

**APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR and MINOR**

1. Submitted by the College of Agriculture Date: November 5, 2009  
 Department/Division offering course: Plant and Soil Science

2. What type of change is being proposed?  Major  Minor\*

\*See the description at the end of this form regarding what constitutes a minor change. Minor changes are sent directly from the dean of the college to the Chair of the Senate Council. If the Senate Council chair deems the change not to be minor, the form will be sent to the appropriate Council for normal processing and an email notification will be sent to the contact person.

3. Current Distance Learning (DL) status:  N/A  Already approved for DL<sup>†</sup>  Please Add  Please Drop  
 If ADDING, check one of the methods below that reflects how the majority of the course content will be delivered.  
 Internet/Web-based  Interactive Video  Extended Campus

<sup>†</sup>If already approved for DL, a new Distance Learning Form must be submitted with this form unless the department affirms (by checking this box)  that the proposed course changes will not affect DL delivery.

**PROPOSED CHANGES**

Please complete all "Current" fields.

Fill out the "Proposed" field only for items being changed. Enter N/A if not changing.

Circle the number for each item(s) being changed. For example: (6.)

4. Current prefix & number: PLS 741/GLY 741 Proposed prefix & number: N/A

5. Current Title Clay Mineralogy  
 Proposed Title<sup>†</sup> Environmental Clay Mineralogy

<sup>†</sup>If title is longer than 24 characters, offer a sensible title of 24 characters or less: \_\_\_\_\_

6. Current number of credit hours: 3 Proposed number of credit hours: 3

7. Currently, is this course repeatable? YES  NO  If YES, current maximum credit hours: \_\_\_\_\_  
 Proposed to be repeatable? YES  NO  If YES, proposed maximum credit hours: \_\_\_\_\_

8. Current grading system:  Letter (A, B, C, etc.)  Pass/Fail  
 Proposed grading system:  Letter (A, B, C, etc.)  Pass/Fail

9. Courses must be described by at least one of the categories below. Include number of actual contact hours per week for each category.

Current:

CLINICAL  COLLOQUIUM  DISCUSSION  LABORATORY  LECTURE  
 INDEPEND. STUDY  PRACTICUM  RECITATION  RESEARCH  RESIDENCY  
 SEMINAR  STUDIO  OTHER – Please explain: \_\_\_\_\_

Proposed:

CLINICAL  COLLOQUIUM  DISCUSSION  LABORATORY  LECTURE  
 INDEPEND. STUDY  PRACTICUM  RECITATION  RESEARCH  RESIDENCY  
 SEMINAR  STUDIO  OTHER – Please explain: \_\_\_\_\_

10. Requested effective date (term/year): Spring / 2010

## APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR and MINOR

11. Supplementary teaching component:  N/A     Community-Based Experience     Service Learning     Both  
*Proposed supplementary teaching component:*     Community-Based Experience     Service Learning     Both

12. Cross-listing:  N/A or GLY 741    Dhananjay Ravat / \_\_\_\_\_  
Current Prefix & Number    printed name    Current Cross-listing Department Chair    signature

a. *Proposed – REMOVE current cross-listing:*  \_\_\_\_\_ / \_\_\_\_\_  
printed name    Current Cross-listing Department Chair    signature

b. *Proposed – ADD cross-listing:* \_\_\_\_\_ / \_\_\_\_\_  
Prefix & Number    printed name    Proposed Cross-listing Department Chair    signature

13. Current prerequisites:

GLY 360 or consent of instructor

*Proposed prerequisites:*

GLY 360 or consent of instructor

14. Current Bulletin description:

A comprehensive study of the crystal structures of clay minerals commonly found in soils and sediments. Lecture and discussion, three hours. Prereq: GLY 360 or consent of instructor (same as GLY 741).

*Proposed Bulletin description:*

A comprehensive study of the crystal structures of clay minerals commonly found in soils and sediments. Lecture and discussion, two hours; laboratory, three hours. Prereq: GLY 360 or consent of instructor (same as GLY 741).

15. What has prompted this change?

The need to strengthen graduate student training by inclusion of a laboratory component.

16. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:

Hands-on laboratory sections will be added to include spectroscopic, microscopic, and thermal analyses of soil clays.

17. Please list any other department that could be affected by the proposed change:

Geological & Environmental Sciences (GLY)

18. Will changing this course change the degree requirements for ANY program on campus?     YES     NO  
 If YES\*, list below the programs that require this course:

\_\_\_\_\_

\*In order for the course change to be considered, program change form(s) for the programs above must also be submitted.

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19. Is this course currently included in the University Studies Program?  Yes  No

20.  Check box if changed to 400G or 500. If changed to 400G- or 500-level, you must include a syllabus showing differentiation for undergraduate and graduate students by (i) requiring additional assignments by the graduate students; and/or (ii) the establishment of different grading criteria in the course for graduate students. (See SR 3.1.4)

21. Within the department, who should be contacted for further information on the proposed course change?

Name: Chris Matocha Phone: 257-9312 Email: cjmato2@uky.edu

22. Signatures to report approvals:

September 15, 2009  
DATE of Approval by  
Department Faculty

Todd Pfeiffer / Todd Pfeiffer  
printed name / Reported by Department Chair / signature

\_\_\_\_\_  
DATE of Approval by College  
Faculty

\_\_\_\_\_  
printed name / Reported by College Dean / signature

\_\_\_\_\_  
\*DATE of Approval by  
Undergraduate Council

\_\_\_\_\_  
Bria / 2011:02:11 09:35:01  
printed name / Reported by Graduate Council Chair / signature  
-05'00'

\_\_\_\_\_  
\*DATE of Approval by Graduate  
Council

\_\_\_\_\_  
printed name / Reported by Graduate Council Chair / signature

\_\_\_\_\_  
\*DATE of Approval by Health  
Care Colleges Council (HCCC)

\_\_\_\_\_  
printed name / Reported by Health Care Colleges Council Chair / signature

\_\_\_\_\_  
\*DATE of Approval by Senate  
Council

\_\_\_\_\_  
Reported by Office of the Senate Council

\_\_\_\_\_  
\*DATE of Approval by the  
University Senate

\_\_\_\_\_  
Reported by the Office of the Senate Council

\*If applicable, as provided by the *University Senate Rules*. (<http://www.uky.edu/USC/New/RulesandRegulationsMain.htm>)

\*\*\*\*\*

Excerpt from *University Senate Rules*:

SR 3.3.0.G.2: **Definition.** A request may be considered a minor change if it meets one of the following criteria:

- a. change in number within the same hundred series;
- b. editorial change in the course title or description which does not imply change in content or emphasis;
- c. a change in prerequisite(s) which does not imply change in content or emphasis, or which is made necessary by the elimination or significant alteration of the prerequisite(s);
- d. a cross-listing of a course under conditions set forth in SR 3.3.0.E;
- e. correction of typographical errors.





**Syllabus for Environmental Clay Mineralogy, PLS 741  
Spring 2010, 3 credits**

**Lecture: TR 11:00am-12:00pm Room A-6 Ag. Sci. Ctr-North (AGN)**

**Lab: T 1:00-4:00pm Rooms N-131, N-103 (AGN)**

**I. Instructors:**

**Dr. A.D. Karathanasis**

**E-mail: [akaratha@uky.edu](mailto:akaratha@uky.edu)**

**Office: N-122K, Ag. North**

**Office phone: 257-5925**

**Dr. C.J. Matocha**

**E-mail: [cjmato2@uky.edu](mailto:cjmato2@uky.edu)**

**Office: N-122R Ag. North**

**Office Telephone: 257-9312**

**II. Objectives:**

- A.** Introduce basic compositional and structural concepts of clay minerals
- B.** Familiarize students with basic laboratory characterization techniques applied to clay mineralogical investigations.
- C.** Elucidate the fundamental behavior of clay minerals in response to changing environmental conditions.

**III. Reading Material:**

No textbook is required.

Primary References:

Minerals in Soil Environments. 1989. J.B. Dixon & S.B. Weed (eds). 2nd ed. Soil Sci. Soc. Am., Madison, WI.

Methods of Soil Analysis: Part 5-Mineralogical Methods. 2008. A. L. Ulery and L.R. Drees (eds.) SSSA Book Series, no. 5., Madison, WI.

**IV. Prerequisites: GLY 360 or consent of instructor**

## **Environmental Clay Mineralogy Lecture and Lab Outline**

### **A. Lecture Series**

1. Introduction (basic compositional and structural classification of minerals).
2. Structure and composition of clay minerals
  - a) Al, Fe, and Mg-hydroxides
  - b) 1:1 minerals
  - c) 2:1 minerals
  - d) 2:1:1 minerals
  - e) Allophanes and zeolites
  - f) Other typical clay-sized minerals (Mn-oxides, Ti-oxides, quartz, feldspars, carbonates)
3. Methods for identification and quantification of clay minerals
4. Surface chemistry and behavior of clay minerals in environmental processes
5. Mineral weathering, thermodynamic stability, and equilibria

### **B. Lab Series**

1. Sample preparation for mineralogical analysis
2. X-ray diffraction (XRD) analysis
3. Application of XRD for mineral identification & quantification
4. Thermal analysis
5. Application of thermal analysis for mineral identification & quantification
6. Total elemental analysis of minerals
7. Application of total elemental analysis for mineral structural composition determination
8. Scanning electron microscopy and energy dispersive x-ray analysis
9. Characterization of mineral surface charge and zeta potential properties
10. Fourier Transform infrared spectroscopy analysis

Soil Science Faculty PLS 741 Course Change – Fall 2009

Faculty Member	Vote	Date
<a href="mailto:marthur@uky.edu">marthur@uky.edu</a> ;	For	12-08-09
barton@uky.edu;		
<a href="mailto:paul.bertsch@uky.edu">paul.bertsch@uky.edu</a> ;	For	12-09-09
Coyne, Mark S;	For	12-08-09
D'Angelo, Elisa;		
Ditsch, David C;	For	12-08-09
Grove, John H;		
<a href="mailto:pkalisz@uky.edu">pkalisz@uky.edu</a> ;		
Karathanasis, A D;	For	12-08-09
<a href="mailto:brad.lee@uky.edu">brad.lee@uky.edu</a> ;	For	12-09-09
<a href="mailto:cjmato2@uky.edu">cjmato2@uky.edu</a> ;		
<a href="mailto:dave.mcnear@uky.edu">dave.mcnear@uky.edu</a> ;		
<a href="mailto:mueller@uky.edu">mueller@uky.edu</a> ;	For	12-10-09
Mullen, Michael D;		
Murdock, Lloyd W;		
<a href="mailto:rpearce@uky.edu">rpearce@uky.edu</a> ;		
Schwab, Gregory J;	For	12-08-09
Sikora, Frank J;		
Thom, William O;		
Unrine, Jason;	For	12-15-09
Wendroth, Ole O	For	12-08-09

**Syllabus for Environmental Clay Mineralogy, GLY/PLS 741**  
**Spring 2010, 3 credits**  
**Lecture:TR 1:00pm-1:50pm Room A-6 Ag. North (AGN)**  
**Lab:R 2:00-4:30pm Rooms N-131, N-103 (AGN)**

**I. Instructors:**

**Dr. A.D. Karathanasis**

**E-mail: [akaratha@uky.edu](mailto:akaratha@uky.edu)**

**Office: N-122K, Ag. North**

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**Dr. C.J. Matocha**

**E-mail: [cjmato2@uky.edu](mailto:cjmato2@uky.edu)**

**Office: N-122R Ag. North**

**Office Telephone: 257-9312**

**MW, 10-12pm, or by appointment**

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- Methods of Soil Analysis; Part 5-Mineralogical Methods. 2008. A. L. Ulery and L.R. Drees (eds.) SSSA Book Series, no. 5., Madison, WI.
- Soil Mineralogy with Environmental Applications. 2002. J.B. Dixon & D.G. Schulze (eds.) SSSA Book Series, no. 7, Madison, WI.

**IV. Prerequisites:      GLY 360 or consent of instructor**



V. **Grading System:**

<u>Evaluation type</u>	<u>Number</u>	<u>Weight(%)</u>	<u>Subtotal(%)</u>
Exam	3	20	60
Reports	5	6	30
HW and quizzes	–	–	<u>10</u>
			100

Grading criteria

<u>%</u>	<u>Grade</u>
≥90	A
80-89	B
70-79	C
≤59	E

VI. **Course Policies:**

**1) Course attendance policy:** Students who attend every session of this course will benefit from first-hand, direct learning opportunities. Excused absences are based on UK's standards (Section 5.2.4.2 of Student Rights and Responsibilities, available at <http://www.uky.edu/StudentAffairs/Code/>).

**2) Academic integrity:** Scholastic dishonesty is not tolerated. Forms of scholastic dishonesty include, but are not limited to: plagiarism (copying or using someone else's work as your own), utilization of unauthorized materials during academic evaluations, etc. University of Kentucky rules are strict on this, so we expect you to do your own, original work. For more information on academic integrity, see Part II of "The Code of Student Conduct" which can be viewed online at <http://www.uky.edu/StudentAffairs/Code/part2.html> or can be obtained in the Dean of Students office.

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Tentative schedule

Lecture	Date	Topic	Lab	Lab Reports
1	1/14/2010	Introduction-Chris	No lab	
2	1/19/2010	Introduction-Chris		
3	1/21/2010	Introduction-Chris	Lab 1 Sample Preparation-Dr. K	
4	1/26/2010	Al, Fe, Mg hydroxides-Tasios		
5	1/28/2010	ID and quantification methods (XRD)--Tasios	Lab 2 XRD--Tasios	
6	2/2/2010	1:1 minerals-Tasios		
7	2/4/2010	1:1 minerals-Tasios	Lab 3 XRD-Tasios	
8	2/9/2010	2:1 minerals-Tasios		
9	2/11/2010	2:1 minerals-Tasios	Lab 4 XRD-Tasios	
10	2/16/2010	2:1:1 minerals-Tasios		
11	2/18/2010	2:1:1 minerals-Tasios	Lab 5 XRD-Tasios	Report 1 due
12	2/23/2010	TA methods--Tasios		
13	2/25/2010	Allophanes and zeolites-Chris	Lab 6 TA lab-Tasios	
14	3/2/2010	Allophanes and zeolites-Chris		
15	3/4/2010	<b>First Exam</b>	Lab 7 TA lab-Tasios	Report 2 due
16	3/9/2010	Other minerals--Chris		
17	3/11/2010	Surface Chemistry--Chris	Lab 8 Mineral Surface Charge lab--Chris	
	Spring Break	No class		
18	3/23/2010	Surface Chemistry--Chris		
19	3/25/2010	Surface Chemistry-Zeta potential--Chris	Lab 9 Zeta potential of clay minerals--Chris	Report 3 due
20	3/30/2010	Total elemental analysis methods--Tasios		
21	4/1/2010	Mineral weathering--Tasios	Lab 10 Total elemental analysis--Tasios	
22	4/6/2010	Mineral weathering--Tasios		
23	4/8/2010	Mineral weathering--Tasios	Lab 11 Total elemental analysis--Tasios	Report 4 due
24	4/13/2010	<b>Second Exam</b>		
25	4/15/2010	FTIR methods--Chris	Lab 12 FTIR lab--Chris	
26	4/20/2010	Other Surface Chemistry Methods--Chris		
27	4/22/2010	SEM/TEM methods-Chris	Lab 13 SEM lab--Chris	Report 5 due
28	4/27/2010	XAS methods--Chris		
29	4/29/2010	Overview and wrapup		Final report