**Scientific Secrets of Crystals and Gems,**

**FYS161**

Block 1, 2018

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**Office hours**: By appointment or whenever you catch me in my office.

**Textbooks**: There is no official textbook for this course; however, students should purchase a hand lens of their own, available at the bookstore (ask at the counter).

**Course meeting times**:M–F 9:00–11:00 am and 1:00–3:00 pm as listed on the syllabus. \*Note especially the all-day field trips Tuesday, September 4th and Wednesday, September 12th. There may be additional half-day field trips not yet scheduled.

**Course** **description**:

The beauty and rarity of crystals and gemstones have lead them to be coveted and controlled by the wealthy, powerful, and famous. However, their true value for scientists lies in the secrets they hold about the history of the Earth. Diamonds, for example, form more than 100 miles underground and are carried to the surface by superfast volcanic eruptions. Rubies are created by the same massive tectonic collisions that lift up mountain ranges. Emeralds, tourmalines, and amethyst grow as a result of magma cooling under volcanoes. These different origins imbue each gemstone with unique physical and chemical characteristics, including their dazzling array of colors and crystal shapes.

In this hands-on course, we will study a variety of precious and semi-precious gemstones to better understand the scientific links between chemical composition and physical properties (like color, hardness, or crystal shape) and between plate tectonic settings and particular gems. We will explore the department’s impressive mineral collection; observe minerals under the microscope; grow and examine our own crystals; collect semi-precious gemstones in the field; and visit the Chicago Field Museum for a behind-the-scenes look at their amazing gemstone collection.

**Student success component:**

The student success component of your FYS extends beyond the first block, to encompass activities and reflection assignments throughout Blocks 1, 2, and 3. Block 1 focuses on time management with an emphasis on helping you manage your academic responsibilities, campus involvement, and personal wellbeing. Block 2 emphasizes civil discourse and intercultural literacy. Block 3 focuses on academic planning and future opportunities.

Student success assignments will comprise 20% of your final FYS grade. These assignments will be evaluated by your FYS success instructor. You and your academic advisor will be informed of your preliminary in-progress grade at the end of Block 1 (which will not include student success assignments), and you will receive your final comprehensive grade at the end of Block 3.

**Course objectives**:

As a First-Year Seminar, this course serves the dual purpose of (i) introducing you to an academic discipline (geology) within the context of the liberal arts and (ii) introducing you to the academic life of Cornell College. You will be expected to master the academic vocabulary as well as the geological concepts and processes; however the goals of the course are broader than this content alone. *Note that this course supports the Educational Priorities and Outcomes of Cornell College with emphases on knowledge, inquiry, reasoning, and communication.*

By the end of the course:

* Students will be able to think intentionally about their academic choices, including their course of study, their attitude toward learning, and the tools and skills they wish to develop to improve their learning.
* Students will be aware of the resources available to them that will help them construct a successful future at Cornell.
* Students will reflect upon their approach to time management and personal wellbeing.
* Students will be able to articulate the connections between a mineral’s properties (both physical and optical) and its chemical composition and crystal structure. [*knowledge*]
* Students will gain hands-on experience with major geological equipment, and will be able to explain how the different instruments can be used to evaluate gemstones. [*knowledge*]
* Students will practice doing science and talking about their science. [*inquiry, reasoning, communication*]
* Students will be able to use their knowledge about mineral formation and mineral chemistry to begin to interpret the geologic history of a given gemstone. [*knowledge, inquiry, reasoning*]
* Students will develop critical thinking and writing skills that demonstrate an ability to understand and analyze geological information and effectively communicate it to a general audience, as well as to their classmates. [*knowledge, inquiry, reasoning, communication*]

**Course information:**

*Responsibility*:

As students at a liberal arts college, you are responsible for your own engagement in the academic conversation. This means being a prepared, active, and respectful participant. This includes reading the syllabus and all the assigned material, but more importantly, this means thinking critically, asking questions, coming to class having formulated your own ideas and responses to the course material, and engaging in dialogue with others. If you do not understand a topic of discussion, an assignment, a grade, or if you have any other questions or concerns, please come and talk with me.

*Technology Policy*

There may be certain times during class that it would be helpful to use a laptop, tablet, or smart phone. I expect you to use these devices only for class related purposes. If I believe that you are misusing technology, I will issue you a warning—after that I may ask you to leave class and other repercussions may follow.

*Late Work*:

I will **not** accept late assignments for a grade, but I will look at them for you to make sure you’re on the right track. Missed reading questions or quizzes may not be made up without prior approval or evidence of a serious emergency. If you need an extension, please see me before the assignment deadline.

*Course Accommodations:*

College Policy regarding students with disabilities: Students who need accommodations for learning disabilities must provide documentation from a professional qualified to diagnose learning disabilities. Students requesting services should schedule a meeting with the disabilities services coordinator as early as possible to discuss their needs and develop an individualized accommodation plan. Ideally, this meeting would take place well before the start of classes. The student must notify the instructor of a new course of any accommodations needed within the first three days of the term. Additional information is available at: <http://cornellcollege.edu/academic_affairs/disabilities/>.

*Academic Honesty:*

College Policy: Cornell College expects all members of the Cornell community to act with academic integrity. An important aspect of academic integrity is respecting the work of others. A student is expected to explicitly acknowledge ideas, claims, observations, or data of others, unless generally known. When a piece of work is submitted for credit, a student is asserting that the submission is their work unless the citation of another specific source is included. If there is no appropriate acknowledgement of sources, whether intended or not, this may constitute a violation of the College’s requirement for honesty in academic work and may be treated as a case of academic dishonesty. The procedures regarding how the College deals with cases of academic dishonesty appear in The Compass, our student handbook, under the heading “Academic Policies – Honesty in Academic Work.”

Cheating, plagiarism, and other forms of academic dishonesty will not be tolerated. Any student in this course who is involved in academic dishonesty (portraying another person’s work or ideas as their own, submitting the same or similar papers in more than one course without permission from the course instructors, facilitating plagiarism, etc.) will not earn credit for the relevant assignments, may be formally charged with academic dishonesty, and may receive an F in the course.

*15-Day Drop*:

To drop on the 15th day, you may have no more than 2 *excused* absences; you must have completed all your work, and you must have participated in class. I reserve the right to decide which excuses are valid and to determine whether you have been participating actively in class.

*Additional Resources Available to You*:

To get the most out of this course, I recommend you use all the resources available to you. This includes me, Science Librarian Amy Gullen, Quantitative Reasoning Consultant Jessica Johannigmeier, Writing Consultant Jennifer Ferrell, and the Academic Technologist Richard Berg. The library has a fairly well-rounded assortment of geological books and journals, and what cannot be found there can be found online through the library’s electronic resources website. Please ask for assistance!

**Graded Work**:

You will complete several different types of assignments in this course, including low-stakes writing assignments, various formal writing assignments, different types of reading (textbook, popular articles, scientific articles), hands-on labs, quizzes and exams, in-class presentations and class discussion, and a block-long story map research project and oral presentation. Assignments will generally be turned in on Moodle; assignments turned in on Moodle will receive comments through Moodle.

*Grading*:

I use the following general scale but reserve the right to use my discretion and your class attendance/participation record.

A 100–95; A- 94–90; B+ 89–85; B 84–80; B- 79–75; C+ 74–70; C 69­­–65; C- 64–60; D 59–55; D- 54–50; F <50

5% Low-stakes writing & participation 20% Labs & assignments 50% Story map project

5% Daily content quizzes 20% Final exam

*Low-stakes Writing Assignments:*

Low-stakes writing assignments, such as write-to-learn assignments, in-class free-writes, or reading responses, are generally short assignments in which you write as a means of organizing your own thoughts on a subject. These assignments are meant to help you understand your knowledge of a topic, as well as your questions and your perspective on that topic. The purpose of these assignments is to get you to think more deeply about a topic and how it affects you; they also help me understand your mastery of a topic. These low-stakes assignments count as part of your participation in the course and will not be graded.

*Content quizzes and exam*:

You will have daily or semi-daily content quizzes at the start of morning class to encourage you to study regularly throughout the block. In general, these quizzes will mirror exam questions and will consist of short-answer questions. A final, cumulative exam for the course will take place on the final Monday of the block.

*Assignments and Labs*:

Any subject is easier to learn when you have lots of practice. Therefore, I will try to give you sufficient assignments to help you practice (and truly learn) the material. We will read a variety of different texts for a variety of different purposes, and we will include a variety of hands-on activities during class. You are free to work with others on the laboratory assignments, but it is important that you understand the material and application of that material, as lab assignments may be used to create questions for exams and quizzes.

*Story Map Project and Presentation*:

You will (in pairs) work on a block-long story map project, researching one particular gemstone and essentially curating an online exhibit for that gemstone. This project is staged throughout the block to provide plenty of opportunity for questions, time for research, and time for essential revision. In essence, this project serves as a total course review, allowing you to pull together all the concepts and techniques you learned throughout the course. Each pair will present their story map formally to the class on the final Wednesday of the block. See additional information on Moodle.

*Evaluation of Student Success Assignments:*

**ALL** of the following criteria must be met for each assignment in order to earn full credit (4 points):

* Attendance at associated meetings and activities
* Thorough and in-depth reflection on all but one question. All questions must be addressed at more than a minimal level.
* The quality of writing does not limit understanding of the reflection.
* Answers are complete sentences and make sense without reading the question.

If any **ONE** of the following criteria is met, then the assignment earns minimal credit (1 point).

* Inattentive or disruptive attendance (being late, not paying attention or not listening to others, talking to neighbors, sleeping, texting, rude comments, etc.).
* One or more of the responses does not or only minimally addresses the question.
* The quality of writing limits the reader’s ability to understand the reflection.
* Answers are not complete sentences or do not make sense without reading the question first.

Assignments falling in between these criteria will earn partial credit (2 points)

Failing to attend or failing to submit a reflection results in no credit (0 points).

See Assignment Rubrics for more details.

Without either prior approval or evidence of a serious emergency: late student success assignments will not be accepted. If an extension is needed, please consult with your FYS success instructor prior to the assignment deadline.

*Options for Revising Student Success Assignments:*

Student may revise up to 3 assignments for which they did not receive full credit. Assignments from Block 3 are not eligible for revision.

For each revised assignment, the following must be completed:

* Students must have attended the relevant activities, participated appropriately, and submitted an initial assignment on time (or if given an extension, by the agreed upon deadline).
* Students must either work with a writing consultant or attend a writing studio workshop on revising their reflection.
* Students must review the rubric and comments provided by the FYS success instructor, make the relevant changes, and submit both a revised reflection and an overview of the revision indicating in bullet points how they addressed each of the concerns raised in the rubric and comments.
* Revisions must be submitted via Moodle within one week of the return of the assignment.

**Course schedule**:

Please see the separate document entitled “Course Schedule” on Moodle. It is a tentative course schedule at this point—I will most likely change the order of, add or cull subject material depending on course progress and additional scheduling of field trip opportunities. Please come see me if you have questions or concerns!