Missouri State.

Curricular Action Workflow

designed by Computer Services

New Course Proposal Form

Submitted on 11/23/2016 by Xiaomin Qiu (Qiu@missouristate.edu).

*All fields require input

(•) New COURSE

( ) New REGULAR PERMANENT SECTION of an existing variable content course. If a new regular section of an existing variable topics course, enter the existing course number below

Course Code: GEO

Course Number: (Check Availability) 200

Course Title: Exploring Our Digital Earth

Will this proposal need to be reviewed by CGEIP? ( ) No (•) Yes

Will this proposal need to be reviewed by EPPC? (•) No ( ) Yes

Prerequisite/Co-requisite or enter 'None': None

General Course Description: (Include any Pass/Not Pass grading restrictions, repeatable limits, limitation on course applicability, UG/GR parallel course, etc.)

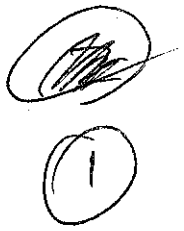
General Education Course (Focus on Public Issues). An exploration of the geospatial technologies related to digital Earth with a focus on their applications in our current world. Topics include geospatial data, digital mapping, geographic information systems(GIS), global positioning systems (GPS), and remote sensing. This course uses a wide range of geospatial technology software freely available on the Internet, and provides an introduction to geospatial technologies as critical thinking and inquiry tools. 3(3-0) F,S.

Credit Hours:	3	Lecture Contact Hours:	3	Lab Contact Hours:	0

Note: If variable credit, enter the highest number and add to end of course description. (e.g. "Variable credit, may be taken 1-3 hours.")

Periodicity. Check all that apply.

[x] Fall [ ] Fall (even-numbered years only) [ ] Fall (odd-numbered years only)



☑ Spring ☐ Spring (even-numbered years only) ☐ Spring (odd-numbered years only)

☐ Summer ☐ On Demand only

Complete Catalog Description:
GEO 200 Exploring Our Digital Earth
Prerequisite: None
General Education Course (Focus on Public Issues). An exploration of the geospatial technologies related to digital Earth with a focus on their applications in our current world. Topics include geospatial data, digital mapping, geographic information systems(GIS), global positioning systems (GPS), and remote sensing. This course uses a wide range of geospatial technology software freely available on the Internet, and provides an introduction to geospatial technologies as critical thinking and inquiry tools. 3(3-0) F,S.
Credit hours: 3 Lecture contact hours: 3 Lab contact hours: 0
Typically offered: Fall, Spring

Include sample syllabus (list topics, course goals.) Use text box OR upload only file types of PDF, DOC or DOCX.

Attached

Purpose of Course

The primary goal of GEO 200 is to offer students an overview of knowledge and techniques about several different geospatial technologies related to digital Earth. Students will develop basic skills to utilize geospatial technologies to collect, manage, analyze, and display geospatial information, e.g. point, linear, and polygon data, aerial photos, and satellite images, to address real-world problems, personally or socially relevant. With the geospatial technologies as exploration tools, students will also be able to develop new perspectives and understanding about our dynamic Earth.

Relationship to Other Departments

N/A

Is there a graduate/undergraduate parallel course to this one? ◉ No ○ Yes

New Course Resource Information

Anticipated Average Enrollment per section:	25	Maximum Enrollment Limit per section:	30
Anticipated Average Enrollment per semester:	50	Maximum Enrollment Limit per semester:	60
Anticipated Average Enrollment per year:	100	Maximum Enrollment Limit per year:	120
Faculty Load Assignment (equated hours):	3		

Is another course being deleted? ◉ No ○ Yes

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

Additional faculty; regular vs per-course

N/A

Other additional expenses

N/A

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

Several faculty members with expertise in Geospatial Science in the Department of Geography, Geology, and Planning are currently teaching one or two sections Regional Geography Courses per year, and the Regional Geography Courses do not require instructors with geospatial specialty. Once GEO200 is approved, these faculty members will teach one or two sections of GEO200 per year.

List names of current faculty qualified and available to teach this course

Dr. Xiaomin Qiu, Dr. Toby J. Dogwiler, Dr. Xin Miao, Dr. Jun Luo

What is the anticipated source of students for this course?

Students with interests in geospatial technologies, e.g. geospatial data, digital mapping, geographic information systems(GIS), global positioning systems (GPS), and remote sensing, from within and outside of the department.

If from within the department, will students be taking this course in addition to or in place of other courses?

If GEO200 is approved as a general education course, under Public Affairs--Public Issues, students could take GEO200, instead of PLN100 Understanding Cities from the department, to fulfill the general education requirement for this category.

If from outside the department, which courses in other departments would most likely be affected?)

If GEO200 is approved as a general education course, under Public Affairs--Public Issues, students could take GEO200, instead of courses from other departments, to fulfill the general education requirement for this category.

Other comments:

Over the past two decades, geospatial technologies, including digital mapping, geographic information systems (GIS), global positioning systems (GPS), and remote sensing, have evolved to recharacterize our Earth. Educators worldwide have recognized that geospatial technologies are key technologies to prepare students to be tomorrow's decision makers dealing with local, regional, and global issues. GEO 200 explores geospatial technologies related to digital Earth with a focus on their applications in our current world. Topics include geospatial data, digital mapping, geographic information systems(GIS), global positioning systems (GPS), and remote sensing. This course will use a wide range of geospatial technology software freely available on the Internet, and provide an introduction to geospatial technologies as critical thinking and inquiry tools. The goals and content of GEO 200 are aligned with the mission, vision, and values of Missouri State University.

What is the date that this new course was approved by departmental or program faculty? (MM/DD/YYYY) 08/26/2016

Current Status:

College Council Review

Proposal Progress:

12/19/2016 - Submitted by Department Head (Toby Dogwiler)

Review Comments:

No comments have been added to this proposal.

[redacted]

(1)

POLICY STATEMENT

GEO 200 – Exploring Our Digital Earth
FALL 2017
TR 11:00-12:15 pm TEMPLE 143

INSTRUCTOR: Dr. Xiaomin Qiu
OFFICE: Temple Hall 323
PHONE: 417-836-3219
E-MAIL: qiu@missouristate.edu
OFFICE HRS: Monday 10:00am-12:00pm; Tuesday 4:00-5:00pm; Wednesday 10:00am-12:00pm or by appointments

CATALOG DESCRIPTION: GEO 200 Exploring Our Digital Earth 3(3-0) F,S.
General Education Course (Focus on Public Issues). An exploration of the geospatial technologies related to digital Earth with a focus on their applications in our current world. Topics include geospatial data, digital mapping, geographic information systems(GIS), global positioning systems (GPS), and remote sensing. This course uses a wide range of geospatial technology software freely available on the Internet, and provides an introduction to geospatial technologies as critical thinking and inquiry tools. 3(3-0) F,S.

COURSE OBJECTIVES
The primary goal of GEO 200 is to offer students an overview of knowledge and techniques about several different geospatial technologies related to digital Earth. Students will develop basic skills to utilize geospatial technologies to collect, manage, analyze, and display geospatial information, e.g. point, linear, and polygon data, aerial photos, and satellite images, to address real-world problems, personally or socially relevant. With the geospatial technologies as exploration tools, students will also be able to develop new perspectives and understanding about our dynamic Earth.

GENERAL EDUCATION GOALS AND LINKS TO GEO 200 GOALS
GEO 200 is part of the Public Affairs component of General Education at Missouri State, Focus on Public Issues:

I. GEO 200 addresses General Goal (1): *Students will be able to develop the disposition and skills to gather, organize, refine, analyze, and evaluate critically information and ideas.*

The goals of GEO 200 support the Specific Learning Outcomes (SLOs) of General Goal (1) as follows:

SLO1. *Identify and follow through on personally and socially relevant problems and reasonable solutions to those problems.*

GEO 200 Goal 2: Students will be able to understand and follow the process of solving real-world problem by collecting, managing, analyzing, and displaying geospatial data in geospatial software freely available on the Internet.

SLO2. *Identify relevant information sources, make reasoned choices among those sources, and open-mindedly follow where those sources lead.*

GEO 200 Goal 1: Students will be able to identify major geospatial data sources at various levels, from federal agencies to local municipalities, from government agencies to open source organizations.

SLO3. *Justify conclusions reached in the analysis of information.*

GEO 200 Goal 3: Students will be able to analyze geospatial information to reach and justify the conclusions about social issues and questions related to our dynamic Earth.

II. GEO 200 addresses General Goal (2): *Students will be able to develop new ideas, products, or solutions and explore novel perspectives and approaches.*

The goals of GEO 200 support the Specific Learning Outcomes (SLOs) of General Goal (2) as follows:

SLO1. *Develop creative and novel solutions to personally and socially relevant problems.*

GEO 200 Goal 4: Students will be able to find location-based solutions to the problems socially or personally related by analyzing geospatial data and displaying as mapping product in geospatial software freely available.

SLO2. *Take account of novel, alternative, contradictory, and even radical viewpoints in creating new ideas, products, or solutions appropriate to the domain or subject matter.*

GEO 200 Goal 7: With the geospatial technologies as exploration tools, students will be able to develop novel perspectives and understanding about phenomena and issues on the surface of the Earth.

III. GEO 200 addresses General Goal (12): *Students will be able to recognize the importance of contributing their knowledge and experiences to their own communities and the broader society.*

The goals of GEO 200 support the Specific Learning Outcomes (SLOs) of General Goal (12) as follows:

SLO3. *Utilize knowledge from academic fields, making relevant connections to civic and political participation.*

GEO 200 Goal 6: Students will be able to utilize the geospatial knowledge and skills to map and understand the spatial structure of civic engagement and political participation locally and regionally.

SLO4. *Recognize the needs of the communities to which they belong and understand how to address those needs.*

(1)

GEO 200 Goal 5: Students will be able to identify where the problems or issues are located locally and regionally and how they can be solved by using geospatial data and technologies.

REQUIRED TEXTBOOK
Introduction to Geospatial Technologies, Third Edition, by Bradley A Shellito; Macmillan, 2016.

COURSE ASSESSMENT – CGEIP
Methods: Assessment Surveys and Pre-test/Post-test

GEO 200 is a General Education course. As required by the General Education program, GEO 200 will be assessed regularly to determine how well it is satisfying the aims and goals of the General Education program. As a result, students will be required to answer an **Assessment Survey and Pre-Test** in class during the first week of the semester. During the final exam week, students will then be required to answer a second **Assessment Survey and Post-Test**. Students' performance on either of these assessments will not have any negative effect on their grade for this course.

In order to give students an incentive to do well on the **Post-Test**, this course offer the option of substituting students' scores on this **Post-Test** for the score on the lowest of their first two exams (e.g., Exam#1 or Exam#2). That means students' performance on the **Post-Test** can potentially improve their Final Grades for this class.

COURSE REQUIREMENTS
Attendance: As is always the case, it is best to attend all lectures and laboratories. Poor attendance is closely associated with poor performance in classroom at higher education level. You are responsible for all materials and deadlines during classes. You should make appointment with advisors, doctors, etc. for the time other than the class time. A written doctor's note or other official document stating that you were unable to attend class is required for counting missing attendance towards extra attendance credit.

Examinations: There will be a total of four exams, including the final.
Exercises: There will be assignments for this class. No late assignments will be accepted after 2 days. For every day late, the exercise or assignment will drop one letter grade. After 2 days (not 2 class periods) the grade for the assignment will be zero. You have until the beginning of the class on the day the assignment is due to turn it in, after which it will be considered one day late. Computer errors and lost or damaged storage media is not an acceptable excuse for late or missing assignments.
Make-ups: No make-up exams or extensions will be given without a written doctor's note or other official document stating that you were incapacitated and/or unable to attend. All make-up examinations will be arranged with Dr. Qiu before December 1st, 2017.
Conduct: Your conduct in the classroom should be adult-like and conducive to learning. If your conduct does not fit these standards, points may be deducted from your final letter grade.

GRADE DETERMINATION

Your final grade is based upon:
15% Exam #1
15% Exam #2
15% Exam #3
15% Final Exam
40% Assignments
3% Extra Credit for Good Attendance (>90% for the 10-20 **random** attendance checking)

Your scores will be converted to a letter grade according to the following scale:
92.50%-100.00% -- A
90.00%-92.49% -- A-
87.50%-89.99% -- B+
82.50%-87.49% -- B
80.00%-82.49% -- B-
77.50%-79.99% -- C+
72.50%-77.49% -- C
70.00%-72.49% -- C-
67.50%-69.99% -- D+
60.00%-67.49% -- D
0.00%-59.99% -- F
INCOMPLETE: Incompletes are not given for this course.

PROCEDURES FOR DROPPING A CLASS
It is your responsibility to understand the University's procedure for dropping a class. If you stop attending this class but do not follow proper procedure for dropping the class, you will receive a failing grade and will also be financially obligated to pay for the class. For information about dropping a class or withdrawing from the university, contact the Office of the Registrar at 836-5520. You may refer to Academic Calendars (www.missouristate.edu/registrar/acad_cal.html) for relevant drop deadlines.

ACADEMIC INTEGRITY/CHEATING AND PLAGIARISM
Missouri State University is a community of scholars committed to developing educated persons who accept the responsibility to practice personal and academic integrity. You are responsible for knowing and following the University's academic integrity policy plus additional more-specific policies for each class. The University policy, formally known as the "Student Academic Integrity Policies and Procedures" is available online at http://www.missouristate.edu/policy/Op3_01_AcademicIntegrityStudents.htm and also at the Reserves Desk in Meyer Library. Any student participating in any form of academic dishonesty will be subject to sanctions as described in this policy.

DISABILITY ACCOMMODATIONS
To request academic accommodations for a disability, contact the Director of the Disability Resource Center, Meyer Library Suite 111, 417-836-4192 or 417-836-6792 (TTY), www.missouristate.edu/disability. Students are required to provide documentation of disability to the Disability Resource Center prior to receiving accommodations. The Disability Resource Center refers some types of accommodation requests to the Learning Diagnostic Clinic, which

also provides diagnostic testing for learning and psychological disabilities. For information about testing, contact the Director of the Learning Diagnostic Clinic, 417-836-4787, http://psychology.missouristate.edu/ldc.

NON-DISCRIMINATION POLICY

Missouri State University is an equal opportunity/affirmative action institution, and maintains a grievance procedure available to any person who believes he or she has been discriminated against. At all times, it is your right to address inquiries or concerns about possible discrimination to the Office for Equity and Diversity, Park Central Office Building, 117 Park Central Square, Suite 111, 417- 836-4252. Other types of concerns (i.e., concerns of an academic nature) should be discussed directly with your instructor and can also be brought to the attention of your instructor's Department Head. Please visit the OED website at www.missouristate.edu/equity/.

CELL PHONE POLICY

As a member of the learning community, each student has a responsibility to other students who are members of the community. When cell phones or pagers ring and students respond in class or leave class to respond, it disrupts the class. Therefore, the Office of the Provost prohibits the use by students of cell phones, pagers, PDAs, or similar communication devices during scheduled classes. All such devices must be turned off or put in a silent (vibrate) mode and ordinarily should not be taken out during class. Given the fact that these same communication devices are an integral part of the University's emergency notification system, an exception to this policy would occur when numerous devices activate simultaneously. When this occurs, students may consult their devices to determine if a university emergency exists. If that is not the case, the devices should be immediately returned to silent mode and put away. Other exceptions to this policy may be granted at the discretion of the instructor.

EMERGENCY RESPONSE

At the first class meeting, students should become familiar with a basic emergency response plan through a dialogue with the instructor that includes a review and awareness of exits specific to the classroom and the location of evacuation centers for the building. All instructors are provided this information specific to their classroom and/or lab assignments in an e-mail prior to the beginning of the fall semester from the Office of the Provost and Safety and Transportation. Students with disabilities impacting mobility should discuss the approved accommodations for emergency situations and additional options when applicable with the instructor. For more information go to http://www.missouristate.edu/safetran/51597.htm and http://www.missouristate.edu/safetran/erp.htm.

Course Outline: Lecture Section (tentative*)

Week	Topic	Reading	Assignment
1	It's a Geospatial World Out There: Introduction to geospatial technologies, geospatial Data, geospatial Jobs, and Google Earth	Chapter 1	Assignment 1: Google Earth (GE) environment, basic functionality, and navigation; GE layers and features

2	Where in the Geospatial World are you? Locations in a digital world, position measurements, coordinate systems, and map projections	Chapter 2	Assignment 2: Coordinates and position measurements in GE
3	Getting Data to Match the Map: Reprojecting, control points, and Transformation	Chapter 3	Assignment 3: Georeferencing images in Microsoft MapCruncher utility
4	Finding Location with Global Positioning System (GPS): GPS origins, applications, and geocaching	Chapter 4	Assignment 4: GPS satellite positions in Trimble Planning Software
EXAM 1			
5	Working with Digital Geospatial Data and Geographic Information Systems (GIS): Modeling the real world, attribute data, metadata, and QGIS	Chapter 5	Assignment 5: Quantum GIS (QGIS) environment, navigation, data characteristics, attribute table, and measurements between objects
6	Using GIS for Spatial Analysis: Databased Query and selection, geoprocessing concepts	Chapter 6	Assignment 6: Database construction and simple spatial analysis in QGIS
7	Using GIS to Make a Map: scale, layouts, and digital map distribution formats	Chapter 7	Assignment 7: Map composer functions in QGIS
8	Getting There Quicker with Geospatial Technologies: Vehicle navigation systems, road maps in a digital world, street networks online	Chapter 8	Assignment 8: Geocoding and Shortest Path analysis in QGIS
EXAM 2			
9	Remotely Sensed Images from Above: aerial photo, color infrared photos, orthophotos, visual image interpretation, photogrammetric measurements	Chapter 9	Assignment 9: Visual image interpretation in Google Earth
10	How Remote Sensing Works: Electromagnetic energy, spectral reflectance, digital imagery	Chapter 10	Assignment 10: Remotely sensed imagery and color composites in MultiSpec
11	Images from Space: Satellite remote sensing, satellite orbits, Landsat program	Chapter 11	Assignment 11: Working with Landsat imagery in MultiSpec
12	Studying the Environment from Space: NASA's Earth Observing System (EOS) program, Terra, Aqua, Aura, and EOS Imagery	Chapter 12	Assignment 12: Examining EOS & MODIS imagery in Google Earth; using Terra and Aqua imagery for environmental analysis
EXAM 3			

13	Digital Landscaping: Digital topographic maps, LIDAR, and 3D view of Landscapes and Terrain	Chapter 13	Assignment 13: Digital terrain analysis in Google Earth and MICRODEM
14	See the World in 3D: 3D geovisualization, 3D modeling, SketchUp, and Google Earth in 3D	Chapter 14	Assignment 14: 3D modeling and visualization in SketchUp and Google Earth
15	Life in the Geospatial Cloud and Other Current Developments: How to easily get data online, using the cloud with geospatial technology, web maps, geospatial technologies in K-12 education, college and university geospatial education	Chapter 15	Assignment 15: Exploring ArcGIS Explorer
FINAL EXAM			

*The instructor may change topics according to progress during the semester.

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Missouri State.

Curricular Action Workflow

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Change Course Proposal Form

Submitted on 12/12/2016 by William Bray (WBray@MissouriState.edu).

*All fields require input

This proposal applies to:

- (●) An existing COURSE
- ( ) An existing REGULAR (e.g. permanent) SECTION of a variable content course.

Existing Course:

MTH215 Discrete Mathematics

Will this proposal need to be reviewed by CGEIP? (●) No ( ) Yes

Will this proposal need to be reviewed by EPPC? (●) No ( ) Yes

Current online catalog description:

MTH 215 Discrete Mathematics

Prerequisite: MTH 138 or approved calculus course or appropriate placement score. Topics include: logic, mathematical reasoning, basic counting, discrete probability, matrices, recursion, sets and relations, graphs and trees. 3(3-0) F,S

Revise the current online catalog description as needed: (Strikethrough all deletions and insert/bold new information. Any content that is copied and pasted will lose existing formatting; please review prior to submission.)

MTH 215 Discrete Mathematics

Prerequisite: **MTH 181 or** MTH 138 or approved calculus course or appropriate placement score. Topics include: logic, mathematical reasoning, basic counting, discrete probability, matrices, recursion, sets and relations, graphs and trees. 3(3-0) F,S

What is changing? Check all boxes that apply.

- ☐ Course Code
- ☐ Course Number (Check Availability)
- ☐ Title
- ☑ Prerequisite
- ☐ Credit Hours/Contact Hours
- ☐ Periodicity
- ☐ Description

2

Reason for proposed change

The combination of MTH 135 and 181 is equivalent to the single course MTH 138, hence it makes sense to allow MTH 181 as a possible prerequisite for MTH 215

Does this change affect course assessment (e.g. student learning evidence/outcomes)? ◉ No ○ Yes

How did you determine the need for this change? Check all boxes that apply or specify other.

☑ Routine or annual review/assessment of curriculum ☐ Faculty Input ☐ Student Input

☐ Accreditation/certification compliance ☐ Review of catalog information

☐ Other (be specific):

☐ Check if this is a non-substantive change.

What is the date that this course change was approved by departmental or program faculty? (MM/DD/YYYY) 12/08/2016

Current Status:

College Council Review

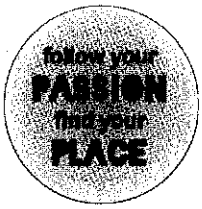
Proposal Progress:

12/12/2016 - Submitted by Department Head (William Bray)

Review Comments:

No comments have been added to this proposal.

[redacted]



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Missouri State.

Curricular Action Workflow

designed by Computer Services

Change Course Proposal Form

Submitted on 12/24/2016 by G Schick (AlanSchick@MissouriState.edu).

*All fields require input

This proposal applies to:

- (●) An existing COURSE
- ( ) An existing REGULAR (e.g. permanent) SECTION of a variable content course.

Existing Course:

CHM502 Techniques of Instrumental Analysis

Will this proposal need to be reviewed by CGEIP? (●) No ( ) Yes

Will this proposal need to be reviewed by EPPC? (●) No ( ) Yes

Current online catalog description:

CHM 502 Techniques of Instrumental Analysis

Prerequisite: "C-" or better in [CHM 201 and 202] or CHM 342; and "C-" or better in CHM 302. Recommended Prerequisite: PHY 124 or PHY 204. Applications of instrumental methods for the separation and analysis of materials; included are potentiometry, photometry and chromatography. May be taught concurrently with CHM 602. Cannot receive credit for both CHM 602 and CHM 502. Supplemental course fee. 4(3-3) F

Revise the current online catalog description as needed: (Strikethrough all deletions and insert/bold new information. Any content that is copied and pasted will lose existing formatting; please review prior to submission.)

CHM 502 ~~Techniques of~~ Instrumental Analysis

Prerequisite: "C-" or better in either ~~[~~CHM 201 ~~and 202]~~ or CHM 342; and "C-" or better in CHM 302. Recommended Prerequisite: PHY 124 or PHY 204. Applications of instrumental methods for the separation and analysis of materials; included are potentiometry, photometry and chromatography. May be taught concurrently with CHM 602. Cannot receive credit for both CHM 602 and CHM 502. ~~Supplemental course fee.~~ 4~~(3-3)~~ **3(3-0)**F

What is changing? Check all boxes that apply.

3

☐	Course Code	☐	Course Number (Check Availability)	☑	Title	☑	Prerequisite
☑	Credit Hours/Contact Hours	☐	Periodicity	☑	Description		

Reason for proposed change

For better scheduling flexibility, we are splitting the lab and lecture components of this course into separate offerings. For reasons related to course numbering consistency within our department, we wish to keep the course number unchanged for the lecture component, and the lab will become CHM 503 (see separate New Course curriculum proposal). We previously did the same thing to CHM 107 (which became CHM 107 Lec and 108 Lab) with few advising problems, and the current course should affect only CHM majors, so no advising complications are anticipated to arise from changing the credit hours and scope of an active course number. Additionally, some minor updates to the course name and catalog description are being proposed as shown in the Revised Catalog Description box above.

Does this change affect course assessment (e.g. student learning evidence/outcomes)? ◉ No ○ Yes

How did you determine the need for this change? Check all boxes that apply or specify other.

☐	Routine or annual review/assessment of curriculum	☑	Faculty Input	☑	Student Input
☐	Accreditation/certification compliance	☐	Review of catalog information		
☐	Other (be specific):				
☐	Check if this is a non-substantive change.				

What is the date that this course change was approved by departmental or program faculty? (MM/DD/YYYY) 09/20/2016

Current Status:

College Council Review

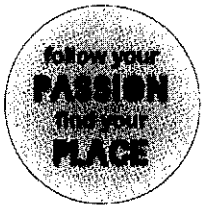
Proposal Progress:

01/05/2017 - Submitted by Department Head (Bryan Breyfogle)

Review Comments:

No comments have been added to this proposal.

[redacted]



4

Missouri State.

Curricular Action Workflow

Designed by Computer Services

Change Course Proposal Form

Submitted on 12/24/2016 by G Schick (AlanSchick@MissouriState.edu).

*All fields require input

This proposal applies to:

- (●) An existing COURSE
- ( ) An existing REGULAR (e.g. permanent) SECTION of a variable content course.

Existing Course:

CHM602 Techniques of Instrumental Analysis

Will this proposal need to be reviewed by CGEIP? (●) No ( ) Yes

Will this proposal need to be reviewed by EPPC? (●) No ( ) Yes

Current online catalog description:

CHM 602 Techniques of Instrumental Analysis

Prerequisite: "C-" or better in either [CHM 201 and 202] or CHM 342; and "C-" or better in CHM 302. Recommended Prerequisite: PHY 124 or PHY 204. Applications of instrumental methods for the separation and analysis of materials; included are potentiometry, photometry and chromatography. Does not apply to a Chemistry major if the student passes CHM 702. May be taught concurrently with CHM 502. Cannot receive credit for both CHM 502 and CHM 602. 4(3-3) F

Revise the current online catalog description as needed: (Strikethrough all deletions and insert/bold new information. Any content that is copied and pasted will lose existing formatting; please review prior to submission.)

CHM 602 ~~Techniques of~~ Instrumental Analysis

Prerequisite: "C-" or better in either ~~[~~CHM 201 ~~and 202]~~ or CHM 342; and "C-" or better in CHM 302. Recommended Prerequisite: PHY 124 or PHY 204. Applications of instrumental methods for the separation and analysis of materials; included are potentiometry, photometry and chromatography. ~~Does not apply to a Chemistry major if the student passes CHM 702.~~ May be taught concurrently with CHM 502. Cannot receive credit for both CHM 502 and CHM 602. ~~4(3-3)~~ **3(3-0)**F

What is changing? Check all boxes that apply.

☐ Course Code ☐ Course Number (Check Availability) ☑ Title ☑ Prerequisite

☑ Credit Hours/Contact Hours ☐ Periodicity ☑ Description

Reason for proposed change

In order to better serve our Accelerated MS program students and improve scheduling flexibility, we wish to split the lab and lecture components of this course into separate offerings. For reasons related to course numbering consistency within our department, we wish to keep the course number unchanged for the lecture component, and the lab will become CHM 503/603 (see separate New Course curriculum proposal). We previously did the same thing to CHM 107 (which became CHM 107 Lec and 108 Lab) with few advising problems, and the current course should affect only CHM majors, so no advising complications are anticipated to arise from changing the credit hours and scope for a continuing course number. Additionally, some minor updates to the course name and catalog description are being proposed as shown in the Revised Catalog Description box above.

Does this change affect course assessment (e.g. student learning evidence/outcomes)? ◉ No ○ Yes

How did you determine the need for this change? Check all boxes that apply or specify other.

☐ Routine or annual review/assessment of curriculum ☑ Faculty Input ☑ Student Input

☐ Accreditation/certification compliance ☐ Review of catalog information

☐ Other (be specific):

☐ Check if this is a non-substantive change.

What is the date that this course change was approved by departmental or program faculty? (MM/DD/YYYY) 09/20/2016

Current Status:

Grad Council Review

Proposal Progress:

01/05/2017 - Submitted by Department Head (Bryan Breyfogle)
01/10/2017 - Reviewed by Dean (Tamera Jahnke)

Review Comments:

No comments have been added to this proposal.

[redacted]

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Missouri State.

Curricular Action Workflow

designed by Computer Services

New Course Proposal Form

Submitted on 01/09/2017 by G Schick (AlanSchick@MissouriState.edu).

*All fields require input

(•) New COURSE

( ) New REGULAR PERMANENT SECTION of an existing variable content course. If a new regular section of an existing variable topics course, enter the existing course number below

Course Code: CHM

Course Number: (Check Availability) 503

Course Title: Instrumental Analysis Laboratory

Will this proposal need to be reviewed by CGEIP? (•) No ( ) Yes

Will this proposal need to be reviewed by EPPC? (•) No ( ) Yes

Prerequisite/Co-requisite or enter 'None':
Prerequisite: "C" or better in CHM 302; and "C" or better in CHM 502 or CHM 602 or current enrollment.

General Course Description: (Include any Pass/Not Pass grading restrictions, repeatable limits, limitation on course applicability, UG/GR parallel course, etc.)
A laboratory course emphasizing applications of instrumental methods for the separation and analysis of materials. The course is designed to reflect and supplement the scope of CHM 502. Included are laboratory exercises in potentiometry, spectrophotometry, and chromatography. May be taught concurrently with CHM 603. Cannot receive credit for both CHM 503 and CHM 603.

Credit Hours: 1 Lecture Contact Hours: 0 Lab Contact Hours: 0

Note: If variable credit, enter the highest number and add to end of course description. (e.g. "Variable credit, may be taken 1-3 hours.")

Periodicity. Check all that apply.

[x] Fall [ ] Fall (even-numbered years only) [ ] Fall (odd-numbered years only)

5

☐ Spring ☐ Spring (even-numbered years only) ☐ Spring (odd-numbered years only)

☐ Summer ☐ On Demand only

Complete Catalog Description:
CHM 503 Instrumental Analysis Laboratory
Prerequisite: Prerequisite: "C-" or better in CHM 302; and "C-" or better in CHM 502 or CHM 602 or current enrollment.
A laboratory course emphasizing applications of instrumental methods for the separation and analysis of materials. The course is designed to reflect and supplement the scope of CHM 502. Included are laboratory exercises in potentiometry, spectrophotometry, and chromatography. May be taught concurrently with CHM 603. Cannot receive credit for both CHM 503 and CHM 603.
Credit hours: 1 Lecture contact hours: 0 Lab contact hours: 0
Typically offered: Fall

Include sample syllabus (list topics, course goals.) Use text box OR upload only file types of PDF, DOC or DOCX.

Attached

Purpose of Course

For better scheduling flexibility, we are splitting the Lab and lecture components of CHM 502 into separate offerings. This New Course Proposal is for the Lab course, CHM 503. [The lecture course is keeping the original course number, CHM 502, and has been submitted separately in a Change Course Proposal form.] The content of CHM 503 (the lab component) is not changing scope from its current contribution in CHM 502. The sample syllabus is therefore effectively just an extraction of the laboratory portion of the current CHM 502 syllabus.

Relationship to Other Departments

No other department offers this course. No students from other departments are expected to take this course.

Is there a graduate/undergraduate parallel course to this one? ○ No ◉ Yes

Enter parallel course number

CHM603 Instrumental Analysis Laboratory

How do these classes differ?

See the sample syllabus for details regarding differences in learning objectives and academic expectations for students in CHM 503 vs. CHM 603.

New Course Resource Information

Anticipated Average Enrollment per section:	12	Maximum Enrollment Limit per section:	12
Anticipated Average Enrollment per semester:	24	Maximum Enrollment Limit per semester:	24
Anticipated Average Enrollment per year:	24	Maximum Enrollment Limit per year:	24
Faculty Load Assignment (equated hours):	3		

5

Is another course being deleted? ◉ No ○ Yes

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.

Additional faculty; regular vs per-course

None.

Other additional expenses

None.

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

This course is already being taught as the lab component of an integrated lecture/lab course. The faculty workload hours are already in place.

List names of current faculty qualified and available to teach this course

Adam Wanekaya
Erich Stienle
Richard Biagioni

What is the anticipated source of students for this course?

This will be a required course for all Chemistry majors.

If from within the department, will students be taking this course in addition to or in place of other courses?

In place of another course.

If from outside the department, which courses in other departments would most likely be affected?)

n/a

5

Other comments:

None.

What is the date that this new course was approved by departmental or program faculty? (MM/DD/YYYY) 09/20/2016

Current Status:

Department Head Review

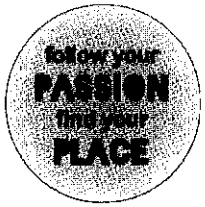
Proposal Progress:

This proposal is waiting for its first review.

Review Comments:

No comments have been added to this proposal.

[redacted]



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CHM 503/603 – INSTRUMENTAL ANALYSIS LAB

Fall 2016 Syllabus

Dr. Adam Wanekaya – Coordinator
wanekaya@missouristate.edu
Ph: 836-5611

Derek Gillis - Assistant

Lab times: **T**: 9.30a – 12.15p (Sec 1) and 5.30p - 8.15p (Sec 2)
Lab location: Temple 440
Dr. Wanekaya's Office Hrs: **MWF;** 1.45p – 2.30p or by appointment (Temple 450)

Course Web Page: Blackboard (http:/blackboard.missouristate.edu. Check website for homework problems, solutions, grades, labs, course information and other useful links

Course Description: The course covers principles and applications of modern instrumental methods utilized in the separation and analysis of materials.

Objectives: By the completion of this course, students are expected to have acquired sufficient knowledge about the major instrumental methods of chemical analysis so that they can determine what technique should be used to solve a particular problem. Upon completion of CHM 503, a student should be able to figure out the following:

A. the chemical and/or physical basis of the measurement (e.g. what is used to stimulate the sample, how does the sample interact with the stimulus, how is the interaction detected)
B. the type of information that can be obtained from the measurement
C. the limitation and/or requirements of the method
D. the advances in instrumentation which have been made, especially those made as a result of problems encountered with the method.

The student should be able to address the problems of analyzing complex samples. This would include defining the problem, determining any constraints, choosing the best methodology, and determining how to test the methodology to prove its merits. Where there are alternatives the student should be able to define the advantages and disadvantages of each.

Upon completion of CHM 603, a student should further be able to adapt pertinent experiments from the chemical literature for use in CHM 503/603.

Safety

Your safety comes first. Standard laboratory safety policies will be **ENFORCED AT ALL TIMES**. In particular:

- Students must wear their own safety goggles, and those goggles must meet Missouri state codes for student eye protection.
- Lab coats are recommended
- Shoes that cover the feet are required. Sandals, open toed shoes, etc., are not permitted
- Specific safety notes will be given in the directions of laboratory exercises
- Students whose behavior poses a safety risk to themselves and/or others may be ejected from the laboratory.

Lab safety quiz is available on blackboard. Student are required to obtain at least 90% before they begin labs.

Cleanup and waste management

- No laboratory session is complete until cleanup is complete.
- All waste must be disposed off as directed
- All waste bottles must be capped securely except when waste is being added.
- Any liquid or solid spills by your work area or by the balances must be cleaned.
- Any solutions that are to be stored must be well labeled.
- All labware must be cleaned and returned to their designated locations.
- All reagents must be returned to their proper location.

Required Materials

1. Text: None.
2. Lab Handouts – These will be posted on blackboard. It is the responsibility of the students to read and understand the handouts prior to lab.
3. A bound laboratory notebooks, spiral notebooks are not allowed.
4. Scientific calculator with exponential calculation capabilities.

Prelab

Prelabs, if given, will constitute 10% of the total lab grade

Attendance

Attendance is required for every lab

Grading

Activity	CHM 503	CHM 603
Safety Quiz and Laibility Waiver	25	25
7 Lab Reports	700	700
Experiment Development	NA	200

Scores will be available at all times on the course Blackboard website in MyGrades section.

Grading Scale

Percentage	Grade
93.0% and above	**A**
90.0 – 92.9%	**A-**
87.0 – 89.9 %	**B+**
83.0 – 86.9%	**B**
80.0 – 82.9%	**B-**
77.0 – 79.9%	**C+**
73.0 – 76.9%	**C**
70 – 72.9%	**C-**
60 – 69.9	**D**
Below 60.0 %	**F**

Lab Experiments

Experiments will be conducted individually or with your assigned partner(s).

Lab Reports

Lab reports will be individual efforts and will be submitted online. Bear in mind that reports may be subjected to SafeAssign analyses in Bb at the instructor's discretion. See sample lab report guidelines at the end of this document.

Lateness and Late Reports

Lateness and late reports will be assessed as follows: 5% per day up to maximum of 35% reduction. For lab time, 5% if 10 min late, 10% if 20 min late.

Experiment Development- CHM 603 students only

CHM 603 students will propose a new CHM 503/603 lab experience by adapting an experimental idea from an article published within the last 10 years in a primary source of chemical research. The idea must be pre-approved by the instructor prior to writing-up the experience. More details are available in a separate document.

Lab Notebooks

A notebook will be kept for the course (see the section on Course Materials above). The general goal of any scientific endeavor is to perform and record the process in enough detail that a trained chemist would be able to follow your experimental procedure and reproduce your results. The record of your procedures and findings will be in your lab notebook. Copies of any pertinent pages will be appended to each corresponding report.

Class Cancellations

In the event that the University closes campus due to severe weather conditions (i.e., snow days) on a day that lab is scheduled, a make-up lab experience will be made available at the discretion of the instructor. Be prepared for these unforeseen circumstances. If an experimental day is missed, the schedule will be altered appropriately.

Dropping a class: It is your responsibility to understand the University's procedure for dropping a class. If you stop attending this class but do not follow proper procedures for dropping the class, you will receive a failing grade and will also be financially obligated to pay for the class. To drop a class anytime after the first week of classes, you most complete and turn in a drop slip at an authorized registration center (see http://www.missouristate.edu/recreg/chnsched.html). **You do not need to obtain signatures on the drop slip**, it does not need to be signed by your instructor, your advisor, or a departmental head. For information about dropping a class or withdrawing from the university contact the Registration Center at 836-4335. See also Academic Calendars (http://www.missouristate.edu/registrar/acad_cal.html) for deadlines.

Emergency Response:
Students who require assistance during an emergency evacuation must discuss their needs with their professors and Disability Services. If you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible. For additional information students should contact the Office of Disability Services, 836-4192 (PSU 405), or Larry Combs, Interim Assistant Director of Public Safety and Transportation at 836-6576. For further information on Missouri State University's Emergency Response Plan, please refer to the following web site:
http://www.missouristate.edu/safetran/erp.htm.

Academic Dishonesty: Missouri State University is a community of scholars committed to developing educated persons who accept the responsibility to practice personal and academic integrity. You are responsible for knowing and following the university's student honor code, *Student Academic Integrity Policies and Procedures*, available at http://www.missouristate.edu/provost/3935.htm and also available at the Reserves Desk in Meyer Library. Any student participating in any form of academic dishonesty will be subject to sanctions as described in this policy.

Other University Policies

Non Discrimination Policy: Missouri State University is an equal opportunity/affirmative action institution, and maintains a grievance procedure available to any person who believes he or she has been discriminated against. At all times, it is your right to address inquiries or concerns about possible discrimination to the Office for Equity and Diversity, Siceluff Hall 296, (417) 836-4252. Other types of concerns (i.e., concerns of an academic nature) should be discussed directly with your instructor and can also be brought to the attention of your instructor's Department Head.

Disability Accommodation Policy: To request academic accommodations for a disability, contact the Director of Disability Services, Plaster Student Union, Suite 405, (417) 836-4192 or (417) 836-6792 (TTY), http://www.missouristate.edu/disability. Students are required to provide documentation of disability to Disability Services prior to receiving accommodations. Disability Services refers some types of accommodation requests to the Learning Diagnostic Clinic, which also provides diagnostic testing for learning and psychological disabilities. For information about testing, contact the Director of the Learning Diagnostic Clinic, (417) 836-4787, http://psychology.missouristate.edu/ldc

The instructor of this course reserves the right to make modifications to this syllabus. If modifications are necessary, you will be informed of them as they occur

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CHM 503/603 Fall 2016 Tentative Lab Schedule

Date	Activity
Aug. 25	Lab 1: Analytical Signals and Noises (due Sep 02) (9.30a-Groups 1 and 2) (5.30p-Groups 3 and 4)
Sep. 01	Lab 2: Introduction to Gas Chromatography (due Sep.09) (9.30a-Group 1) (5.30p-Group 3)
Sep. 08	Lab 2: Introduction to Gas Chromatography (due Sep. 16) (9.30a- Group 2) (5.30p- Group 4)
Sep. 15	Lab 3: Quantitative Analysis of a mixture by GC (due Sep. 23) (9.30a-Group 1) (5.30p-Group 3)
Sep. 22	Lab 3: Quantitative Analysis of a mixture by GC (due Sep 30) (9.30a- Group 2) (5.30p- Group 4)
Sep. 29	Lab 4: High Performance Liquid Chromatography (due Oct. 07) (9.30a-Group 1) (5.30p-Group 3)
Oct. 06	Lab 4: High Performance Liquid Chromatography (due Oct. 14) (9.30a- Group 2) (5.30p- Group 4)
Oct. 13	Lab 5: Atomic Absorption Spectroscopy (due Oct. 21) (9.30a-Group 1) (5.30p-Group 3)
Oct. 20	Lab 5: Atomic Absorption Spectroscopy (due Oct. 28) (9.30a- Group 2) (5.30p- Group 4)
Oct. 27	Lab 6: Inductively Plasma Atomic Emission Spectroscopy (Nov. 04) (9.30a-Group 1) (5.30p-Group 3)
Nov. 03	Lab 6: Inductively Plasma Atomic Emission Spectroscopy (Nov. 11) (9.30a- Group 2) (5.30p- Group 4)
Nov. 10	Lab 7: Spectrophotometric analysis of a vitamin mixture (due Nov 18) (9.30a-Group 1) (5.30p-Group 3)
Nov. 17	Lab 7: Spectrophotometric analysis of a vitamin mixture (due Nov 28) (9.30a- Group 2) (5.30p- Group 4)
Nov. 24	No Lab (Thanksgiving week)
Dec. 01	Experiment Development (CHM 603 Only) (9.30a-Groups 1 and 2) (5.30p-Groups 3 and 4)
Dec. 08	Experiment Development (CHM 603 Only) (9.30a-Groups 1 and 2) (5.30p-Groups 3 and 4)
Dec. 12	No Lab (Finals Week)

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CHM 503/603 – Fall 2016
Formal Laboratory Reports (Applies to all labs except lab 1)

Written laboratory reports should be prepared in formal journal style. Look at recent issues of one the American Chemical Society journals (http://pubs.acs.org) for examples. An abstract is not required. All reports should be prepared with a word processing program and double-spaced throughout.

Reports should include the following:

1. Cover page: The cover page should include the following information:

Experiment Title

Your name (underlined)
Name(s) of partner(s)

Date submitted (the day you actually turn in the report)
Date due (the assigned due date)

Concise results summary for any unknown
(i.e., values determined for unknown), usually in tabular form.

2. Introduction: The main purpose of the introduction of a paper is to give some perspective to what follows, e.g., the paper will describe experiments aimed at determining and comparing the fatty acid composition of several types of vegetable oil. This should be a concise discussion of the purpose and principles of the experiment, including some discussion of why the particular analytical technique is appropriate and why the information from the analysis is desirable. It should not be a rehash of the experimental handout, and it should not include much experimental detail. The introduction should normally be no longer than one standard page.

3. Experimental section: **The experimental section is NOT a set of directions.** The experimental section should state, as matter-of-factly as possible, what you actually did (**past tense!**) in the laboratory. It should include enough detail to allow a moderately experienced chemist to reconstruct the experiment, but it should not be a drop-by-drop description of the procedure. It should not serve as a laboratory manual for a student without any previous experience in chemical procedures.

Experimental sections should normally be divided into the following subsections:
a. Instrumentation: A brief declaration of any instrumentation used, including model number.

b. Chemicals: A brief declaration of the reagents and solutions employed in the experiment, specifying what chemicals were used, the source of the chemicals (whether a stock solution was provided for you, or whether you prepared it) *written in prose form, not as a list.*
c. Specialized apparatus: If any specialized apparatus is used, it should be described briefly. Routine apparatus (beakers, pipets, etc.) should not be mentioned.
d. Experimental procedure: A brief description of the experimental procedure. It should be divided into subsections such as "Preparation of Standards", "Sample Preparation", "Instrumental Settings", "Chromatographic Runs", etc. This should be written to inform a moderately experienced lab worker, and should not be written as a set of directions.

An example of what **NOT** to write follows:

> Preparation of standards: Clean two 500-mL and six 100-mL volumetric flasks with Alconox soap solution and then rinse them thoroughly with deionized water. Prepare a 100.0ppm Ca intermediate stock solution by adding 50.00mL of the 1000 ppm Ca stock solution to a 500-mL volumetric flask, using a 50.00mL pipet that you have previously rinsed out twice with the 1000 ppm Ca stock solution which was prepared by the instructor. Fill the 500-mL flask partially with deionized water and shake it thoroughly. Fill the flask to its calibration mark with deionized water and shake it again. Next, transfer a 50.00mL aliquot of the intermediate solution to another 500-mL volumetric flask, using another 50.00-mL pipet that you have rinsed twice with the 100.0ppm stock solution, and then dilute with deionized water as before to obtain a 10.00ppm working solution. To six 100.0-mL volumetric flasks, add the following volumes of the 10.0ppm working solution: 0.00, 2.00, 4.00, 6.00, 8.00, 10.00 mL. To each flask, add 6 mL of concentrated (35%) HCl using a 10-mL graduated cylinder. Fill each flask partially with deionized water and shake it, and finally fill each to its calibration mark with deionized water and shake again. Be sure to label each flask.

This description is *much* too detailed, and it is written as a set of directions, rather than as a statement of what was actually done. Most of the details are standard laboratory techniques (e.g., any chemist would expect the glassware to be cleaned and rinsed, and would know the proper manner of filling a volumetric flask and of using a pipet). A concise statement of the procedure follows:

> Preparation of standards: Five-hundred milliliters each of 100 ppm and 10.0ppm Ca solutions were prepared by serial dilution from the 1000 ppm stock solution (provided). Standard solutions in the range from 0 to 1.00ppm Ca containing 1% HCl were prepared by combining portions of the 10.0ppm Ca solution with 35% HCl (6 mL) in 100-mL volumetric flasks. See Table 2.

TABLE 2

Volume 10.0 ppm Ca (mL)	Concentration of standard (ppm)	Absorbance (Average)
0.00	0.000	0.025
2.00	0.200	0.128
4.00	0.400	0.221
6.00	0.600	0.330
8.00	0.800	0.439
10.00	1.000	0.535

Note that Table 2 includes additional information (absorbance readings) which would be described in a different section.

Instrumental parameters: Parameter settings for an instrument should be noted when significant (e.g., when studying the influence of slit setting on resolution for an absorbance spectrum) but are not necessary if they are readily and logically inferred from the data (e.g., in electrochemistry, reporting a current that varied from 0 to 75 millivolts would suggest

that the potentiometer was set to read ca. 100 mV full scale). In general, write out the instrument settings in normal text, not as a table.

4. Results Section: This should include the data and results of calculations based on the data (often organized into well-labeled tables), along with properly formatted and labeled data plots and relevant statistical information. Details of calculations may be included in an appendix.

5. Discussion Section: Describe your observations and results, preferably in chronological order. Include comments about the reliability of your results (especially when a result may be compared to a known standard) and about the technique used, along with discussion of the significance of the results. In particular, if you have prepared some kind of calibration curve that is expected to be linear, comment on how well your experimental data fits the "best fit" line. NOTE: *You may combine the Results and Discussion section into a single section if you feel that it is appropriate to do so. This often makes writing the sections a lot easier.*

Laboratory report presentation: The text of the report should be typed and double spaced, but equations and other difficult text may be neatly printed in. Photocopies of spectra, chromatograms, etc., reduced to convenient size, should also be included in the report. Ideally, tables and figures should be placed at an appropriate location in the body of the report. However, it is acceptable to insert them at the end of the report. Each tables should be labeled as such (e.g., Table 1), which each graph, spectrum, chromatogram, etc., should be denoted as "Figure" (i.e., Figure 1, *not* Graph 1).

Tables: Tables should be well-organized. Entries should be clearly labeled. Numbers in columns should normally be set to the same format (i.e., decimals should align, etc.).

Plots: The purpose of data plots is to provide a visual display of data so that the reader can easily and accurately evaluate your data. Therefore, it is essential that plots be of high quality. All plots should include the following characteristics:

* Descriptive title (e.g., "Figure 3: Calibration curve: Absorbance versus [Cl^-]")
* Each axis should be clearly labeled, including units (where appropriate)
* Divisions marked along each axis should be correctly marked and rational (e.g., the marks should correspond to 0.0, 0.5, 1.0, etc., not to 0.0, 0.4329, 0.8658, etc.)
* If more than one set of data is plotted on a given graph, then each set should have a unique symbol, e.g., circles for one set, squares for another, and there should be some kind of legend distinguishing them.
* If it is appropriate to fit the data to a straight line, then the "best fit" line (regression line, trendline) should be shown. It is usually not appropriate to just "connect the dots". Display the experimental data with symbols only, and the best fit line with a line only.

Writing style: Reports will be judged primarily on their scientific content, but poor writing can obscure good content, so the quality of the presentation will also be considered.

Reports should be written using proper English. Sentences should be well constructed and clear, and each paragraph should be constructed logically. Proofreading to catch misspellings and typographical errors is recommended (minor corrections may be made neatly in pen). (Hint: Have someone else read your report to help catch errors).

For most portions of a lab report, it is acceptable to write in the first person, e.g., using "I" or "we", etc. The one exception is the experimental section, which should *always be written in past tense and in passive voice*, e.g., "The standard solutions were prepared ....", NOT "I prepared the standard solutions...."

Vocabulary: Precision in writing requires that the author uses technical terms correctly. Here are some commonly used/misused terms:

Analysis versus determination: Analysis is the ascertainment of the identities and/or concentrations of the components of a sample. **Determination** is the ascertainment of the quantity or concentration of a specific substance within a sample. A quantitative analysis of steel would probably include the determination of Mn – the steel is analyzed, the Mn is determined.

Apparatus (both singular and plural): Scientific equipment not used for measurement purposes (e.g., stills). Compare to instrument below.

Chromatograph/chromatogram: A chromato*graph* is an instrument used for chromatography; a chromato*gram* is the plot of detector signal versus elution time (or volume) from a chromatograph. A chromatogram is NOT a spectrum.

Datum/data (singular/plural): information. Note that because "data" is plural, it should be used with plural forms of verbs (e.g., "the data *are*...", not "the data *is* ....").

Get/Got: Please do not "get" results. Try "acquire" or "obtain" or some other appropriate word.

Graph: This term is seldom used in formal reports. "Figure" or "Plot" (noun and verb, respectively) are typically used instead.

Instrument: A scientific measuring device (e.g., a pH meter).

Machine: A mechanical device for drilling, sawing, etc. A scientific instrument is not a machine.

Spectrum/spectra (singular/plural): A plot of absorbance, transmittance, or intensity versus wavelength or frequency output from a spectrophotometer. Chromatographs and potentiostats do not produce spectra; they produce chromatograms and voltammograms, respectively.

Voltammogram: a plot of current versus potential output from a potentiostat.

(6)

Missouri State.

Curricular Action Workflow

designed by Computer Services

New Course Proposal Form

Submitted on 01/09/2017 by G Schick (AlanSchick@MissouriState.edu).

*All fields require input

(•) New COURSE

( ) New REGULAR PERMANENT SECTION of an existing variable content course. If a new regular section of an existing variable topics course, enter the existing course number below

Course Code: CHM

Course Number: (Check Availability) 603

Course Title: Instrumental Analysis Laboratory

Will this proposal need to be reviewed by CGEIP? (•) No ( ) Yes

Will this proposal need to be reviewed by EPPC? (•) No ( ) Yes

Prerequisite/Co-requisite or enter 'None':
Prerequisite: "C" or better in CHM 302; and "C" or better in CHM 502 or CHM 602 or current enrollment.

General Course Description: (Include any Pass/Not Pass grading restrictions, repeatable limits, limitation on course applicability, UG/GR parallel course, etc.)
A laboratory course emphasizing applications of instrumental methods for the separation and analysis of materials. The course is designed to reflect and supplement the scope of CHM 602. Included are laboratory exercises in potentiometry, spectrophotometry, and chromatography. May be taught concurrently with CHM 503. Cannot receive credit for both CHM 503 and CHM 603.

Credit Hours: 1 Lecture Contact Hours: 0 Lab Contact Hours: 3

Note: If variable credit, enter the highest number and add to end of course description. (e.g. "Variable credit, may be taken 1-3 hours.")

Periodicity. Check all that apply.

☑ Fall ☐ Fall (even-numbered years only) ☐ Fall (odd-numbered years only)

6

☐ Spring ☐ Spring (even-numbered years only) ☐ Spring (odd-numbered years only)

☐ Summer ☐ On Demand only

Complete Catalog Description:
CHM 603 Instrumental Analysis Laboratory
Prerequisite: Prerequisite: "C-" or better in CHM 302; and "C-" or better in CHM 502 or CHM 602 or current enrollment.
A laboratory course emphasizing applications of instrumental methods for the separation and analysis of materials. The course is designed to reflect and supplement the scope of CHM 602. Included are laboratory exercises in potentiometry, spectrophotometry, and chromatography. May be taught concurrently with CHM 503. Cannot receive credit for both CHM 503 and CHM 603.
Credit hours: 1 Lecture contact hours: 0 Lab contact hours: 3
Typically offered: Fall

Include sample syllabus (list topics, course goals.) Use text box OR upload only file types of PDF, DOC or DOCX.

Attached

Same as CHM 503

Purpose of Course

In order to better serve our Accelerated MS program students and improve scheduling flexibility, we wish to split CHM 602 into separate lab and lecture courses. This New Course Proposal is for the lab course, CHM 603. [The lecture course is keeping the original course number, CHM 602, and has been submitted separately in a Change Course Proposal form.] The content of CHM 603 is not changing scope from its current contribution in CHM 602. The sample syllabus is therefore effectively just an extraction of the laboratory portion of the current CHM 602 syllabus.

Relationship to Other Departments

No other department offers this course. Students from other departments are not expected to take this course.

Is there a graduate/undergraduate parallel course to this one? ○ No ◉ Yes

Enter parallel course number

CHM503 Instrumental Analysis Laboratory

How do these classes differ?

See the sample syllabus for details on how CHM 603 differs from CHM 503 in terms of learning objectives and academic expectations.

New Course Resource Information

Anticipated Average Enrollment per section:	2	Maximum Enrollment Limit per section:	12
Anticipated Average Enrollment per semester:	2	Maximum Enrollment Limit per semester:	12
Anticipated Average Enrollment per year:	2	Maximum Enrollment Limit per year:	12
Faculty Load Assignment (equated hours):	0		

Is another course being deleted? ◉ No ○ Yes

6

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.

Additional faculty; regular vs per-course

None.

Other additional expenses

None.

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

This course is already being taught as the lab component of an integrated lecture/lab course.

List names of current faculty qualified and available to teach this course

Adam Wanekaya
Erich Stienle
Richard Biagioni

What is the anticipated source of students for this course?

Graduate students in Chemistry who choose to take the lab portion of Instrumental Analysis when they are taking the lecture. Typically, this will not be required.

If from within the department, will students be taking this course in addition to or in place of other courses?

In place of another course.

If from outside the department, which courses in other departments would most likely be affected?)

n/a

Other comments:

6

Note regarding enrollments in CHM 603: Although a few to several students are expected to enroll in the new CHM 602 (lecture) each year, very few are expected to enroll in CHM 603 (lab). Most students taking CHM 602 will be either graduate students or undergraduates receiving mixed credit as part of their accelerated masters program. The accelerated students would take the lab portion as CHM 503 because the lab portion is not available for mixed credit. Graduate students typically take only the lecture portion. Thus, anticipated enrollment in CHM 603 is 0-2 per year.

What is the date that this new course was approved by departmental or program faculty? (MM/DD/YYYY) 09/20/2016

Current Status:

Department Head Review

Proposal Progress:

This proposal is waiting for its first review.

Review Comments:

No comments have been added to this proposal.

[redacted]

7

Missouri State.

Curricular Action Workflow

designed by Computer Services

Change Course Proposal Form

Submitted on 12/24/2016 by G Schick (AlanSchick@MissouriState.edu).

*All fields require input

This proposal applies to:

- (•) An existing COURSE
- ( ) An existing REGULAR (e.g. permanent) SECTION of a variable content course.

Existing Course:

CHM505 Fundamentals of Physical Chemistry

Will this proposal need to be reviewed by CGEIP? (•) No ( ) Yes

Will this proposal need to be reviewed by EPPC? (•) No ( ) Yes

Current online catalog description:

CHM 505 Fundamentals of Physical Chemistry

Prerequisite: 20 hours of chemistry coursework, and "C-" or better in either MTH 287 or MTH 261. A one semester introduction to physical chemistry including the following topics: thermodynamics, solution chemistry, electrochemistry, kinetics, and atomic and molecular structure. Laboratory experiments will illustrate principles of physical chemistry and techniques of analysis. Does not apply to a Chemistry major or minor if the student passes CHM 506. May be taught concurrently with CHM 605. Cannot receive credit for both CHM 605 and CHM 505. 4(3-3) S

Revise the current online catalog description as needed: (Strikethrough all deletions and insert/bold new information. Any content that is copied and pasted will lose existing formatting; please review prior to submission.)

B I ~~S~~

CHM 505 Fundamentals of Physical Chemistry

Prerequisite: ~~20 hours of chemistry; and "C-" or better in either MTH 287 or MTH 261.~~ **"C-" or better in CHM 302; and CHM 201 or CHM 342; and MTH 261 or MTH 287.** A one semester introduction to physical chemistry including the following topics: thermodynamics, ~~solution chemistry, electrochemistry,~~ **chemical equilibrium, chemical** kinetics, ~~and~~ atomic and molecular structure**, and spectroscopy**. Laboratory experiments will illustrate principles of physical chemistry and techniques of analysis. Does not apply to a Chemistry major or minor if the student passes CHM 506. May be taught concurrently with CHM 605. Cannot receive credit for both CHM 605 and CHM 505. 4(3-3) S

7

What is changing? Check all boxes that apply.

☐	Course Code	☐	Course Number (Check Availability)	☐	Title	☑	Prerequisite
☐	Credit Hours/Contact Hours	☐	Periodicity	☑	Description		

Reason for proposed change

The proposed pre-requisite list better spells out the necessary background rather than leaving it to an assumed background based on a number of CHM credits. The course description has been updated to reflect current practices.

Does this change affect course assessment (e.g. student learning evidence/outcomes)? ◉ No ○ Yes

How did you determine the need for this change? Check all boxes that apply or specify other.

☐	Routine or annual review/assessment of curriculum	☑	Faculty Input	☐	Student Input
☐	Accreditation/certification compliance	☐	Review of catalog information		
☐	Other (be specific):				
☐	Check if this is a non-substantive change.				

What is the date that this course change was approved by departmental or program faculty? (MM/DD/YYYY) 09/20/2016

Current Status:

College Council Review

Proposal Progress:

01/05/2017 - Submitted by Department Head (Bryan Breyfogle)

Review Comments:

No comments have been added to this proposal.

[redacted]

8

Missouri State.

Curricular Action Workflow

Assigned by Computer Services

Change Course Proposal Form

Submitted on 12/24/2016 by G Schick (AlanSchick@MissouriState.edu).

*All fields require input

This proposal applies to:

- (●) An existing COURSE
- ( ) An existing REGULAR (e.g. permanent) SECTION of a variable content course.

Existing Course:

CHM605 Fundamentals of Physical Chemistry

Will this proposal need to be reviewed by CGEIP? (●) No ( ) Yes

Will this proposal need to be reviewed by EPPC? (●) No ( ) Yes

Current online catalog description:

CHM 605 Fundamentals of Physical Chemistry

Prerequisite: 20 hours of chemistry; and "C" or better in either MTH 287 or MTH 261. A one semester introduction to physical chemistry including the following topics: thermodynamics, solution chemistry, electrochemistry, kinetics, and atomic and molecular structure. Laboratory experiments will illustrate principles of physical chemistry and techniques of analysis. Does not apply to a Chemistry major if the student passes CHM 606. May be taught concurrently with CHM 505. Cannot receive credit for both CHM 505 and CHM 605. 4(3-3) S

Revise the current online catalog description as needed: (Strikethrough all deletions and insert/bold new information. Any content that is copied and pasted will lose existing formatting; please review prior to submission.)

CHM 605 Fundamentals of Physical Chemistry

Prerequisite: ~~20 hours of chemistry; and "C" or better in either MTH 287 or MTH 261.~~ **Departmental approval.** A one semester introduction to physical chemistry including the following topics: thermodynamics, ~~solution chemistry, electrochemistry,~~ **chemical equilibrium, chemical** kinetics, ~~and~~ atomic and molecular structure, **and spectroscopy**. Laboratory experiments will illustrate principles of physical chemistry and techniques of analysis. Credit does not apply to BS or MS degrees in Chemistry. May be taught concurrently with CHM 505. Cannot receive credit for both CHM 505 and CHM 605. 4(3-3) S

What is changing? Check all boxes that apply.

8

☐ Course Code ☐ Course Number (Check Availability) ☐ Title ☑ Prerequisite

☐ Credit Hours/Contact Hours ☐ Periodicity ☑ Description

Reason for proposed change

The current prerequisite is too broad and poorly defined, so we are altering the prerequisite to be more appropriate. CHM 605 is offered in parallel with CHM 505 for a very small population of non-chemistry graduate students (maybe one every 3-4 years). In this respect, the CHM 505 prerequisite list (the undergraduate parallel course; see separate proposal) has been modified with specific courses for chemistry majors in our non-comprehensive program. Because CHM 605 is offered for only non-chemistry graduate students, student backgrounds may vary significantly. The proposed change of the prerequisite to "Department approval" will require all interested students to check with the department to be sure that CHM 605 is an appropriate course for them. In addition, the course description is being updated to reflect current practices.

Does this change affect course assessment (e.g. student learning evidence/outcomes)? ◉ No ○ Yes

How did you determine the need for this change? Check all boxes that apply or specify other.

☐ Routine or annual review/assessment of curriculum ☑ Faculty Input ☐ Student Input

☐ Accreditation/certification compliance ☐ Review of catalog information

☐ Other (be specific):

☐ Check if this is a non-substantive change.

What is the date that this course change was approved by departmental or program faculty? (MM/DD/YYYY) 09/20/2016

Current Status:

Grad Council Review

Proposal Progress:

01/05/2017 - Submitted by Department Head (Bryan Breyfogle)
01/10/2017 - Reviewed by Dean (Tamera Jahnke)

Review Comments:

No comments have been added to this proposal.

[redacted]