Graduation Composition and Communication Requirement (GCCR)
GCCR PROPOSAL AND CHANGE UNDERGRADUATE PROGRAM FORM

I. General Information:

College:	A&S	Department (Full name):	Earth and Environmental Science
Major Name (full name please):	Geological Sciences	Degree Title:	B.A. and B.S.
Formal Option(s), if any:	———	Specialty Field w/in Formal Options, if any:	———
Requested Effective Date:	FALL 2014, ***IF*** RECEIVED BY SENATE COUNCIL BY MONDAY, APRIL 7.		
Contact Person:	David Moecher, Chair	Phone: 7-6939	Email: moker@uky.edu

II. Parameters of the Graduation Composition and Communication Requirement (GCCR):

The new GCCR replaces the old Graduation Writing Requirement. It is fulfilled by a course or courses specified within a B.A./B.S. degree program. As outlined in draft Senate Rule 5.4.3.1, the GCCR stipulates that students must successfully complete this requirement after achieving sophomore status and prior to graduation. To satisfy the GCCR, students must earn an average grade of C or better on the designated Composition and Communication (C&C) intensive assignments produced in any given course designated as fulfilling some or all of the GCCR. The requirements for GCCR courses include:

- at least 4500 words of English composition (approximately 15 pages total);
- a formal oral assignment *or* a visual assignment;
- an assignment demonstrating information literacy in the discipline;
- a draft/feedback/revision process on GCCR assignments.

The program requirements for the GCCR include:

- at least one specific Program Student Learning Outcome for C&C outcomes;
- a plan for assessing both the writing and oral *or* visual components of the GCCR;
- clear goals, rubrics, and revision plans for GCCR implementation.

Upon GCCR approval, each program will have a version of the following specification listed with its Program Description in the University Bulletin:

> *"**Graduation Composition and Communication Requirement.** Students must complete the Graduation Composition and Communication Requirement as designated for this program. Please consult a college advisor or program advisor for details. See also 'Graduation Composition and Communication Requirement' on p. XX of this Bulletin."*

III. GCCR Information for this Program (by requirement):

A. *List the courses currently used to fulfill the old Graduation Writing Requirement:*

EES 490 Earth Dynamics

B. *GCCR Program Outcomes and brief description:*

1. Please specify the Major/Program Student Learning Outcomes (SLOs) pertaining to Composition & Communication and the GCCR requirement. These are *program* outcomes, not *course* outcomes. Please specify the program-level SLOs for C&C in your program:

Writing: Gradautes will demonstrate effective written communication skills in the Earth Sciences as demonstrated by proficiency in technical writing.

2. Please provide a short GCCR description for your majors (limit 1000 characters): Please explain the GCCR requirement in language appropriate for undergraduate majors to understand the specific parameters and justification of your program's GCCR implementation plan:

Writing and oral/visual communication are critical skills for professional geoscientists. Geoscientists need to be proficient in technical writing, a style of writing that is distinct from that commonly taught in English composition courses in high school and college. Examples of technical writing include research papers, reports, and topical reviews. Technical writing uses elements common to other writing styles (proper grammar, sentence structure, punctuation and spelling). However, it is a style of writing

that is distinguished by being more evidenciary, objective, concise, and less personal. Also, as geology deals with the 3-dimensional Earth, geoscientists need to effecitvely communicate their science in a combined oral-visual format. The format of such a presentation typically incorporates maps, graphics, data plots, and images to convey a message. The GCCR in Geology is intended to help students develop both communication formats in the context of the undergraduate curriculum.

C. *Delivery and Content:*

1. Delivery specification: for your major/program, how will the GCCR be delivered? Please put an X next to the appropriate option. *(Note: it is strongly recommended that GCCR courses be housed within the degree program.)*

- ☐ a. Single required course within program
- ☒ b. multiple required or optional courses within program
- ☐ c. course or courses outside program (i.e., in another program)
- ☐ d. combination of courses inside and outside program
- ☐ e. other (please specify): _

2. Basic Course Information: Please provide the following information for course(s) used to satisfy the GCCR, either in whole or in part:

Course #1: Dept. prefix, number, and course title: EES 235 Fundamentals of Geology II

- new or existing course? Existing (*new courses should be accompanied by a New Course Proposal*)
  - ☐ *if a new course, check here that a New Course Proposal has been submitted for review via eCATS*
- required or optional? Required
- shared or cross-listed course? No
- projected enrollment per semester: 15

Course #2 (if applicable): Dept. prefix, number, and course title: EES 461 Igneous and Metamorphic Petrology

- new or existing course? Existing (*new courses should be accompanied by a New Course Proposal*)
  - ☐ *if a new course, check here that a New Course Proposal has been submitted for review via eCATS*
- required or optional? Required
- shared or cross-listed course? _____
- projected enrollment per semester: 15

Course #3 (if applicable): Dept. prefix, number, and course title: _____

- new or existing course? _____ (*new courses should be accompanied by a New Course Proposal*)
  - ☐ *if a new course, check here that a New Course Proposal has been submitted for review via eCATS*
- required or optional? _____
- shared or cross-listed course? _____
- projected enrollment per semester: _____

3. Shared courses: If the GCCR course(s) is/are shared from *outside* the program, please specify the related department or program that will be delivering the course(s). Please provide the following:

- **Contact information of providing program:**

_____

- **Resources:** what are the resource implications for the proposed GCCR course(s), including any projected budget or staffing needs? If multiple units/programs will collaborate in offering the GCCR course(s), please specify the resource contribution of each participating program.

_____

- **Memorandum of Understanding/Letter of Agreement**: Attach formal documentation of agreement between the providing and receiving programs, specifying the delivery mechanisms and resources allocated for the specified GCCR course(s) in the respective programs (include with attachments).

Date of agreement: _____

4. Syllabi: Please provide a sample syllabus for each course that will be designated to fulfill the GCCR. Make sure the following things are clearly indicated on the syllabi for ease of review and approval (check off each):

- the GCCR assignments are highlighted in the syllabus and course calendar;
- the GCCR assignments meet the minimum workload requirements as specified by the Senate Rules for GCCR courses (see the draft Senate GCCR rule linked here);
- the elements are specified in the syllabus that fulfill the GCCR requirement for a clear draft/feedback/revision process;

- the grade level requirements for the GCCR are specified on the syllabus (i.e., an average of C or better is required on GCCR assignments for credit);
- the course or sequence of courses are specified to be completed after the first year (i.e. to be completed after completing 30 credit hours) for GCCR credit;
- the course syllabus specifies "This course provides full/partial GCCR credit for the XXX major/program"
  - if the course provides partial GCCR credit, the fulfilled portion of the GCCR must be specified and the other components of the GCCR for the program must be specified: e.g. "This course provides partial credit for the written component of the GCCR for the XXX major/program in conjunction with Course 2"

5. Instructional plan: Summarize the instructional plan for teaching the C&C skills specified in the program SLOs and delivered in the course(s). Include the following information in **brief** statements (1000 characters or less). Information can be cut-and-pasted from the relevant sample syllabus with indications **where** on the syllabus it is found:

- overview of delivery model: summarize how the GCCR will be delivered for **all** program majors: explain how the delivery model is appropriate for the major/program and how it is offered at an appropriate level (e.g. required course(s), capstone course, skills practicum sequence of courses, etc.):

Rather than a "one-shot" opportunity, we take more of a 'writing/presentation across the curriculum approach' to the GCCR requirement. All Geological Sciences majors (B.A. and B.S.) take EES 235 and EES 461. Students are introduced to technical writing and presentation in EES 235. They are likely to have several other opportunities to develop their writing or make in-class presentation in other courses (EES 350, 360, 450G), but not all courses with a writing/presentation component are required for the major. Students take 235 as the third course in the major sequence, and EES 461 is usually taken in the last year of the major sequence. The writing assignment in EES 461 is designed as a process to yield a product that is essentially identical to something they would produce in a professional setting.

- assignments: overview or list of the assignments to be required for the GCCR (e.g. papers, reports, presentations, videos, etc.), with a summary of how these GCCR assignments appropriately meet the disciplinary and professional expectations of the major/program:

EES 235 Fundamentals of Geology: 3000 word term paper and in-class presentation
EES 461 Igneous and Metamorphic Petrology: 4500 word term paper and in-class presentation
Our rationale is discussed in Section B.2 above. Our alumni who are professionals in various sub-disciplines of geoscience repeatedly tell our students that THE most important part of their job is effective written and oral communication skills. We therefore attempt to help students develop proficiency in written and oral technical communication through activities in several of our major courses.

- revision: description of the draft/feedback/revision plan for the GCCR assignments (e.g. peer review with instructor grading & feedback; essay drafting with mandatory revision; peer presentations; etc.):

In EES 235 there will be one editing/review/revision/feedback of the paper by the instructor. In 461 the paper is constructed in parts with editing, and grading of three drafts with the fourth draft being the complete document. Completed documents will be shared with other students and will serve as the source of content for the oral presentations. In both courses the oral presentation will include a component of peer review.

- other information helpful for reviewing the proposal:

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D. Assessment:

In addition to providing the relevant program-level SLOs under III.B, please specify the assessment plan at the program level for the proposed course(s) and content. Provide the following:

- specify the assessment schedule (e.g., every 3 semesters; biennially):

Biennially but evaluation will include products for both years of the biennium.

- identify the internal assessment authority (e.g. curriculum committee, Undergraduate Studies Committee):

DUS and Curriculum Committee

- if the GCCR course(s) is/are shared, specify the assessment relationship between the providing and receiving programs: explain how the assessment standards of the receiving program will be implemented for the provided course(s):

_____

Signature Routing Log

General Information:

GCCR Proposal Name (course prefix & number, program major & degree):	EES 235 EES 461, Earth & Evnironmental Sciences, BA BS
Contact Person Name:	David Moecher, Chair
Phone:	257-6939
Email:	moker@uky.edu

Instructions:

Identify the groups or individuals reviewing the proposal; record the date of review; provide a contact person for each entry. On the approval process, please note:

- Proposals approved by Programs and Colleges will proceed to the GCCR Advisory Committee for expedited review and approval, and then they will be sent directly to the Senate Council Office. Program Changes will then be posted on a web transmittal for final Senate approval in time for inclusion in the Fall 2014 Course Bulletin.
- New Course Proposals for the GCCR will still require review and approval by the Undergraduate Council. This review will run parallel to GCCR Program Change review.
- In cases where new GCCR courses will be under review for implementation after Fall 2014, related GCCR Program Changes can still be approved for Fall 2014 as noted "*pending approval of appropriate GCCR courses.*"

Internal College Reviews and Course Sharing and Cross-listing Reviews:

Reviewing Group	Date Reviewed	Contact Person (name/phone/email)
Home Program *review by Chair or DUS, etc.*	3-14-2014	David Moecher / 76939 / moker@uky.edu
Providing Program *(if different from Home Program)*		/ /
Cross-listing Program *(if applicable)*		/ /
College Dean	4/1/14	Ruth Beattie, Associate Dean / 3-9925 / rebeat1@uky.edu
		/ /

Administrative Reviews:

Reviewing Group	Date Approved	Approval of Revision/ Pending Approval[1]
GCCR Advisory Committee	4/21/2014	

Comments:

_____

[1] *Use this space to indicate approval of revisions made subsequent to that group's review, if deemed necessary by the revising group; and/or any Program Change approvals with GCCR course approvals pending.*

EES 235 – Fundamentals of Geology II
Spring 20XX

Class time MW 1:00-2:50 PM, and some Saturdays (see below)
Location Slone 203, Science Library 213f (some Mondays), Science Library 213e (some Wednesdays)

Instructors	Dr. Sean Bemis	Dr. Kent Ratajeski
	Slone 306	Slone 301
	(859) 257-1374	(859) 257-4444
	sean.bemis@uky.edu	kent.ratajeski@uky.edu
	T 2-3; W 3-4	M 3:30-4:30; TW 11-12
TA's	TBA	TBA

Course description, objectives, and prerequisites

UK Bulletin description: Laboratory and field methods for identification and description of rocks and minerals with emphasis on igneous and metamorphic rocks and rock-forming minerals. Field study of geologic structures. Interpretation of geologic maps. Laboratory, four hours per week. Four days in the field. Prereq: EES 220 and 230

This course is intended as a follow-up to EES 230 and is designed to develop skills in:

- the methods of geologic field work and geologic mapping
- topographic and geologic map interpretation
- hand sample identification and description of rocks and minerals
- information literacy, library research, geologic report writing, and oral presentation skills

Since you have already learned some basic knowledge and skills in EES 230, the primary goal of this class is to develop a higher degree of mastery and independence in your work as a geologist. Most class sessions will involve a combination of lecture and laboratory exercises. More intensive field projects, including a weekend trip, will contribute to your development of geologic and professional skills. The course will culminate with a capstone field-based project in which you plan and carry out geologic mapping of a complex area from start to finish with minimum guidance and interference from the instructor.

Graduation Composition and Communication Requirement

This course provides full GCCR credit for Geology B.A./B.S. majors. You must have completed 30 hours of previous coursework to qualify for GCCR credit.

Textbook

One text is required: *Geologic Maps*, 2nd Edition, by Edgar W. Spencer.

Course materials and supplies

Bring the following items to class:
textbook
12" ruler (English & metric)
graph paper (0.1" divisions)
protractor
calculator
colored pencils (set of at least 12)
mechanical pencil
eraser (a nice soft one)
fine-tipped pen
handlens (10X magnification)
USB drive (1-2 GB)

Bring the following items on fieldtrips:
field notebook
metal or plastic clipboard/case
rock hammer (high quality, pick style)
hand lens (10X magnification)
mechanical pencil (2H or 3H) and eraser
ruler
protractor with straight edge
backpack
proper field attire on field days (watch the weather)

Graded surprise inspections will occur both in class and in the field!

Blackboard course page

You can access the Blackboard page at https://elearning.uky.edu. The course page will eventually contain a copy of this syllabus, your grades, lecture powerpoints (uploaded <1 day AFTER each class), and other information. We will use Blackboard to communicate important announcements to the class and for emailing individual students.

Policies

Attendance

Except in the case of a valid university excuse, all students are required to attend all classes and fieldtrips and to turn in all work by the stated deadlines. No late work will be accepted without a valid excuse (as defined below), and the grade for late work will be a zero.

Excused absences for missed fieldtrips, exams, and assignment due dates may be granted for:

1. Significant illness of the student or serious illness of a member of the student's household (permanent or household); formal verification must be furnished to allow a makeup.
2. The death of a member of the student's household (permanent or campus) or immediate family; formal verification must be furnished to allow a makeup.
3. Trips for members of student organizations sponsored by an academic unit, trips for University classes, and trips for participation in intercollegiate athletic events. When feasible, the student must notify the instructor prior to the occurrence of such absences, but in no case shall such notification occur more than one week after the absence. Formal notification from appropriate university personnel is required to document the student's participation in such trips and to allow a makeup.
4. Major religious holidays; students are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day for adding a class.

Missed or late work

Requests to take makeup exams, submit missed work due during class, or to submit late homework or projects must be made in writing (by email) to Dr. Bemis AND Dr. Ratajeski) within 1 week of the missed quiz or exam (except where prior notification is required). In your email, be sure to mention the course number (EES 235), the specific work you missed, and the reason you are requesting a makeup or extension. If the reason fits one of the criteria above, one of the instructors will arrange for you to make up the missed work. You must include the necessary documentation when you submit the late work or take a makeup exam or you will not be allowed to make up the missed work.

Behavior and academic integrity

Disruptive behavior such as cell phone use and loud talking are not allowed during class, and professional behavior is also expected during field trips! Cheating of any type will not be tolerated. Cheating is defined in the Student Handbook of Rights and Responsibilities, but in particular for this course, includes relying too much on another student's work (i.e., copying another student's work from the current or previous semesters) or copying from published geologic maps. Discussion in small groups will be permitted during in-class exercises, but you should not simply copy a classmate's answers without being engaged yourself in all parts of the problem or assignment. Learn to work independently, and learn the material for yourself, because you will be working independently on the final mapping project. The instructors are here to help you accomplish this. If you are not sure what you should do on an assignment, please ask the instructors first!!

All written reports should be in your own words. Any outside information or phrases (books, articles, maps, websites) should be properly cited, even for paraphrases, and quotation marks used for direct quotes. Failure to properly cite references, copying of materials, and all forms of plagiarism will not be tolerated, and you will receive a zero on the assignment.

The following protocol will be followed should there be evidence of cheating or plagiarism on an assignment:

1. Instructor will discuss the matter confidentially with the student(s) involved; if not satisfactorily resolved,
2. Instructor will discuss the matter confidentially with Department Chair and the student; if not yet resolved,
3. Instructor will discuss the matter confidentially with the Academic Ombud and the student.

Based on the outcome of this procedure, instances of cheating may result in a grade of "0" for the assignment and possibly additional penalties including a failing grade for the entire course.

Homework
Homework assignments (some having components to be completed in-class) will involve practical aspects of rock identification and the interpretation of geologic maps and cross-sections. You are allowed to work in small groups (≤ 3 people) on the homework, but everyone needs to turn in an assignment written in their own words. Do not mindlessly copy answers and let someone else do all the thinking for you! This constitutes cheating (see above).

Exams
These will be closed book, will occur at the beginning of class, and will take ~ 1 hour to complete. No one will be permitted to leave the classroom during an exam except for an emergency.

Field projects
Field projects are directed at teaching fundamental observational and measurement skills in the field and will consist of a stratigraphic column and two mapping projects. The Boonesborough mapping project is the capstone exercise and will pull together all the skills developed in EES 230 and EES 235; it will be due on May 2 at 4:30 PM.

Working in the field may be hazardous due to loose rocks, steep slopes, and traffic. Students should always exercise caution when working in the field (e.g., do not climb steep cliffs or outcrops, do not work alone, secure permissions to enter private property, etc.). Use of rock hammers should be restricted to areas suitable for collecting small samples without defacing the outcrop (especially if it is located in a public place, such as a road cut).

All students participating in EES 235 field exercises are required to travel in University vans and not in personal vehicles. Seat belts should be worn at all times when traveling in University vehicles.

Assignments to fulfill the Graduation Composition and Communication Requirement (GCCR)

Appalachians term paper
Pairs of students will be assigned topics related to the geology of the south-central Appalachians. Collaborating as a team, each pair will write a 3000-word report. The report and presentation should cover much of the same content, and each student should contribute equally on the research and writing. You will be graded on a preliminary bibliography, first draft, and a final draft: half the deducted points from the first draft will be restored after corrections are made on the second draft, and you must do a second draft incorporating the suggested revisions or you will receive a 0 for the exercise. Papers will be submitted in class as printed copies.

Tour of King Science Library
A tour of the Science Library, which will include activities designed to develop information literacy, research skills, as well as an introduction to the GEOREF database, will be given shortly after the topics for the Appalachians term projects are assigned.

Appalachians oral presentation
Pairs mentioned above will collaborate on an oral presentation given in front of the class, using information included in their written reports. Copies of your powerpoint slides will be distributed to the other students in the class. Each student in a pair should contribute equally on the presentation.

Blount Springs geologic map summary
A 750-word summary of the geology of the Blount Springs map area will be submitted as part of the requirements for this field project.

Boonesborough geologic map summary
A 750-word summary of the geology of the Boonesborough map area will be submitted as part of the requirements for this field project.

You MUST receive an average of "C" or higher on the above GCCR assignments to fulfill your GCCR requirement.

Getting additional help
Please ask questions at any time during lecture. I have an open-door policy, but I may have to turn you away if it is not a good time for me outside of office hours. The TA is also available to help you.

If you have a documented disability that requires academic accommodation(s), please see me as soon as possible during my scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center. The center is located in Room 2, Alumni Gym. If you have not registered with the Disability Resource Center for coordination of campus disability services, please contact the Center by calling 257-2754 or by email to the center director, Jacob Karnes, jkarnes@email.uky.edu.

Grading

In calculating your final grade, the various exercises and projects will carry the following weights:

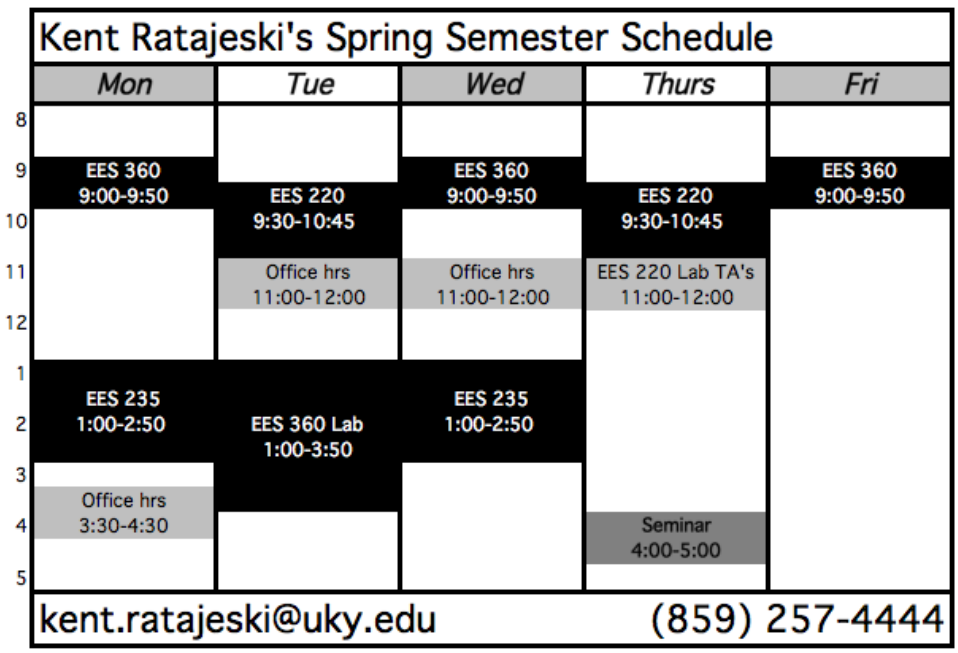
35%	Exams (3)
25%	Lab exercises and homework
20%	Field projects (3)
	• Blount Springs mapping project and GCCR summary (8 %)
	• Boonesborough mapping project and GCCR summary (12 %)
15%	Appalachian Orogeny research project
	• GCCR report (8%)
	• GCCR presentation (7%)
5%	Attendance and participation, professional behavior, and surprise gear inspections (?)

Final grades will be computed by dividing the total points earned by the total points possible. This percentage will be rounded to the nearest whole number and assigned a letter grade according to the following scale: A = 85-100, B = 75-84, C = 65-74, D = 55-64, and E (or F) = 0-54. No curves will be applied in the grading.

Date	**Topic/Activity (tentative)**
Jan. 15 Wed	Course overview (goals, plans, expectations, syllabus); Geologic mapping: paper or plastic?
Jan. 20 Mon	**NO CLASS** (MLK Day)
Jan. 22 Wed	Intro to geologic mapping concepts using Google Earth
Jan. 27 Mon	Basics of ArcGIS
Jan. 29 Wed	Basics of ArcGIS continued and accessing existing geospatial data
Feb. 3 Mon	Creating a base map
Feb. 5 Wed	Digitizing an existing geologic map
Feb. 10 Mon	Produce a presentable map
Feb. 12 Wed	Working with existing geologic map geodatabases
Feb. 17 Mon	Collecting basic digital geospatial point and line data
Feb. 19 Wed	GCCR writing and oral presentation assignments handed out and discussed
Feb. 24 Mon	**EXAM 1**
Feb. 26 Wed	Geology of the Appalachians
Mar. 3 Mon	Research literacy; visit to Science Library and online resources
Mar. 5 Wed	Structures and geologic maps: unconformities
Mar. 10 Mon	Structures and geologic maps: high-angle faults
Mar. 12 Wed	Structures and geologic maps: low-angle faults
Mar. 17 Mon	**NO CLASS** (Spring Break)
Mar. 20 Wed	**NO CLASS** (Spring Break)
Mar. 24 Mon	Structures and geologic maps: folds
Mar. 26 Wed	GCCR student presentations
Mar. 28-30	**FIELDWORK** (Blount Springs, AL mapping project)
Mar. 31 Mon	NO CLASS
Apr. 2 Wed	GCCR student presentations
Apr. 7 Mon	**Feedback on GCCR Student Oral Presentations**
Apr. 9 Wed	**EXAM 2**
Apr. 12 Sat	**FIELDWORK** (Boonesborough, KY mapping project)
Apr. 14 Mon	Plutonic rocks and maps

Date	Topic/Activity (tentative)
Apr. 16 Wed	**EES Dept. Assessment Exam.** This exam does not count toward your grade in EES 235, but is required for all geology majors.
Apr. 19 Sat	**FIELDWORK** (Boonesborough mapping project)
Apr. 21 Mon	Volcanic rocks and maps
Apr. 23 Wed	Metamorphic rocks and maps
Apr. 26 Sat	**OPIONAL FIELDWORK** (Boonesborough mapping project)
Apr. 28 Mon	Complex maps
Apr. 30 Wed	In-class workday. Boonesborough mapping project due on Friday, May 2 at 4:30 PM.
May 7 Wed	**EXAM 3** (1-3 PM; non-comprehensive)

Dr. R's schedule



EES 461 IGNEOUS AND METAMORPHIC PETROLOGY **Syllabus Fall 2014**

Or

Origin and Evolution of Earth's Lithosphere (and that of terrestrial planets too!)

Or

Magmas and Mountains: What, Where, When, Why, and How

Bulletin description: classification and origins of the common igneous and metamorphic rocks. Lecture material will emphasize the mineralogical, chemical, and physical equilibria within the Earth. Laboratory topics will stress hand-speciment and microscopic petrography.

Igneous and Metamorphic Petrology ("Ig-Met") deals with the origin of the materials comprising the Earth's crust and mantle (basalt, granite, peridotite, gneiss, schist, etc.), and the tectonic, physical, and chemical processes involved in their formation. That's the formal definition. Basically, we address two features related to the evolution of Earth: where, why, and how magmas and mountains form, and how these processes produce Earth's crust. A required four-day field trip to the Blue Ridge and Great Smoky Mtns. during the early part of the semester will give you a chance to see many of these rock types in their geological context.

COURSE GOALS

Upon completion of this course a student should be able to do the following:

-Explain the origin of magma in relation to plate tectonics and the distribution of heat and pressure in the crust and mantle;

-Explain the processes that give rise to the range of igneous rock types in the crust;

-Explain why igneous rocks occur in specific tectonic settings and not randomly in the crust;

-Explain the settings, conditions, and processes in the crust that lead to orogeny and metamorphism;

-Identify the mineralogic components of igneous and metamorphic rocks; interpret structures and textures in hand samples and thin sections, and make inferences bearing on the dynamic processes involved in their formation;

-Relate igneous and metamorphic rocks and processes to broad scale earth dynamics and crustal evolution.

NOTE: *EES 461 is the second course for Geological Sciences B.A. and B.S. majors (with EES 235 Fundamentals of Geology) that addresses the UK Graduation Composition and Communication Requirement ("GCCR"). This requirement has a written and oral presentation component. Further details are discussed below.*

INSTRUCTOR: Moecher; 304 Slone Bldg.; moker@uky.edu; 257-6939 (office); 7-3758 (Dept. office); 7-3934 (lab); 492-6749(cell); Off. Hrs.: MWF 10 a.m. and noon, or whenever I am in my office; call ahead or just drop in and knock on the door.
TA: Emma Larkin, Rm. 217 Slone Research Bldg., emma.larkin@uky.edu; Off. Hrs.: TBA.

TEXTBOOKS & MATERIALS: John D. Winter: *An Introduction to Igneous and Metamorphic Petrology, 1st Edition* (ISBN0-13-240342-0) [no need to buy 2nd edition! The 1st ed. is fine and it's cheaper on-line]; D. Perkins & K.R. Henke: *Minerals in Thin Section*, 2nd. Ed; Other reading assignments will be announced and will be taken from material on reserve in the Pirtle Geology Library. For lab you will need a 10X magnification hand lens; bring the lens to all lab sessions and the field trip! You'll also need a hammer for the field trip. **Building keys will be issued to students so they can work after hours in the petrology lab. Final grades for the course will not be issued until keys are returned.**

GRADES: Your grade will be based on the following breakdown between material in lecture and lab:

Lecture/Field Trip Exams: 45% of final grade; Three in-class exams (10% each) and final (15%) based on material covered in lecture or on the field trip.

Laboratory: 35% of final grade; two lab practical exams (rock and mineral identification), based on material in lab (each 10% of final grade) and lab exercises (all labs comprising 15% of final grade).

Homework, In-Class Exercises, Quizzes, and Seminar Attendance*: 10% of final grade; homework problems or in-class exercises will be assigned on a regular basis; some may be unannounced! You will also be required to attend and report on two Dept. seminars (see instructions below).

Volcano (GCCR) Term Technical Writing and Presentation Project: 10 % of final grade. Students must earn a minimum grade of C on this assignment (70%) in order to satisfy the GCCR requirement. Students must also have at least sophomore

standing (30 credits) to fulfill the GCCR. See further details below. The written and oral presentation component will constitute 75% and 25% of the grade, respectively.

Final course grades are based on your average calculated with the above weighting scheme, and assigned according to the following breakdown: 100-90%: A; 89-80%: B; 79-70%: C; 69-60%: D. I reserve the right to adjust these cutoffs *downward* (only) depending on the distribution of grades. Some subjective criteria (class participation, effort, attendance, conscientiousness) may be used to determine the final grade cutoffs or ones final grade. A midterm evaluation will be calculated based on work completed by the midterm and may not accurately reflect the final grade. The midterm grade is meant to improve course performance if necessary. Plagiarism and cheating will result in a grade of E on the assignment.

POLICY REGARDING INCOMPLETE LABS AND HOMEWORK

Late **or** incomplete labs **or** homework will **not** be accepted for credit, except in the case of a legitimate excuse (documented illness, death in family, conflict with extramural University functions, etc.; see the Student Handbook for more details on what constitutes a legitimate excuse). Always contact me ahead of time if you anticipate being absent, or when in doubt-I am usually very understanding about competing demands on your time and scheduling conflicts. Best advice: **GET TO CLASS ON TIME, STAY ENGAGED, ASK QUESTIONS, KEEP ME INFORMED, NO LAME EXCUSES!!**

If you have a **documented disability** that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodation in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Rm. 2, Alumni Gym 257-2754, email jkarnes@email.uky.edu) for coordination of campus disability services to students with disabilities.

Lecture Topics Sequence (date of, and time on, each topic varies)

No Class: Labor Day (M Sept. 2); Th-F Oct. 3 and 4 (Field Trip); Geological Society of American Annual Meeting: Oct. 28-30, Nov. 1 possibly; Thanksgiving Break (W Nov. 21):

TOPICS (order subject to change depending on progress)	READING (Winter)
Introduction	
Review of Earth Structure, Plate Tectonics, Rock Cycle, Earth's Thermal Budget, Pressure and Temperature Distribution in Lithosphere; Distribution of Igneous and Metamorphic Rocks	Syllabus; Secs. 1.2, 1.7, 1.8; Dynamic Planet map
Exam #1 (date and time TBA)	
GCCR writing and presentation requirement: background and assignment	**Date: lecture period following Exam #1**
Volcanic rocks I: basaltic volcanism; Kilauea videos	Sec. 4.1, Scientific American article
Volcanic rocks II: Arc volcanism; Mt. Pinatubo video	USGS Mt. Pinatubo report
Volcanic rocks III: Silicic "supervolcano" caldera eruptions	Yellowstone Papers
Intrusive rocks: batholiths etc	Sec. 4.2
Crystallization of Magma	Chap. 6
Differentiation of Basalt: Layered Mafic Intrusions	Chap. 12
Oceanic Crust and Ophiolites	Chap. 13
Exam #2 (date and time TBA)	
Origin of Basalt	Chaps. 6, 10
Subduction Zone/Arc Magmatism and Origin of Calc-Alkaline Rock Suite	Chap. 16, Chap. 17
Metamorphism and Tectonics of Mountain Belts	
Introduction to Metamorphism and Metamorphic Processes	Chap. 21
Metamorphic facies and grade	Sec. 25.1, 25.2
Regional metamorphism and pelitic metamorphic rocks	Chap. 28
Subduction zone metamorphism: blueschists & eclogites	Sec. 25.3.4
Pressure-Temperature-time Paths	Sec. 25.4
GCCR Student Presentations	**Week before Deadweek**
Feedback and discussion of student presentations	**Deadweek**
Origin and Growth of Continents and the Rock Cycle Revisited	
Final Exam Date: Wed. Dec. 18, 10:30 a.m. Rm. 203 Slone Bldg.	

****REQUIRED FIELD TRIP****

We will be taking a field trip to the Appalachian Blue Ridge Province, Oct. 3-6 (8 a.m. Thur. to ~10 p.m. Sun.) to examine the variety of rocks exposed in an ancient, deeply eroded mountain belt. We essentially see the features currently forming in the roots of mountain belts such as the Himalayas and Andes. We will travel in Dept. vans and stay in the Great Smoky Mtns. area at National Park or State Forest campgrounds. You will need to inform instructors in other classes of your impending absence. I will contact instructors who require a written excuse for your absence. Please let me know this ASAP if you require such a letter.

Term Technical Writing & Oral Presentation Project (GCCR Component)

Each student will write a research paper and make an in-class presentation dealing with the eruptive history of an active volcano or an extinct but well known volcanic edifice (i.e., mountain). The type of material to be summarized in the project includes the following, but is not limited to:

-Plate tectonic setting of the volcano
-Style and chronology of eruption history
-Magma compositions erupted during history
-Origin of lava in context of plate tectonic setting
-Volcanic hazards and human impact

Each aspect of the project will be completed as we cover the relevant material in class. Potential volcanoes for study include the following; you may wish to study a different volcano – there are plenty out there! The federal geological surveys of volcano-prone countries (Chile, New Zealand, Japan, Philippines, Indonesia) are also useful resources.

Examples of Active Volcanic Systems	Examples of Dormant or Extinct Volcanic Systems
Popocatepetl, Mexico	Fuji, Japan
Etna, Italy	Kilimanjaro, Kenya
Rabaul, Indonesia	Ranier, Washington
Ruapehu, New Zealand	Mazama, Oregon (Crater Lake)
Kluchevskoy, Russia	Krakatao, Indonesia
Arenal, Costa Rica	Santorini, Greece
Augustine, Alaska	Ararat, Turkey
Long Valley Caldera, California	West Elk Volcano, Gunnison Colorado

Additional details regarding format, style, organization, references, etc. will be distributed later in the term in class. Students will receive "Guidelines for Technical Writing in the Geosciences", a document constructed by several faculty in EES that covers aspects of style, usage, format and common writing errors. This document is also used in EES 235, so it should not be new to you!

Students will derive their information from the scientific literature, including peer reviewed papers, monographs, and in some cases websites written at a high technical level (e.g., U.S. Geological Survey Volcano Observatories have web sites that publish original information and datasets). We will discuss methods for electronically searching for relevant materials using several on-line databases. Each student will need to utilize at least three peer-reviewed research papers to obtain data and information on their volcano. The UK Pirtle Geology Library has thousands of paper maps that are also important resources.

The paper will be written in four drafts, with each draft incorporating successively more information, and each draft having been edited by the instructor. Students will revise each draft before submitting the successive draft. The final draft is to be submitted at the end of exam week. This final draft will be placed in your writing portfolio that we use for assessment purposes.

Figures are an important component of technical documents, and should be incorporated in the body of the document as would be done for a published research paper or report. We will show you how to prepare a document that includes figures and figure captions. The paper should be a minimum of 4500 words in length. Note that we do not measure the paper by length as the figures and figure captions take up considerable space.

Students will make a 15 minute in-class presentation based on the content of their paper, i.e., you should be able to convert the content of your paper to a presentation. Strategies for effective technical presentations will be discussed in class. One way to learn how to be an effective speaker is to observe other speakers. Therefore, we require students to attend two department seminars (see last page of syllabus). The presentation component will be peer and instructor evaluated.

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EES 461 FALL 2014 LABORATORY SCHEDULE

Experience is the best teacher, and these labs will provide experience examining igneous and metamorphic rocks from a variety of geologic settings. Most of the labs involve examination and description of 10-20 rock samples; this requires additional time outside of the weekly three-hour lab session to complete the assigned material. You will be permitted to have building keys so you can work at your convenience outside normal lab hours. HOWEVER: I strongly recommend that you **use the allocated class time** in order to ask questions of the instructors.

DATE		TOPIC	READING
August	28	Optics Review; Intro Granitic Plutonic Rocks	Chap. 2 17-22 Chap. 3 27-36
September	4	Granitic Plutonic Rocks II:	
	11	Granitic Plutonic Rocks III: Gunnison Suite	
	18	Mafic and Ultramafic Plutonic Rocks I	Sec. 2.3.4
	25	Mafic and Ultramafic Plutonic Rocks II	
October	2	Intro to Volcanic Rocks	Chap. 2 22-26 Chap. 3 36-38
	9	**Lab Practical I**	
	16	Volcanic Rocks/Colorado Tertiary extrusive suite	
	23	Meteorites I	Chap. 1; handouts
	30	Meteorites II	
November	6	Metamorphic Rocks II: Pelitic Rocks	Chap. 23, 28
	13	Metamorphic Rocks III: Mafic Rocks	
	20	Metamorphic Rocks III: Mylonites	
	27	**No lab: Thanksgiving Break**	
December	4	TBA	
	11	**LAB PRACTICAL II (Volcanic and Metamorphic Rocks)**	

*** Attendance at Department Rast-Holbrook Seminars***

Although you are encouraged to attend seminar as often as possible, you will be required to attend and report on **two** lectures presented during the Fall term in the EES Rast-Holbrook Seminar Series. Most seminars are held Thursday at 4:00 p.m., with refreshments served at 3:30 p.m. Guidelines for the written evaluation of each talk are given below. Seminar reports are due no later than one week after the seminar. Attending seminars is a good way to learn how to make an effective presentation.

GLY 461 Igneous and Metamorphic Petrology
Outline for Written Review of Department Seminars and Speakers

You should attend and report on the two Rast-Holbrook Seminars. Attend the seminar and prepare a one page (**double spaced, 12 pt. font, 1" margins**) written evaluation of the presentation. The points to incorporate in your review are:

1. Speaker and title of talk; including speaker's professional affiliation (title, university, position, company, etc.).

2. A general summary of the talk and topic discussed, e.g., hypothesis being tested, approach used to test it, methodology employed, conclusions. This should be the longest part of your summary.

3. Statement of three things you learned that you didn't already know.

4. Your assessment of the quality of the presentation, i.e., what was a particularly effective speaking technique or format for the presentation that you would use in one of your own presentations, and what wouldn't you use, or what detracted from the presentation (if any).

Devote one paragraph to each of the four topics. Since the report cannot be longer than one page, it must be concise! Points will be allocated based on how well you follow the instructions and address points 1-4.