08-7r.

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Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person	Email Address
Michael A. Poage	mpoage@iup.edu
Proposing Department/Unit	Phone
Geosciences - Natural Sciences and Mathematics	724-357-5627

Check all appropriate lines and complete information as requested. Use a separate cover sheet for each course proposal and for each program proposal.

1. Course Proposals (check all that apply)

_X_ New Course _____ Course Prefix Change _____ Course Deletion

_____ Course Revision _____ Course Number and/or Title Change _____ Catalog Description Change

	GEOS 301 Mineralogy and Petrology
***Current* Course prefix, number and full title**	***Proposed* course prefix, number and full title, if changing**

2. Additional Course Designations: check if appropriate

_____ This course is also proposed as a Liberal Studies Course.

_____ This course is also proposed as an Honors College Course.

_____ Other: (e.g., Women's Studies, Pan-African)

3. Program Proposals

_____ Catalog Description Change _____ Program Revision

_____ New Degree Program _____ Program Title Change _____ Other

_____ New Minor Program _____ New Track

***Current* program name**	***Proposed* program name, if changing**

4. Approvals		**Date**
Department Curriculum Committee Chair(s)		2/4/08
Department Chair(s)		2/4/08
College Curriculum Committee Chair		2-11-08
College Dean		2-11-08
Director of Liberal Studies *		
Director of Honors College *		
Provost *		
Additional signatures as appropriate: (include title)		
UWUCC Co-Chairs	Gail S Sechrist	10/14/08

* where applicable

Received SEP 25 2008 Liberal Studies

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Part II. Description of Curricular Change

1. SYLLABUS OF RECORD

I. Catalog Description — 3 class hours
GEOS 301 Mineralogy and Petrology — 3 lab hours
4 credit hours

Prerequisite: Grade of C or better in GEOS 201 and GEOS 202 (3c-3l-4cr)
Introduces students to crystallography, crystal chemistry, optical properties and phase equilibria of minerals pertinent to geology, Earth resources and technology. Introduces the origins of igneous and metamorphic rocks based on a plate tectonic framework emphasizing melting and crystallization processes as well as metamorphic reactions. Laboratory exercises will focus on mineral and rock identification and interpretation as well as quantitative techniques such as x-ray diffractometry and optical microscopy.

II. Course Objectives
At the end of this course students will be able to:

1) Explain the fundamentals of crystallography and chemical bonding.
2) Demonstrate knowledge of approximately 100 minerals commonly encountered in geology, earth resources and technology, their chemistry, identification, occurrence and geologic relevance.
3) Use the petrographic microscope to identify common minerals in thin section using optical properties.
4) Relate common minerals with igneous, metamorphic and sedimentary rocks and the tectonic setting in which these rocks form.
5) Classify approximately forty igneous and metamorphic rocks commonly encountered in geology as well as demonstrate knowledge of their chemistry, phase relations, occurrence and geologic relevance.
6) Use the optical microscope to classify common igneous and metamorphic rocks in thin section on the basis of their mineralogy, and interpret textures within those rocks.
7) Evaluate the tectonic history of a region based on the occurrence and distribution of igneous and metamorphic rocks.

III. Course Outline

Lecture

Part A (10 academic hours): Foundations of Mineralogy

1. Symmetry and Crystallography
2. Atoms, Elements and Chemical Bonding
3. Physical Properties of Minerals
4. Conceptually Building Minerals
5. Chemical Classes of Minerals

Exam 1 (1 academic hour)

Part B (10 academic hours): Systematic Mineralogy

1. Non-Silicate Minerals
2. Silicate Minerals
3. Phyllosilicate Minerals

Exam 2 (1 academic hour)

Part C (10 academic hours): Igneous Rocks

1. Melting Mechanisms and Plate Tectonics
2. Felsic Igneous Rock Associations and Phase Relations
3. Intermediate Igneous Rock Associations and Phase Relations
4. Mafic Igneous Rock Associations and Phase Relations

4. Tectonic Interpretations of Igneous Rocks

Exam 3 (1 academic hour)

Part D (9 academic hours): Metamorphic Rocks

1. Agents of Metmorphism
2. Types of Metamorphism and Metamorphic Rocks
3. Metamorphic Textures and their Origins
4. Metamorphic Facies, Reactions and Pressure-Temperature-Time Paths
5. Tectonic Interpretations of Metamorphic Rocks

Final exam during final exam period.

Laboratory Exercises (3 academic hours each)

Week 1:	Geologic Interpretation Exercise
Week 2:	Symmetry and Crystallography
Week 3:	Physical Properties of Minerals
Week 4:	Systematic Mineralogy
Week 5:	Systematic Mineralogy
Week 6:	Systematic Mineralogy
Week 7:	Laboratory Exam 1
Week 8:	Felsic Igneous Rocks
Week 9:	Intermediate Igneous Rocks
Week 10:	Mafic Igneous Rocks
Week 11:	Metamorphic Rocks
Week 12:	Metamorphic Rocks
Week 13:	Tectonic Interpretation Exercise
Week 14:	Laboratory Final Exam

IV. Evaluation Methods

Each component of the course will contribute to final grade according to:

Exam 1	15%
Exam 2	15%
Exam 3	15%
Final Exam	30%
Laboratory Exam 1	10%
Laboratory Final Exam	10%
Laboratory Exercises	5%
Total	100%

Possible points earned are distributed between lecture and lab according to the credit hour allocation for the course (3 credits for the lecture, 1 credit for the lab).

V. The final grade for this course will be determined using the following schedule:

A=90-100%; B=80-89%, C=70-79%, D=60-69%, F=<60%

VI. Attendance Policy

The attendance policy will conform to IUP's undergraduate course attendance policy.

VII. Required textbooks, supplemental books and readings

Sen, G. *Earth's Materials: Minerals and Rocks*. Upper Saddle River, N.J.: Prentice Hall, 2001.

Approximately five scientific papers will be used periodically throughout the course to supplement textbook readings.

VIII. Special resource requirements

There are no special resource requirements for this course.

IX. Bibliography

In addition to the required textbooks and supplemental readings from science journals, the following will be used to develop the course curriculum:

Winter, J.D. (2001) An Introduction to Igneous and Metamorphic Petrology: Prentice Hall, Upper Saddle River, NJ, 697p.

Klein, C. (2002) The 22nd Edition of the Manual of Mineral Science: John Wiley and Sons, New York, 641p.

Klein, C. (1994) Minerals and Rocks: Exercises in Crystallography, Mineralogy and Hand Specimen Petrology: John Wiley and Sons, New York, 405p.

Chang, L.L.Y. (2002) Industrial Mineralogy: Materials, Processes and Uses: Prentice Hall, Upper Saddle River, NJ, 472p.

Putnis, A. (2001) Introduction to Mineral Sciences: Cambridge University Press, Cambridge, UK, 457p.

Perkins, D. (2002) Mineralogy, 2nd ed.: Prentice Hall, Upper Saddle River, NJ, 483p.

Nesse, W.D. (2000) Introduction to Mineralogy: Oxford University Press, New York, 442p.

Spear, F.S. (1993) Metamorphic Phase Equilibria and Pressure-Temperature-Time Paths: Mineralogical Society of America, Washington, DC, 799p.

Nesse, W.D. (2004) Introduction to Optical Mineralogy: Oxford University Press, New York, 348p.

Philpotts, A.R. (1990) Principles of Igneous and Metamorphic Petrology: Prentice Hall, Upper Saddle River, NJ, 498p.

Perkins, D. and Henke, K.R. (2000) Minerals in Thin Section: Prentice Hall, Upper Saddle River, NJ, 125p.

Course Analysis Questionnaire

Section A: Details of the Course

A1. How does this course fit into the programs of the department? For which students is the course designed? Explain why his course cannot be incorporated into an existing course.

This course will combine content previously covered in GEOS 220 Mineralogy and GEOS 320 Igneous and Metamorphic Petrology. This course will be a required upper-level course for students in the Geology Track and may serve as a controlled elective for students in the Environmental Geology track.

A2. Does this course require changes in the content of existing courses or requirements for a program?

This course does not require changing the existing content of any other courses or requirements for any program. GEOS 220 Mineralogy and GEOS 320 Igneous and Metamorphic Petrology will be deleted and replaced by this course.

A3. Has this course been offered at IUP on a trial basis?

This course has never been offered in the Geoscience Department.

A4. Is this course to be a dual-level course?

This course is not a dual-level course.

A5. If this course may be taken for variable credit, what criteria will be used to relate the credits to the learning experience of each student?
This course cannot be taken for variable credit.

A6. Do other higher education institutions currently offer this course? If so, please list examples.
Almost all universities with geology or geoscience departments teach courses containing similar content. Historically, as has been the case at IUP, Mineralogy and Igneous and Metamorphic Petrology have been designated as separate courses. However, recently, with the decline in petrology research, many universities are combining the two courses. Examples include:

University of Montana: Geology 226 Mineralogy and Petrology
Allegheny College: Geology 250 Introduction to Crystallography, Mineralogy, and Petrology
Bowling Green State University: Geology 306 Rocks and Minerals

A7. Is the content, or are the skills, of the proposed course recommended or required by a professional society, accrediting authority, law or other external agency?
No professional society, accrediting authority, law or other external agency recommends or requires any specific content or skills for this course.

Section B: Interdisciplinary Implications

B1. Will this course be taught by instructors from more than one department?
This course will be taught by one instructor from the Geoscience Department.

B2. What is the relationship between the content of this course and the content of courses offered by other departments?
There is no overlap between the content of this course and that of other courses offered by other departments.

B3. Will this course be cross-listed with other departments?
This course will not be cross-listed with any other department.

B4. Will seats in this course be made available to students in the School of Continuing Education?
Seats in this course will not be available to students in Continuing Education.

Section C: Implementation

C1. Are faculty resources adequate?
Faculty resources are currently adequate to teach this course. This course will be counted as one preparation and six hours of equated workload.

C2. What other resources will be needed to teach this course and how adequate are the current resources?
a. Classroom space is currently adequate to teach this course.
b. There is no special equipment required to teach either the lecture of laboratory portions of this course.

c. There may be small amounts of consumable supplies required for the laboratory portion of the class. These are either already available in the Geoscience Department or are sufficiently inexpensive that they can be covered by the department budget.
d. Library materials are currently adequate for this course.
e. There will be no additional travel expenses.

C3. Are any of the resources for this course funded by a grant?
No resources for this course are currently funded by a grant.

C4. How frequently do you expect this course to be offered?
The department expects that this course will be offered every other year (see attached program revision). There are no seasonal restrictions.

C5. How many sections of this course do you anticipate offering in any single semester?
We anticipate offering a single section of this course in a given semester.

C6. How many students do you plan to accommodate in a section of this course?
We plan to accommodate no more than twenty-four students in a section of this course. This is the maximum number of students that can be accommodated in the Geoscience Department's teaching laboratory rooms.

C7. Does any professional society recommend enrollment limits or parameters for a course of this nature?
No professional society makes recommendations for this course.

C8. Not applicable.

Section D: Miscellaneous
None.

Part III. Letters of Support or Acknowledgment
No other departments or programs are affected by this new course.