New Course Request

Check Appropriate Boxes:

Undergraduate credit [X] Graduate credit [X] Professional credit [ ]

1. School/Division: School of Science
2. Academic Subject Code: GEOX-G

3. Course Number: 418
   (must be cleared with University Registrar)
4. Instructor: Andrew P. Barth

5. Course Title: Igneous and Metamorphic Petrology

   Recommended Abbreviation (Optional):...

   (limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year):...Fall 2007...

7. Credit Hours: Fixed at 3 or Variable from...to...

8. Is this course to be graded S-F (only)? Yes [X] No...

9. Is variable title approval being requested? Yes [X] No...

10. Course description (not to exceed 50 words) for Bulletin publication:

    Prerequisites: G222 or Equivalent...

    Portions of the course will stress the application of modern petrographic, mineralogic, geochemical and phase equilibrium techniques to the solution of relevant petrologic problems...

11. Lecture Contact Hours: Fixed at 3 or Variable from...to...

12. Non-Lecture Contact Hours: Fixed at 2 or Variable from...to...

13. Estimated enrollment: 15 of which 3 percent are expected to be graduate students.

14. Frequency of scheduling: biannual...Will this course be required for majors? No

15. Justification for new course:

16. Are the necessary reading materials currently available in the appropriate library? Yes

17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials.

18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant.

19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by:...
Department Chairman/Division Director Date 1/17/07

Approved by:...
Dean Date 2/4/07

Dean of Graduate School (when required)...

Chancellor/Vice-President Date...

University Registrar

After School/Division approval, forward the last copy (without attachments) to the University Registrar for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.
I. Title: Igneous and Metamorphic Petrology  
Course #: GEOL G418  
Instructor: Barth  
Prerequisites: Geology G222 or equivalent

II. Course Description:  
The petrogenesis of igneous and metamorphic rocks. Both lecture and laboratory Portions of the course will stress the application of modern petrographic, mineralogic, geochemical, and phase equilibria techniques to the solution of relevant petrologic problems.

III. Educational Objectives:  
Igneous and Metamorphic Petrology is a course designed to acquaint you with the tools used by geologists to understand the formation of rocks at moderate and high temperatures, and the evolution of the solid Earth. This course will use a combination of directed discussion, hands-on laboratory work, and independent study to help you:  
- Apply basic chemical thermodynamics and actualistic principles to interpret environments of rock formation  
- Explain processes of partial melting and fractionation leading to formation of igneous rocks  
- Explain the physical interactions between the hydrosphere and lithosphere, and chemical fractionation associated with incongruent weathering reactions leading to the diversity of metamorphic protoliths  
- Use solid state chemical reactions to describe environments of isochemical metamorphism  
- Associate the dynamics of the rock cycle with orogenesis and lithospheric plate kinematics  
Achieving these objectives will increase your understanding of geology as a physical science. In the process, you will improve your ability to think in quantitative as well as qualitative terms, and to critically analyze data and physical models relevant to understanding complex and as yet incompletely understood Earth processes.

IV. Course Content:  
Week 1. Earth in three dimensions  
Week 2. Time in Earth evolution  
Week 3. Crystal chemistry and phase equilibria  
Week 4. Phase equilibria in binary systems  
Week 5. Phase equilibria in ternary systems – partial melting  
Week 6. Phase equilibria in quaternary systems – fractional crystallization  
Week 7. Magmatism and geodynamics – oceanic crust  
Week 8. Magmatism and geodynamics – intraplate magmatism  
Week 9. Magmatism and geodynamics – continental crust  
Week 10. Sedimentary cycles – chemical diversification of rocks  
Week 11. Phase equilibria – solid state reactions
Week 12. Phase equilibria – devolatilization reactions
Week 13. Phase equilibria – metamorphic facies and facies series
Week 14. Phase equilibria – thermobarometry
Week 15. Metamorphism and geodynamics – low temperature environments
Week 16. Metamorphism and geodynamics – high temperature environments

V. Recommended Texts and Supplementary Reading:


VI. Evaluation and Grading:

Your grade in this course is based on the following activities:

- 1 lecture exam: 20%
- 8 laboratory reports: 40%
- homework: 10%
- term project: 30%

You will receive comments and suggestions on all your work, but credit only for work submitted on time.

VII. Cheating and Plagiarism

As a student in this course, you must not use or attempt to use unauthorized assistance, materials, or information in any class activity. Cheating specifically includes allowing others to conduct research or to prepare work for you without advance authorization from the instructor. You must not make any unauthorized use of materials obtained from commercial companies or from files of papers prepared by other persons. It is cheating to collaborate with others on a class activity or project and submit a copy of an exercise, computer program,
computations, or a written report which is represented explicitly or implicitly as your individual work. It is plagiarism to adopt or reproduce ideas, words, or statements of another person without appropriate acknowledgment. You must give credit and acknowledge another person's actual words or ideas, either oral or written in text or electronic form, and you must credit facts or data borrowed from another person, including all facts or data acquired from print or electronic resources.