

Missouri State University
Curricular Proposal Program Change or Deletion

Department Biology Date Oct. 20, 2014

Title of Program Affected Biology Education

Type of Program: Major Comprehensive Major Option Minor Certificate Certification
Academic Rules Other

Revised Catalog Description (cut and paste present description from online catalog, strikethrough all deletions, and insert and bold new information)

See attachment A

Complete New Catalog Description

See attachment B

Total Hours no change in hours required in the program

What is changing? Check all boxes that apply.

- Title change
- Course changes of under 18 hours
- Course changes of 18 hours or more
- From option to program (major)
- From program (major) to option
- Program or option deletion
- Other _____

Reason for Proposed Change

The addition of BIO 210 as an option for the microbiology course will help with flexibility in student course scheduling while still meeting the state certification requirements.

DEPARTMENT: Route according to ART VI, SEC 3B(1-4) of Bylaws of the Faculty Senate. Forward three typed, originally signed forms to one of the following (please check all that apply and send to first council/committee marked). If the program needs to go through more than one committee/council, forward one additional form for each additional council/ committee marked.

- College Council (Send all undergraduate program changes through College Council as first step before forwarding either to PEC, CGEIP, or directly to Faculty Senate)
- Professional Education Committee (Considers all program changes affecting BS and MS in Education and Educational Specialist degrees)
- Committee on General Education and Intercollegiate Programs (Considers all general education and multi-college program changes)
- Graduate Council (Considers all graduate-level program changes)

Signature *A Mathis*
Department Head

Date 10-28-14

(Routing on Reverse Side)

Attachment A: Revised catalog description**Bachelor of Science in Education
(Certifiable grades 9-12)**

General Education Requirements - see General Education Program and Requirements section of catalog

The following required courses can be used to meet both General Education and Major Requirements: BIO 121(4); MTH 135(3) or 181(3) or 138(5) or 261(5) or 287(3); GLG 110(4) or GRY 135(4) or GLG 171(3) or PHY 100(4) or PHY 123(4)

Major Requirements

Core (32 hours): BIO 121(4), 122(4), 215(2), 235(4), 210(3) or 310(5), 361(4), 369(4), 515(3); Select elective courses in biology, 300 level or higher, to total a minimum of 32 hours.

Related Requirements (6-9 hours): SCI 505(3); MTH 135(3) and MTH 181(3), or MTH 138(5) or 261(5) or 287(3); *Note: MTH 130 cannot be substituted for MTH 135.*

Complete the requirements in one of the following grades 9-12 certification areas:

Categorical Science (13-21 hours): CHM 116(4) and 117(1), or (CHM 160(4) and 161(1) and 170(3) and 171(1)); PHY 100(4) or PHY 123(4) and 124(4); GLG 110(4) or GRY 135(4) or GLG 171(3)

Unified Science (25 hours): CHM 160(4), 170(3), 171(1); PHY 123(4), 124(4); GLG 110(4); GRY 135(4)

Public Affairs Capstone Experience will be fulfilled by completion of SCI 214(1), 314(3), 414(3), 493(6), 494(6).

Professional Education Courses (38 hours). Note: A grade of "C" or better in each course is required for state certification.

SCI 214(1), 314(3), 414(3), 493(6), 494(6)

Professional Education Required Core and Competencies - see Teacher Certification, Teacher Education Program and Secondary Education Requirements section of catalog

This program also requires compliance with the Teacher Education Program requirements for eligibility to enroll in Professional Education courses; admission to and continuance in the Teacher Education Program; approval for supervised teaching; and recommendation for certification; as well as the requirements for Secondary Education. Refer to the Teacher Education Program section of the catalog for requirements.

General Baccalaureate Degree Requirements - see General Baccalaureate Degree Requirements section of catalog

In order to meet Missouri state teacher certification requirements, candidates for the Bachelor of Science in Education degree are required to meet the following grade point average requirements: at least a 2.75 GPA on all course work attempted at all colleges attended; at least a 3.00 GPA in the certificate subject area (major field of study) which includes all courses listed under B; at least a 3.00 GPA in any additional certificate subject area; at least a 3.00 GPA in the professional education courses which includes all courses listed under C; and no grade lower than a "C" in all professional education courses. All GPA requirements include both Missouri State and transfer grades.

Health Education Certification (certifiable grades 9-12, added endorsement only): Students who complete the Bachelor of Science in Education degree with a major in Biology Education may receive Missouri state certification in Health Education grades 9-12 by completing the following courses: BMS 307(4) or KIN 250(3), BMS 308(4) or KIN 252(3), or equivalents; CFD 163(3); BMS 130(3) or 240(3); KIN 253(2), 256(2), 257(2), 358(3); PSY 101(3); SWK 330(3); plus additional hours of electives in health-related courses, in consultation with their advisor, to bring total to 30 hours. In order to meet Missouri state teacher certification requirements, student must have at least a 3.00 GPA in the certificate subject area which includes all courses listed above.

Attachment B: Complete catalog description**Bachelor of Science in Education
(Certifiable grades 9-12)**

General Education Requirements - see General Education Program and Requirements section of catalog

The following required courses can be used to meet both General Education and Major Requirements: BIO 121(4); MTH 135(3) or 181(3) or 138(5) or 261(5) or 287(3); GLG 110(4) or GRY 135(4) or GLG 171(3) or PHY 100(4) or PHY 123(4)

Major Requirements

Core (32 hours): BIO 121(4), 122(4), 215(2), 235(4), 210(3) or 310(5), 361(4), 369(4), 515(3); Select elective courses in biology, 300 level or higher, to total a minimum of 32 hours.

Related Requirements (6-9 hours): SCI 505(3); MTH 135(3) and MTH 181(3), or MTH 138(5) or 261(5) or 287(3); Note: MTH 130 cannot be substituted for MTH 135.

Complete the requirements in one of the following grades 9-12 certification areas:

Categorical Science (13-21 hours): CHM 116(4) and 117(1), or CHM 160(4) and 161(1) and 170(3) and 171(1); PHY 100(4) or PHY 123(4) and 124(4); GLG 110(4) or GRY 135(4) or GLG 171(3)

Unified Science (25 hours): CHM 160(4), 170(3), 171(1); PHY 123(4), 124(4); GLG 110(4); GRY 135(4)

Public Affairs Capstone Experience will be fulfilled by completion of SCI 214(1), 314(3), 414(3), 493(6), 494(6).

Professional Education Courses (38 hours). Note: A grade of "C" or better in each course is required for state certification.
SCI 214(1), 314(3), 414(3), 493(6), 494(6)

Professional Education Required Core and Competencies - see Teacher Certification, Teacher Education Program and Secondary Education Requirements section of catalog

This program also requires compliance with the Teacher Education Program requirements for eligibility to enroll in Professional Education courses; admission to and continuance in the Teacher Education Program; approval for supervised teaching; and recommendation for certification; as well as the requirements for Secondary Education. Refer to the Teacher Education Program section of the catalog for requirements.

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2

Missouri State University
Curricular Proposal Course Change or Deletion

Department Biology

Date Oct. 15, 2014

Check one: This is a change to X an existing COURSE
_____ an existing REGULAR (i.e. permanent) SECTION of a variable content course

Present Course Code and Number BIO 111 Course Title Understanding Biological Systems Through Inquiry

Revised Catalog Description (Copy/paste present description from online catalog, strikethrough all deletions, and insert/bold new information.)

BIO 111 ~~Understanding Biological Systems Through Inquiry~~ **Laboratory for Biology in Your World**

Prerequisite: *BIO 101 or concurrent enrollment. General Education Course (Focus on Life Sciences).*

A laboratory course that partially fulfills the general education requirement in the Life Sciences. Organisms are studied from their physiological, behavioral, ecological, hereditary, and evolutionary perspectives. Students will develop skills of gathering information about science, reasoning scientifically from that information and synthesizing responses to questions based upon that information in order to explain biological phenomena. Cannot count towards a biology major or minor. Students receiving credit towards graduation for BIO 101 and/or BIO 111 cannot also receive credit for BIO 100.

Credit hours: 1

Lecture contact hours: 0

Lab contact hours: 2

Typically offered: Fall, Spring, Summer

Complete New Catalog Information

BIO 111 Laboratory for Biology in Your World

Prerequisite: *BIO 101 or concurrent enrollment. General Education Course (Focus on Life Sciences).*

A laboratory course that partially fulfills the general education requirement in the Life Sciences. Organisms are studied from their physiological, behavioral, ecological, hereditary, and evolutionary perspectives. Students will develop skills of gathering information about science, reasoning scientifically from that information and synthesizing responses to questions based upon that information in order to explain biological phenomena. Cannot count towards a biology major or minor. Students receiving credit towards graduation for BIO 101 and/or BIO 111 cannot also receive credit for BIO 100.

Credit hours: 1

Lecture contact hours: 0

Lab contact hours: 2

Typically offered: Fall, Spring, Summer

What is changing? Check all boxes that apply.

- Course Deletion
- Course Code
- Course Number
- Title
- Prerequisite
- Credit Hours/Contact Hours
- Periodicity
- Description

Reason for Proposed Change or Deletion

The title was changed to reduce student confusion about the relationship between BIO 101 and BIO 111.

How Did You Determine the Need For This Change or Deletion?

Faculty discussion.

___ Check if this is a non-substantive change. Distribution for non-substantive changes of 100- through 500-level courses: two originally-signed copies to Faculty Senate; 600- through 900-level courses: three originally-signed copies to Graduate Council. Graduate Council will give two copies to Faculty Senate after approval.

Substantive Change: Department routes according to ART VI, SEC 3B(1-4) of Bylaws of the Faculty. Forward three originally signed forms to one of the following (please check all that apply and send to first council/committee marked). If proposal needs to go through more than one council/committee, forward one additional form for each additional council/committee marked. See Senate Action 11-93/94 for definitions of substantive/non-substantive changes.

College Council

___ Professional Education Committee

Committee on General Education and Intercollegiate Programs

___ Graduate Council (Considers all 600-900 level course changes.)

Signature A Mathis
Department Head

Date 10-27-14

(Routing on Reverse Side)

3

Missouri State University Curricular Proposal Course Change or Deletion

Department Biology

Date 10/30/14

Check one: This is a change to an existing COURSE
 an existing REGULAR (i.e. permanent) SECTION of a variable content course

Present Course Code and Number BIO 320 Course Title Introduction to Cellular Biology

Revised Catalog Description (Copy/paste present description from online catalog, strikethrough all deletions, and insert/bold new information.)

BIO 320 Introduction to Cellular Biology

Prerequisite: "C-" or better in BIO 235 or BMS 230 and BMS 232 or BMS 231; and "C-" or better in [CHM 201 and 202] or CHM 342.

Introduction to the structure and function of cells with an emphasis on eukaryotes. Supplemental course fee.

Complete New Catalog Information

BIO 320 Introduction to Cellular Biology

Prerequisite: "C-" or better in BIO 235 or BMS 230 and BMS 232 or BMS 231; and "C-" or better in [CHM 201 and 202] or CHM 342.

Introduction to the structure and function of cells with an emphasis on eukaryotes. Supplemental course fee.

What is changing? Check all boxes that apply.

- | | | | | |
|---|--------------------------------------|--|--------------------------------------|--|
| <input type="checkbox"/> Course Deletion | <input type="checkbox"/> Course Code | <input type="checkbox"/> Course Number | <input type="checkbox"/> Title | <input checked="" type="checkbox"/> Prerequisite |
| <input type="checkbox"/> Credit Hours/Contact Hours | | <input type="checkbox"/> Periodicity | <input type="checkbox"/> Description | |

Reason for Proposed Change or Deletion

BMS230 is the BMS genetics course without a lab. In order to succeed in BIO320 course, students must have a previous hands-on experience from a genetics course with a lab. We added BMS 231 is a 4-hr genetics course with a lab as an option. If students take BMS 230, then we now specify that they also must take a genetics lab course (BMS 232, a 1-hr lab course).

How Did You Determine the Need For This Change or Deletion?

Students who took BMS231 contacted us because they have not been allowed to register for BIO 320. At this time, we also noticed the oversight that the listed pre-requisite of BMS 320 did not include the lab.

Check if this is a **non-substantive** change. Distribution for non-substantive changes of 100- through 500-level courses: two originally-signed copies to Faculty Senate; 600- through 900-level courses: three originally-signed copies to Graduate Council. Graduate Council will give two copies to Faculty Senate after approval.

Substantive Change: Department routes according to ART VI, SEC 3B(1-4) of Bylaws of the Faculty. Forward three originally signed forms to one of the following (please check all that apply and send to first council/committee marked). If proposal needs to go through more than one council/committee, forward one additional form for each additional council/committee marked. See Senate Action 11-93/94 for definitions of substantive/non-substantive changes.

- College Council
- Professional Education Committee
- Committee on General Education and Intercollegiate Programs
- Graduate Council (Considers all 600-900 level course changes.)

Signature A Mathis
Department Head

Date 10-30-14

(Routing on Reverse Side)

FS Program Change - 10/8/2013

4

**Missouri State University
Curricular Proposal Program Change or Deletion**

Department Chemistry Date October 22, 2014

Title of Program Affected Master of Science, Chemistry

Type of Program: Major Comprehensive Major Option Minor Certificate Certification
Academic Rules Other

Revised Catalog Description (cut and paste present description from online catalog, strikethrough all deletions, and insert and bold new information)

6. Research Requirement. For both options, the student is required to give an oral presentation of his/her work to the Department.
- a. **Thesis Option:** The maximum credit toward the 32-hour degree requirement is 6 hours of CHM 798 and 6 hours of CHM 799. Submission of a thesis is a specific requirement for the degree. The purpose of the thesis is to demonstrate competence in scientific research and the ability to: choose a research topic of scientific importance; conduct a comprehensive literature search of the problem; design and implement a plan of research; collect and interpret scientific data; and communicate results and findings to peers. An oral defense of the thesis is required.
- b. **Non-thesis Option:** After an attempt at a research-based thesis, and with the permission of the thesis committee and department head, a student may switch to a non-thesis option. This requires the completion of two degree papers, one of which must be presented orally at a departmental seminar. Four hours of CHM 792 and four hours of CHM 798 may be counted toward this degree under this option.

Complete New Catalog Description

6. Research Requirement. For both options, the student is required to give an oral presentation of his/her work to the Department.
- a. Thesis Option: The maximum credit toward the 32-hour degree requirement is 6 hours of CHM 798 and 6 hours of CHM 799. Submission of a thesis is a specific requirement for the degree. The purpose of the thesis is to demonstrate competence in scientific research and the ability to: choose a research topic of scientific importance; conduct a comprehensive literature search of the problem; design and implement a plan of research; collect and interpret scientific data; and communicate results and findings to peers. An oral defense of the thesis is required.
- b. Non-thesis Option: After an attempt at a research-based thesis, and with the permission of the thesis committee and department head, a student may switch to a non-thesis option. This requires the completion of two degree papers, one of which must be presented orally at a departmental seminar. Four hours of CHM 792 and four hours of CHM 798 may be counted toward this degree under this option.

Total Hours 32

What is changing? Check all boxes that apply.

- Title change From option to program (major) Other Option addition
 Course changes of under 18 hours From program (major) to option
 Course changes of 18 hours or more Program or option deletion

Reason for Proposed Change

This provides another option for graduate students that cannot finish the traditional research thesis. The option requires two term papers on selected Chemistry topics. This option also requires additional lecture courses, as CHM 799 (Thesis) hours would not count towards the 32 hour requirement.

DEPARTMENT: Route according to ART VI, SEC 3B(1-4) of Bylaws of the Faculty Senate. Forward three typed, originally signed forms to one of the following (please check all that apply and send to first council/committee marked). If the program needs to go through more than one committee/council, forward one additional form for each additional council/ committee marked.

- College Council (Send all undergraduate program changes through College Council as first step before forwarding either to PEC, CGEIP, or directly to Faculty Senate)
- Professional Education Committee (Considers all program changes affecting BS and MS in Education and Educational Specialist degrees)
- Committee on General Education and Intercollegiate Programs (Considers all general education and multi-college program changes)
- Graduate Council (Considers all graduate-level program changes)

Signature 
Department Head

Date 10/23/2014

(Routing on Reverse Side)

5

Missouri State University
CURRICULAR PROPOSAL

NEW COURSE (or new REGULAR SECTION of an existing variable content course)

Department Chemistry

Date October 22, 2014

Check one: New COURSE New REGULAR (i.e. permanent) SECTION of an existing variable content course. If a new regular section of an existing variable topics course, to what existing course is it to be attached? _____

Course Code CHM Course Number 792 Course Title Degree Paper

PROPOSED CATALOG DESCRIPTION

Prerequisite: 4 hours or more of CHM 798 and permission of advisor.

Written research paper on a selected topic. Exclusively satisfies requirements for non-thesis option, which also requires that at least one CHM 792 paper will be presented orally to the department. May be repeated up to 4 hours. Graded Pass/Not Pass only. 2 (2-0) D

PURPOSE OF COURSE

RELATIONSHIP TO OTHER DEPARTMENTS

None

DEPARTMENT: Route according to ART VI, SEC 3B(1-4) of Bylaws of the Faculty. Attach New Course Resource Information form (FS 300a/05) and forward three typed, originally signed forms to one of the following (please check all that apply and send to first council/committee marked). If the course needs to go through more than one council/committee forward one additional form for each additional council/committee marked.

- College Council (All new course proposals numbered 100-599 must go through College Council first. After approval, College Council will forward appropriate number of copies to the next committee/ council or directly to the Faculty Senate if no further committee approval is needed.)
- Professional Education Committee (Considers all new courses affecting BS and MS in Education and Educational Specialist degrees)
- Committee on General Education and Intercollegiate Programs (Considers all general education and multi-college new course proposals)
- Graduate Council (Considers all 600-, 700-, and 800-level new courses)

*If the course needs to go through more than one council/committee, forward one additional form for each additional council/committee marked.

Signature [Signature]
Department Head

Date 10/23/2014

(Routing on Reverse Side)

FS New Course - 4/10/2014

5

NEW COURSE RESOURCE INFORMATION

Department Chemistry _____ Date Oct. 24, 2014 _____

Course Number and Title CHM 792 : Degreee Paper _____

Anticipated Average Enrollment 1-2 yearly _____ Maximum Enrollment Limit N/A _____

Faculty Load Assignment N/A _____ Equated Hours _____

1 Is another course being deleted? If so, give course number and title.

N/A

2 What will this course require in the way of:

Additional library holdings? N/A

Additional computer resources? N/A

Additional or remodeled facilities? N/A

Additional equipment or supplies? N/A

Additional travel funds? N/A

Additional faculty--general vs specialized? N/A

Other additional expenses? N/A

3 If additional faculty are not required, how will faculty be made available to teach this course?

Faculty members will supervise students taking this course as part of their normal research requirements. The department head and graduate director will coordinate this course as part of their normal responsibilities.

List names of current faculty qualified to teach this course:

All graduate faculty in the Chemistry department will be qualified to teach this course as needed.

4 What is the anticipated source of students for this course? (If from within the department, will students be taking this course in addition to or in place of other courses? If from outside the department, which courses in other departments would most likely be affected?)

Students already accepted into the Masters of Science program will have the option to take this course as part of a Non-Thesis option, where two degree papers will replace the traditional research-based thesis course (CHM 799 : Thesis). Other departments will not be affected by this new course.

5 Other comments:

This course is part of a Non-Thesis option for current graduate students that will not be able to finish the research-based thesis project. They will be required to attempt the traditional research thesis first before being allowed to take the Non-Thesis track. It will also be advantageous for students working full-time who may not have the ability to pursue a chemistry research project in a laboratory on campus.

5

CHEM 792: Degree Paper

Course Syllabus

Dr. Erich D. Steinle
Office: Temple 417
Phone: 836-5319

Office Hours: MWF 1:30-3:00PM
or by appointment
E-mail: esteinle@missouristate.edu

Required Course Materials

None

Course Description

Written research paper on a selected topic. Exclusively satisfies requirements for non-thesis option, which also requires that at least one CHM 792 paper will be presented orally to the department. May be repeated up to 4 hours. Graded Pass/Not Pass only. 2 (2-0) D

Grade Criteria

To achieve a passing grade in this course, the student must complete a written degree paper on a chemistry-related topic. This topic will be chosen by the student, with consultation from the student's thesis committee, graduate director, and department head. The same topic cannot be used on subsequent degree papers. The scope of the topic and the required level of detail in the degree paper will be negotiated between the student and the thesis committee prior to the start of the course.

Upon completion of the degree paper, the work will be submitted to the thesis committee, who will decide whether or not the paper is worthy of a passing grade. If the work is not passed, the student can take the comments from the committee, revise the paper and resubmit for grading.

Other Information

In order to graduate with a Masters of Chemistry degree with the non-thesis option, one of the CHM 792 Degree Papers must be given as an oral presentation. Options for this presentation include the weekly Chemistry department seminar, the Graduate Interdisciplinary Forum on campus, and Regional or National meetings of the American Chemical Society.

6

Missouri State University
CURRICULAR PROPOSAL
NEW COURSE (or new REGULAR SECTION of an existing variable content course)

Department Geography, Geology & Planning Date October 7, 2014

Check one: New COURSE New REGULAR (i.e. permanent) SECTION of an existing variable content course. If a new regular section of an existing variable topics course, to what existing course is it to be attached? _____

Course Code GLG Course Number 782 Course Title Contaminant Geochemistry

PROPOSED CATALOG DESCRIPTION

GLG 782 Contaminant Geochemistry

Recommended Prerequisite: Undergraduate background in both geology and chemistry. Geochemical principles applied to solve environmental problems involving surface water, groundwater, sediments, soils, and the atmosphere. Case studies in groundwater geochemistry, medical geology, and mining geology. Geostatistics (ArcGIS, SPSS) and geochemical modeling (MINTEQ) tools used. Credit hours: 3; Lecture contact hours: 2; Lab contact hours: 2
Typically offered: Spring (odd-numbered years)

PURPOSE OF COURSE

Provide graduate students with a clear understanding of principles of chemistry applied to solving geochemical problems, as well as with tools to make quantitative predictions on the outcome of chemical reactions working towards rock-water interaction, groundwater remediation and contamination prevention.

RELATIONSHIP TO OTHER DEPARTMENTS

Most of the audience for this course will be second-year graduate students in our M.S. program in Geospatial Sciences in Geography and Geology. We anticipate also attracting a few individual graduate students from the M.S. in Chemistry and from the MNAS program from time to time. This course should not compete directly with any existing course currently offered by any other department.

DEPARTMENT: Route according to ART VI, SEC 3B(1-4) of Bylaws of the Faculty. Attach New Course Resource Information form (FS 300a/05) and forward three typed, originally signed forms to one of the following (please check all that apply and send to first council/committee marked). If the course needs to go through more than one council/committee forward one additional form for each additional council/committee marked.

- College Council** (All new course proposals numbered 100-599 must go through College Council first. After approval, College Council will forward appropriate number of copies to the next committee/ council or directly to the Faculty Senate if no further committee approval is needed.)
**For information only
- Professional Education Committee** (Considers all new courses affecting BS and MS in Education and Educational Specialist degrees)
- Committee on General Education and Intercollegiate Programs** (Considers all general education and multi-college new course proposals)
- Graduate Council** (Considers all 600-, 700-, and 800-level new courses)

*If the course needs to go through more than one council/committee, forward one additional form for each additional council/committee marked.

Signature 
Department Head
(Routing on Reverse Side)

Date 10/7/2014
FS New Course - 4/10/2014

6

NEW COURSE RESOURCE INFORMATION

Department Geography, Geology & Planning Date September 26, 2014

Course Number and Title GLG 782 -- Contaminant Geochemistry

Anticipated Average Enrollment 5 Maximum Enrollment Limit 12

Faculty Load Assignment 3 Equated Hours

1 Is another course being deleted? If so, give course number and title.

No

2 What will this course require in the way of:

- Additional library holdings? None
- Additional computer resources? None
- Additional or remodeled facilities? None
- Additional equipment or supplies? None
- Additional travel funds? None
- Additional faculty--general vs specialized? None
- Other additional expenses? None

3 If additional faculty are not required, how will faculty be made available to teach this course?

We will consolidate sections of GLG 171 (General Education course in Environmental Geology) to free up space in the teaching schedule of Dr. Melida Gutierrez.

List names of current faculty qualified to teach this course: Dr. Melida Gutierrez

4 What is the anticipated source of students for this course? (If from within the department, will students be taking this course in addition to or in place of other courses? If from outside the department, which courses in other departments would most likely be affected?)

Most of the audience for this course will be second-year graduate students in our M.S. program in Geospatial Sciences in Geography and Geology. We anticipate also attracting a few individual graduate students from the M.S. in Chemistry and from the MNAS program from time to time. This course should not compete directly with any existing course currently offered by any other department.

5 Other comments:

POLICY STATEMENT – SPRING 20xx

GEOLOGY

**DEPARTMENT OF GEOGRAPHY,
GEOLOGY & PLANNING**

GLG 782 –CONTAMINANT GEOCHEMISTRY
Section 555 CRN 55555
TEM 331; MW 4:00 PM – 5:40 PM
Office Hours. MTWRF 1-2 PM, or by appointment

Dr. Mélida Gutiérrez
Office: Temple Hall 319
MGutierrez@MissouriState.edu
Tel. (417) 836-5967

CATALOG DESCRIPTION: GLG 782 CONTAMINANT GEOCHEMISTRY 3(2-2) S0.

Prerequisites: GLG110 and CHEM 160, or permission of instructor. Chemical principles will be applied to solve geological and environmental problems. Case studies in groundwater geochemistry, medical geology, mining exploration and processing, and disposal of wastes (oil and mining industry) will be included. Statistical methods (Excel, SPSS) and geochemical modeling (MINTEQ) tools will be used in finding the answers.

COURSE OBJECTIVES

Provide students with a clear understanding of principles of chemistry applied to solving geological problems, as well as with tools to make quantitative predictions on the outcome of chemical reactions working towards rock-water interaction, groundwater remediation and contamination prevention.

COURSE FORMAT

The course is a lecture session in which the material will be contained in 10-12 case studies. Each case study has the following components (1) reading assignment (2) introduction in class, (3) in-class exercise, (4) discussion of results, and (5) test. Additional question on these exercises or extensions to them will be assigned to graduate students. There will be online weekly quizzes on the assigned readings.

BOOKS (strongly recommended)

- a) Geochemistry, groundwater and pollution, by Appelo and Postma, 2010, 2nd Edition, CRC Publishing.
 - b) Practical Problems in Groundwater Hydrology, 2006, Blair E.S. and T.D. Lahm. Pearson Education.
- Meyer library carries a good selection of reference geochemistry books, check them out over GB code

GRADING

The final grade will be calculated as follows:

Cases Writing Assignment	20%
Cases Exams	20%
Participation and Discussion	20%
Online quizzes	20%
Final Exam	20%

- (1) homework is due the week after it is assigned; late work will be penalized by 10% each lecture day that it is late
- (2) quizzes will be available online from Thursday (5 PM) to Sunday (10 PM)- and will cover assigned reading material.

The letter grade scale is:

	92.50%-100.00%-- A	90.00%-92.50% -- A-
87.50%-89.99% -- B+	82.50%-87.50% -- B	80.00%-82.50% -- B-
77.50%-79.99% -- C+	72.50%-77.50% -- C	70.00%-72.50% -- C-
67.50%-69.99% -- D+	60.00%-67.50% -- D	0.00%-59.99% -- F

ATTENDANCE AND MAKE-UP: Excessive absence may affect your grade. Missed quizzes and in-class assignments cannot be made up for credit. Make-up exams may be requested only under dire circumstances and ahead of time. Only one exam can be made up.

DROPPING THE COURSE: If you stop coming to class and don't want an "F", you must go through the proper drop procedure. The University's deadline for automatic no penalty drop is Friday April 1Xth.

EXTRA CREDIT WORK: Activities closely related to the class can be taken for extra points, each substituting a missed quiz (max. 2). Activities need to be previously approved by the instructor.

STUDENT RESPONSIBILITIES:

Obtaining Notes/Handouts for Missed Lectures: If you miss a lecture, it is your responsibility to obtain notes/handouts from a classmate (most material will be posted in Blackboard).

Seeking Extra Help: Please consider seeking additional help before irreparable damage is done. I am happy to answer your questions and provide additional help during my office hours. However, it is your responsibility to prepare for this additional help by thoroughly reading the assigned material and carefully reviewing class notes before going to my office.

Class Disruptions: Please be considerate to your classmates. Examples of disruptions include: 1) excessive talking during class; 2) consistently arriving late for class; 3) leaving class early (without notifying the instructor); and 4) cell phone, text messaging, i-pod usage.

DISABLED STUDENTS: All physically and learning disabled students should get in touch with me as soon as possible to discuss any problems that you can foresee, e.g., if you need reasonable accommodations. MSU makes reasonable accommodations for students with disabilities

NONDISCRIMINATION: MSU is a community of people with respect for diversity that emphasizes the dignity and equality common to all individual faculty, staff and students. The University does not discriminate on the basis of race, color, religion, sex, national origin, ancestry, age, disability, or veteran status in employment or in any of its program or activities. A grievance procedure incorporating due process is available to any person who believes he or she has been discriminated against. Inquiries should be directed to the Equal Opportunity Officer, Office for Institutional Equity and Compliance, equity@missouristate.edu 417-836-4252. Please visit the OED site at www.missouristate.edu/equity/. Other types of concerns (i.e., of academic nature) should be discussed directly with your instructor and can also be brought to the attention of your instructor's Department Head.

PROBLEMS: If you foresee or experience any problems during the course, please come and see me as early as possible. I am easy to reach by phone or by e-mail.

TENTATIVE SCHEDULE GLG 782

I. Water Chemistry, Balancing Ions, Units, modeling

Balancing ions, Case: *Coal Pile Storage, Deepwater Station, N.J.*

MINTEQ2 Case: *Water quality in carbonate aquifers*

Geochemistry and human health. Case: *Fluoride and volcanic activity*

Emergent contaminants Case: *Llobregat aquifer, Spain*

II. Surface Water Contamination

Agricultural wastes, eutrophication

Rivers, Case: *Metal pollution in Rhine River, Germany*

Ponds and lakes, Case: *Emergent contaminants Cape Cod*

Modeling, Case: *Swine manure treatment modeling*

Silicate weathering, Case: *Aqua de Penha, Portugal*

III. Groundwater Contamination

Seawater intrusion. Case: *Fossil aquifer Tunisia*

Aquifer characterization. Case: *Estimating hydraulic conductivity and Remediation of TCE and PCE at North Canton, Ohio*

Contaminant transport and remediation, Case: *Problem 1 — 1-D Contaminant Transport of TCE (Concentration versus Distance) South Well Field, Wooster, Ohio*

IV. Soils, Sediments, and Rock-Water Interaction

Definition soil & sediment, size distribution, analyses, sequence of extraction

Spatial analyses of metal contamination. Case: *Copper*

Landfills: Case: *Old leaking landfill in Denmark*

Fracking: Case: *Potential groundwater-quality degradation associated with production of shale gas*

V. FINAL EXAM

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Dr Gutierrez holds a Ph.D. in Geohydrology from the University of Texas at El Paso (UTEP), graduated 1992. Since 1994 she has taught at Missouri State University (MSU), Geography, Geology and Planning Department the courses of Physical Geology, Earth Science for Teachers, Water Resources, Environmental Geology, Principles of Geochemistry, Groundwater Contamination, and Research in Geology.

Her research focuses on soil and water contamination, stream water quality, geochemistry of natural waters, geochemical modeling of carbon sequestration, and earth science education. The areas in which I have conducted research are the states of Missouri and the state of Chihuahua, Mexico. Some of her recent peer-reviewed articles include:

Gutierrez M, Wu S, Peebles J. Assessment of mine-contaminated sediments in southwest Missouri. In press.

Reyes VM , Alarcon-Herrera MT, Gutierrez M., Nuñez, D. Arsenic and fluoride in groundwater of an endorheic basin undergoing land use changes. In press.

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