	Introduction to Geochemistry	A	A	A	A	A	A
Earth Sciences	5622	Stable Isotope Biogeo chemistry	A	A	A	A	A	A
Earth Sciences	5625	Igneous Petrology	A	A	A	A	A	A
Earth Sciences	5627	Global Biogeochemical Cycles	A	A	A	A	A	A
Earth Sciences	5628	Environmental Isotope Geochemistry	A	A	A	A	A	A

	Course Number	Course Title	Read/ evaluate Earth Sci literature	Present Earth Sci info	Apply Earth Sci data	Apply appropriate techniques/ methods	Identify Earth Sci problems, develop solutions	Apply other sciences
Earth Sciences	5629	Principles of Petrology	A	A	A	A	A	A
Earth Sciences	5636	Advanced Topics in Mineralogy and Crystallography	A	A	A	A	A	A
Earth Sciences	5641	Geostatistics	A	A	A	A	A	A
Earth Sciences	5642	Geomathe matical Analysis	A	A	A	A	A	A
Earth Sciences	5644	Tectonic Evolution of Continents	A	A	A	A	A	A
Earth Sciences	5645	Advanced Structural Geology	A	A	A	A	A	A
Earth Sciences	5646	Geodynamics	A	A	A	A	A	A
Earth Sciences	5650	Glaciology	A	A	A	A	A	A
Earth Sciences	5651	Hydrogeology	A	A	A	A	A	A
Earth Sciences	5655	Land Surface Hydrology	A	A	A	A	A	A
Earth Sciences	5660	Geology of Metallic Deposits	A	A	A	A	A	A

	Course Number	Course Title	Read/ evaluate Earth Sci literature	Present Earth Sci info	Apply Earth Sci data	Apply appropriate techniques/ methods	Identify Earth Sci problems, develop solutions	Apply other sciences
Earth Sciences	5661	Petroleum Geology	A	A	A	A	A	A
Earth Sciences	5663	Global Change and Sustainability in the Earth System	A	A	A	A	A	A
Earth Sciences	5670	General and Economic Geology of Selected Areas	A	A	A	A	A	A
Earth Sciences	5676	Elemental Chemical Analysis using Inductively Coupled Plasma Optical Emission and Mass Spectrometry	A	A	A	A	A	A
Earth Sciences	5680	Deep Earth Geophysics	A	A	A	A	A	A
Earth Sciences	5687	Borehole Geophysics	A	A	A	A	A	A
Earth Sciences	5703	Principles of Biostratigraphy	A	A	A	A	A	A
Earth Sciences	5713	Taxonomy and Phylogeny in the Fossil Record	A	A	A	A	A	A

	Course Number	Course Title	Read/ evaluate Earth Sci literature	Present Earth Sci info	Apply Earth Sci data	Apply appropriate techniques/ methods	Identify Earth Sci problems, develop solutions	Apply other sciences
Earth Sciences	5714	Biometry	A	A	A	A	A	A
Earth Sciences	5717	Critical Issues in World Freshwater Resources	A	A	A	A	A	A
Earth Sciences	5718	Aquatic Geochemistry	A	A	A	A	A	A
Earth Sciences	5719	Environmental Organic Geochemistry	A	A	A	A	A	A
Earth Sciences	5746	Seminar in Rheological Properties of Solids	A	A	A	A	A	A
Earth Sciences	5751	Quantitative Reservoir Modeling	A	A	A	A	A	A
Earth Sciences	5752	Contaminants in Aqueous Systems	A	A	A	A	A	A
Earth Sciences	5754	Risk Assessment and Management in Earth Systems	A	A	A	A	A	A
Earth Sciences	5779	Seminar in Physical Properties of Minerals and Rocks	A	A	A	A	A	A
Earth Sciences	5780	Reflection Seismology	A	A	A	A	A	A

	Course Number	Course Title	Read/ evaluate Earth Sci literature	Present Earth Sci info	Apply Earth Sci data	Apply appropriate techniques/ methods	Identify Earth Sci problems, develop solutions	Apply other sciences
Earth Sciences	5781	Gravity Exploration	A	A	A	A	A	A
Earth Sciences	5782	Magnetic Exploration	A	A	A	A	A	A
Earth Sciences	5790.10	Antarctica Study Abroad Seminar	I		I	I	I	I
			Can only be used in the Earth System Science track of the B.S.					
Earth Sciences	5797.10	Study at a Foreign Institution: Antarctica	I	I	I	A	I	A
			Can only be used in the Earth System Science track of the B.S.					
Geod Sci	5781	Geodesy and Geodynamics	A	A	A	A	A	A

	Course Number	Course Title	Read/ evaluate Earth Sci literature	Present Earth Sci info	Apply Earth Sci data	Apply appropriate techniques/ methods
Electives from other departments (Geog, AtmosSC, EEOB, ENR, Chem, Math, etc.)						I-A

Program Learning Goals:

A) Students critically read and evaluate Earth Science literature

B) Students present Earth Science information in a clear and logical manner, both orally and in writing.

C) Students apply knowledge of Earth Science data to understand the dynamic physical, chemical, and biological processes of the Earth and its history.

D) Students apply knowledge of appropriate techniques, field methods, field mapping, and numerical methods to measure, portray, analyze, and interpret Earth Science data in specific subdisciplines.

E) Students identify Earth Science problems and develop solutions.

F) Students apply knowledge of modern applications from chemistry, physics, biology, mathematics, statistics, and computing to the solution of Earth Science problems.

Key: B = Beginning level; I = Intermediate level; A = Advanced level