



Missouri State.

Curricular Action Workflow



Missouri State > Computer Services - MIS > Curricular Action Workflow > CAW - Change Course Proposal Form

Change Course Proposal Form

Submitted on 03/29/2018 by Rebecca Baker (Beckybak@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:

PHY324 Instrumental/Computer Interfacing

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:

PHY 324 Instrumental/Computer Interfacing

Prerequisite: PHY 152; and CSC 125 or other language by permission. An introduction to computer architecture, machine/assembly language programming, and peripheral interfacing. Topics include microprocessor operation, addressing modes, memory organization, microprocessor buses, reset and interrupts, parallel I/O, serial I/O, timers, and analog/digital conversions. 4(2-4) F,S

Revise the current online catalog description as needed. (Strike through 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~~

PHY 324 Instrumental/Computer Interfacing

Prerequisite: PHY 152; ~~and CSC 125 or other language by permission.~~ An introduction to computer architecture, machine/assembly language programming, and peripheral interfacing. Topics include microprocessor operation, addressing modes, memory organization, microprocessor buses, reset and interrupts, parallel I/O, serial I/O, timers, and analog/digital conversions. 4(2-4) F,S

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

Missouri State.

②

Curricular Action WorkflowMissouri State > Computer Services - MIS > Curricular Action
Workflow > CAW - New Course Proposal Form**New Course Proposal Form****Submitted on 03/20/2018 by Michael Reed (Mikereed@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:

PHY

Course Number: (Check Availability)

110

Course Title:

Big Ideas in Physics

Will this course become part of a program? No Yes (A corresponding program change form must be submitted)Will this proposal need to be reviewed by CGEIP? No YesWill this proposal need to be reviewed by EPPC? No Yes

Prerequisite/Co-requisite or enter 'None':

None

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

Introduction to Big Ideas in Physics where topics may include Big Bang Theory, Quantum Theory, String Theory, Special and General Relativity, High-Energy (particle accelerator) Physics, Exoplanets and Life in the Universe. Also includes an introduction to the profession, culture, and discipline of physics, astronomy, and materials science and the facilities, faculty and current research at Missouri State University. This course is primarily for those either considering or intending to pursue a career in physics, astronomy, and/or materials science. Graded Pass/Not Pass only.

Credit Hours:

2

Lecture Contact Hours:

2

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.")

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Periodicity. Check all that apply.

- 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:

PHY 110 Big Ideas in Physics

Prerequisite: None

Introduction to Big Ideas in Physics where topics may include Big Bang Theory, Quantum Theory, String Theory, Special and General Relativity, High-Energy (particle accelerator) Physics, Exoplanets and Life in the Universe. Also includes an introduction to the profession, culture, and discipline of physics, astronomy, and materials science and the facilities, faculty and current research at Missouri State University. This course is primarily for those either considering or intending to pursue a career in physics, astronomy, and/or materials science. Graded Pass/Not Pass only.

Credit hours: 2 Lecture contact hours: 2 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

Retention is a problem in STEM fields, yet Missouri needs STEM graduates for our continued economic growth, particularly in tech areas. A 2013 Department of Education study found that math and physics majors who take courses in their majors during their freshman year have a higher degree of success. Additionally, students who feel a sense of belonging within a department are more likely to succeed. This course is designed to foster interaction between freshmen and more senior students and faculty within our department. By getting first (and some second) year students to interact with the community of their major, we can provide that sense of belonging and establish relationships to help them succeed. Additionally, this course will pique their interests by discussing topical events within the field and we will provide knowledge about future careers and career advise.

Relationship to Other Departments

None.

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

New Course Resource Information

Anticipated Average Enrollment per section:	15	Maximum Enrollment Limit per section:	40
Anticipated Average Enrollment per semester:	15	Maximum Enrollment Limit per semester:	40
Anticipated Average Enrollment per year:	15	Maximum Enrollment Limit per year:	40
Faculty Load Assignment (equated hours):	2		

Is another course being deleted? No Yes

②

What will this course require in the way of:

Additional library Holdings

None needed. Current on-line resources are sufficient.

Additional computer resources

None

Additional or remodeled facilities

None

Additional equipment or supplies

None

Additional travel funds

None

Additional faculty, general vs specialized

None are needed as we have sufficient faculty to cover this course.

Additional faculty, regular vs per-course

None needed.

Other additional expenses

None

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

This course will likely be team taught by two faculty at an increase of 1 hour each. We have flexibility within the department to cover that, once we are at full strength again next fall (we are currently hiring).

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

Any PAMS faculty are qualified, but most likely it will be team taught by one astronomer (we have three) and one materials scientist (we have six) as those are the main research areas of our department.

What is the anticipated source of students for this course?

Incoming freshman and transfer (most likely sophomore) students who anticipate majoring in physics.

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

In addition to.

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

None

Other comments:

None

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

01/17/2018

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Current Status:

College Council Review

Proposal Progress:

03/29/2018 - Submitted by Department Head (David Cornelison)

Review Comments:

03/29/2018 - Department Head Review - David Cornelison - We are increasing recruiting efforts and one issue is that intro physics courses focus on the background needed for further study and do not expose the students to the newer, exciting work currently being done. We intend this class to help show students the possibilities, within both our department and the field in general.



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Grading

This grade for this course will be either a P (pass) or F(fail). At the end of each class, you will be required to complete a short summary of that day's topic. Your final grade in this course will be based on your summaries.

Materials Required

There are no materials required for this course. During the course, we will use on-line journals to investigate current topics.

Academic statements

Attendance/Absentee policy: The University's attendance policy can be found in the Undergraduate Catalog at www.missouristate.edu/registrar/catalog/attendan.html. Class beings promptly as scheduled.

Statement of Non-discrimination:

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 Institutional Equity and Compliance, 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/.

Statement of Disability Accommodation:

If you are a student with a disability and anticipate barriers related to this course, it is important to request accommodations and establish an accommodation plan with the University. Please contact the Disability Resource Center (DRC) (<https://www.missouristate.edu/disability/>), Meyer Library, Suite 111, 417-836-4192, to initiate the process to establish your accommodation plan. The DRC will work with you to establish your accommodation plan, or it may refer you to other appropriate resources based on the nature of your disability. In order to prepare an accommodation plan, the University usually requires that students provide documentation relating to their disability. Please be prepared to provide such documentation if requested. Once a University accommodation plan is established, you may notify the class instructor of approved accommodations. If you wish to utilize your accommodation plan, it is suggested that you do so in a timely manner, preferably within the first two weeks of class. Early notification to the instructor allows for full benefit of the accommodations identified in the plan. Instructors will not receive the accommodation plan until you provide that plan, and are not required to apply accommodations retroactively.

Statement of 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 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.

Statement of Cell Phone/Pager 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.

Laptop Computer Policy: You may use your computers/tablets for taking notes. I ask that you keep your wi-fi turned off and do not surf the web, facebook, or email during class.

Emergency Response Assistance:

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>.

Shelter Information (in case of severe weather).

Shelter and Evacuation information here, depending upon location.

Dropping a class policy:



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.

Religious Accommodation:

The University may provide a reasonable accommodation based on a person's sincerely held religious belief. In making this determination, the University reviews a variety of factors, including whether the accommodation would create an undue hardship. The accommodation request imposes responsibilities and obligations on both the individual requesting the accommodation and the University. Students who expect to miss classes, examinations, or other assignments as a consequence of their sincerely held religious belief shall be provided with a reasonable alternative opportunity to complete such academic responsibilities. It is the obligation of students to provide faculty with reasonable notice of the dates of religious observances on which they will be absent by submitting a *Request for Religious Accommodation Form* to the instructor by the end of the third week of a full semester course or the end of the second week of a half semester course.

Audio and Video Recordings of Course Activities:

Students who wish to record lectures or class activities for study purposes should inform the faculty member first. Distribution or sale of recordings or other course materials is prohibited without the written permission of the instructor and other students who are recorded. Distribution without permission is a violation of copyright law and the Code of Student Rights and Responsibilities (Sections 4.6, 4.8, 4.9).

Mental Health and Stress Management:

As a student you may experience a range of personal issues that can impede learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. You can learn more about free and confidential Missouri State University Counseling Center services available to assist you at <https://counselingcenter.missouristate.edu/>.

Title IX Policy:

Missouri State University has a Title IX policy that guides our response to instances of sexual violence. Sexual Violence includes: Rape, Sexual Assault, Sexual Misconduct, Sexual Discrimination, Domestic Violence, Dating Violence, Stalking, Sexual Harassment and Pregnancy issues. The Title IX policy can be located on the MSU Title IX website at www.missouristate.edu/titleix/. This website is also a good resource for any questions or issues involving Title IX and contains contact information for the MSU Title IX Office and staff. Read an [overview of the Title IX office](#).

If an MSU student discloses a Title IX related issue to a MSU faculty or staff member who is deemed to be a "Responsible Employee" under the policy, that faculty or staff member is required to report such disclosure to the Title IX Coordinator. A responsible employee includes any employee who has the authority to take action to redress sexual violence; who has been given the duty of reporting incidents of sexual violence or any other misconduct by students to the Title IX Coordinator or other appropriate school designee; or whom a student could reasonably believe has the authority or duty to take action. Taylor Health employees and MSU Counseling Center Clinicians are not considered to be Responsible Employees under the policy, and therefore, are not required to report Title IX issues to the Title IX Coordinator.

Chosen Name Policy:

A student may choose a name other than their legal name to identify themselves at Missouri State University. A chosen name is different than the student's legal name. Refer to the [Chosen Name policy](#) for more information. Students can provide their chosen first and middle names in the *Profile* tab of [My Missouri State](#).

General comments and classroom courtesy:

Feel free to ask questions at any time.

Please resist talking with neighbors when the class is in progress. Constant chatter is both

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Missouri State.**Curricular Action Workflow**Missouri State > Computer Services - MIS > Curricular Action
Workflow > CAW - New Course Proposal Form**New Course Proposal Form**Submitted on 03/29/2018 by Kartik Ghosh (Kartikghosh@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:

MAT

Course Number: (Check Availability)

514

Course Title:

Techniques in Electron Microscopy

Will this course become part of a program? No Yes (A corresponding program change form must be submitted)Will this proposal need to be reviewed by CCEIP? No YesWill this proposal need to be reviewed by EPPC? No Yes

Prerequisite/Co-requisite or enter 'None':

None

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

An introduction to techniques in electron microscopy with a primary emphasis on scanning electron microscopy and X-ray microanalysis. Theoretical background and experimental procedures involve both techniques but the major focus will be on obtaining secondary electron images. Additional coverage will include sample preparation, back-scattered electron imaging, X-ray mapping, and related image processing techniques. This course will be taught concurrently with MAT 614. Cannot receive credit for both MAT 514 and MAT 614. 3(1-2) F.

Credit Hours:

2

Lecture Contact Hours:

1

Lab Contact Hours:

2

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.")

3

Periodicity. Check all that apply.

- 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:

MAT 514 Techniques in Electron Microscopy
Prerequisite: None

An introduction to techniques in electron microscopy with a primary emphasis on scanning electron microscopy and X-ray microanalysis. Theoretical background and experimental procedures involve both techniques but the major focus will be on obtaining secondary electron images. Additional coverage will include sample preparation, back-scattered electron imaging, X-ray mapping, and related image processing techniques. This course will be taught concurrently with MAT 614. Cannot receive credit for both MAT 514 and MAT 614. 3(1-2) F.

Credit hours: 2 Lecture contact hours: 1 Lab contact hours: 2
Typically offered: Fall (even-numbered years only)

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

[Redacted syllabus content]

Attached

Purpose of Course

To provide knowledge on a theoretical background and a wide range of practical applications of electron microscopy.

Relationship to Other Departments

This course may be of interest to students in the field of chemistry, geology, agriculture, biology, and biomedical sciences.

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

Enter parallel course number

MAT614 Techniques in Electron Microscopy

How do these classes differ?

In MAT 614, students need to do an advanced project related to their field of study. In MAT 514, no advanced project is needed.

New Course Resource Information

Anticipated Average Enrollment per section:	10	Maximum Enrollment Limit per section:	12
Anticipated Average Enrollment per semester:	10	Maximum Enrollment Limit per semester:	12
Anticipated Average Enrollment per year:	10	Maximum Enrollment Limit per year:	12
Faculty Load Assignment (equated hours):	3		

Is another course being deleted? No Yes

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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?

None

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

Ridwan Sakidja, Kartik Ghosh, Robert Mayanovic

What is the anticipated source of students for this course?

Physics, Chemistry, Geology, Agriculture, Biology, and Biomedical Science. A proposed parallel graduate course will be an option in the revised MS program in Materials Science.

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

Optional Course

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

We are not aware that the proposed course will affect in any other department.

Other comments:

A parallel graduate course MAT 614 is being proposed simultaneously.

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

03/28/2018

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Current Status:

College Council Review

Proposal Progress:

03/29/2018 - Submitted by Department Head (David Cornelison)

Review Comments:

No comments have been added to this proposal.



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Course Number and Title: MAT514-Techniques in Electron Microscopy

Instructor Name: Dr. X., Professor, Department of Physics, Astronomy, and Materials Science

Office location: Kemper 10X

Phone Number: (417) 836-5131

Textbook:

Scanning Electron Microscopy and X-Ray Microanalysis (Third Edition) 2003, by Joseph Goldstein, Dale E. Newbury, David C. Joy, Charles E. Lyman, Patrick Echlin, Eric Lifshin, Linda Sawyer and Joseph Michael. Plenum Press, 689 pp + CD. Hardback.

Office hours: To be set.

Description:

The purpose of this course is to provide the theoretical background to permit the practical use of the scanning electron microscope (SEM) for scientific research. The students will be given opportunities to learn to prepare samples correctly for SEM, to operate the SEM and to collect data and perform analysis on the samples. The data collected will include secondary-electron and back-scattered electron images, X-ray mapping and EDS spectra. The course will have 1 hr of lecture and 1 hr of lab per week. The lecture will cover theoretical backgrounds on and relevant computer simulations to the electron microscopy.

Proposed syllabus and topics to cover:

1. Historical background of electron microscopy and SEM
2. Electron-specimen interactions and MC simulations
 - Overview of the interaction
 - Elastic and inelastic scattering of High Voltage electron by specimen
 - Monte Carlo simulation for electron interaction
 - Backscattered electrons
 - Secondary electrons
 - Ion shell Ionization
 - X-ray Energies
 - Absorption Edge Energies
 - Fluorescence yield
 - Cathodoluminesce
 - Ranges and interaction volumes.
3. Background on Electron-optical Column
 - Electron Gun source
 - W, LaB₆, FE gun sources
 - W filament
 - Focusing the electrons with Columns
 - Condenser Lenses
 - Scanning Coils
 - Probe current regulation

- Beam Diameter and Imaging Resolution
- SEM Resolution
- 4. Introductory to Vacuum
 - Units of Vacuum
 - "Rough vacuum" pump
 - Molecular flow vs viscous flow
 - Turbo Pumps
 - SEM vacuum setup
 - Ion pump
 - Measuring vacuum
- 5. Image Acquisition (includes low voltage)
 - SEM Imaging Modes
 - Depth of Field
 - Spatial resolution imaging
 - Stigmatism
 - High current operation
 - Low voltage imaging
 - Secondary electron images
 - BSE images
 - SEM Detectors
 - SEM Resolution
- 6. Variable Pressure ("Environmental") SEM work
 - Detectors for -ESEM
 - Wet Samples
 - Low Voltage
 - Operating Under ESEM
- 7. Introductory to EDS Analysis
 - Inside the detector
 - Detection of X-ray: SiLi
 - Detection of X-ray: SDD
 - EDS Windows
 - X-ray Transmission through EDS Windows
 - Dead Time
 - Background correction
 - Interferences at Low Voltages
- 8. Quantification method: ZAF Matrix Corrections
 - Absorption and Fluorescence
 - Matrix Corrections
 - ZAF
 - Standardless Analysis
 - X-ray Mapping
- 9. Specimen preparation: coating
 - Sample Mounts
 - Mounting Media
 - Edge Retention
 - Cutting, Grinding, Polishing

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- Cleaning
- Gold or Carbon Coating
- Storage

10. Special Specimens:

- SEM for nanoparticles and inclusions
- SEM for cross-sectioned areas
- SEM for topologies/morphologies

11. NIH Image Analysis

Grading System:

The course will be graded based on a combination of HWs, Lab reports, Midterms and Individual SEM projects as follows:

- HW assignments – 20%
- Lab reports – 20 %
- Two midterms - 15 each – 30 %
- Final Project – 30%

Grading will be based on the total scores normalized to 100%

A	90 -100 %
B	80 - 89.99 %
C	70 - 79.99 %
D	60 – 69.99 %
F	< 60%

Attendance:

- Attendance and punctuality are strongly urged, since students who attend class perform better. Arriving late is disruptive and will be discouraged. Bear in mind if you are absent or late to class, you are responsible for the materials missed.
- Missing a test: If you know in advance that you will miss a scheduled test, contact me to schedule the test prior to the date due. If you miss class on a scheduled test day due to an unexpected serious emergency, it is important that you send me an email at your earliest opportunity, concerning the reason for the missed exam. If you fail to do that, the decision to allow a make-up test will be made on a case by case basis, and is completely at the discretion of the instructor. Having a cold or over-sleeping are inexcusable absences on test day.
- Expected classroom behavior: students must refrain from socializing, eating, or other behavior that interferes with the class. No Internet usage during class; cell phones should be on silent, or better yet, OFF.

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Workflow > CAW - New Course Proposal Form**New Course Proposal Form**Submitted on 03/29/2018 by Kartik Ghosh (Kartikghosh@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:

PHY

Course Number: (Check Availability)

591

Course Title:

Computational Methods and Data Analysis in Physical Sciences

Will this course become part of a program? No Yes (A corresponding program change form must be submitted)Will this proposal need to be reviewed by CGEIP? No YesWill this proposal need to be reviewed by EPPC? No Yes

Prerequisite/Co-requisite or enter 'None':

PHY 291 or Instructor's Permission

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

Computational techniques related to physical sciences including techniques used for data analysis. An exploration of scientific operating systems, programs used for analysis and simulations, and methods for analyzing data and producing simulations. May be taught concurrently with PHY 692. May only receive credit for one of PHY 591 or PHY 692. 3(3-0) F for one of PHY 591 or PHY 692. 3(3-0) F.

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.

- | | | |
|---------------------------------|--|--|
| <input type="checkbox"/> Fall | <input type="checkbox"/> Fall (even-numbered years only) | <input checked="" type="checkbox"/> Fall (odd-numbered years only) |
| <input type="checkbox"/> Spring | <input type="checkbox"/> Spring (even-numbered years only) | <input type="checkbox"/> Spring (odd-numbered years only) |
| <input type="checkbox"/> Summer | <input type="checkbox"/> On Demand only | |

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Complete Catalog Description:

PHY 591 Computational Methods and Data Analysis in Physical Sciences

Prerequisite: PHY 291 or Instructor's Permission

Computational techniques related to physical sciences including techniques used for data analysis. An exploration of scientific operating systems, programs used for analysis and simulations, and methods for analyzing data and producing simulations. May be taught concurrently with PHY 692. May only receive credit for one of PHY 591 or PHY 692. 3(3-0) F for one of PHY 591 or PHY 692. 3(3-0) F.

Credit hours: 3 Lecture contact hours: 3 Lab contact hours: 0

Typically offered: Fall (odd-numbered years only)

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

Attached

Purpose of Course

This is a part of the program enhancement in computational technique course offerings in the department. This class will provide an advanced overview of computing for the physical sciences. It will include an overview of operating systems, commonly used packaged programs, scientific scripting for problem solving, computational techniques for analyzing and simulating data, numerical approximations and the basics of programming for experimental data acquisition, computer modelling, and data analysis in physical sciences.

Relationship to Other Departments

None

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

Enter parallel course number

PHY692 Computation and Data Analysis in Physical Sciences

How do these classes differ?

In PHY 692, students need to do an advanced project related to their field of study. In PHY 591, they do not need to do an advanced project.

New Course Resource Information

Anticipated Average Enrollment per section:	10	Maximum Enrollment Limit per section:	15
Anticipated Average Enrollment per semester:	10	Maximum Enrollment Limit per semester:	15
Anticipated Average Enrollment per year:	10	Maximum Enrollment Limit per year:	15
Faculty Load Assignment (equated hours):	3		

Is another course being deleted? No Yes

④

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?

None

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

Drs. Ridwan Sakidja, Evan Frodermann, Mike Reed, David Cornellison

What is the anticipated source of students for this course?

Physics, Chemistry, Mathematics, Geography, Geology, and Computer Science. A proposed parallel graduate course will be an option in the revised MS program in materials science

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

This is an optional course

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

We are not aware that the proposed course will affect courses in any other department.

Other comments:

A parallel graduate course PHY 692 is being proposed simultaneously

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

03/28/2018

4

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.



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Course Number and Title: PHY 591- Computational Methods and Data Analysis in Physical Sciences

Instructor Name: Dr. X., Professor, Department of Physics, Astronomy, and Materials Science

Office location: Kemper 10X

Phone Number: (417) 836-5131

Textbook: Data Analysis for Scientists and Engineers (Princeton University Press) by Edward L. Robinson

Office hours: To be set.

Purpose: This class will provide an advanced overview of computing for the physical sciences. It will include an overview of operating systems, commonly used packaged programs, scientific scripting for problem solving, computational techniques for analyzing and simulating data, numerical approximations and the basics of programming for experiments in physical sciences.

Course design: The course will include the following sections:

- History and overview of scientific usage of operating systems.
- Working environments. Commonly used programs for analyzing and/or simulating data, interfacing with equipment, and producing results (graphics)
- Data analysis.
- Computational problem solving techniques.

Topics to cover:

1. Overview of operating systems
2. Overview of packaged programs
 - a. Matlab
 - b. Mathematica
 - c. Gnuplot
 - d. Labview
3. Scientific scripting for problem solving
4. Computational techniques for analyzing and simulating data
 - c2
 - Least-squares
 - Fourier
 - Monte Carlo
 - Poisson distribution
5. Numerical approximations
6. The basics of programming for experiments in physical sciences
 - Data acquisition
 - Computer modelling
 - Data analysis
7. Advanced Topics in Physics and Astronomy
 - Kinematics and Dynamics
 - Waves and Electromagnetics
 - Monte Carlo and Reverse Monte Carlo Applications
 - Solar Systems and N-Body Simulations
 - Bayesian Techniques

Grading: Grading will be based on the completion of projects and homeworks.

④

Usual notices would be placed below this.

Grading System:

The course will be graded based on a combination of HWs, Midterms and Final Exam as follows:

- HW assignments – 40%
- Two midterms - 15 each – 30 %
- Final Exam – 30%

Grading will be based on the total scores normalized to 100%

A	90 -100 %
B	80 - 89.99 %
C	70 - 79.99 %
D	60 – 69.99 %
F	< 60%

Attendance:

- Attendance and punctuality are strongly urged, since students who attend class perform better. Arriving late is disruptive and will be discouraged. Bear in mind if you are absent or late to class, you are responsible for the materials missed.
- Missing a test: If you know in advance that you will miss a scheduled test, contact me to schedule the test prior to the date due. If you miss class on a scheduled test day due to an unexpected serious emergency, it is important that you send me an email at your earliest opportunity, concerning the reason for the missed exam. If you fail to do that, the decision to allow a make-up test will be made on a case by case basis, and is completely at the discretion of the instructor. Having a cold or over-sleeping are inexcusable absences on test day.
- Expected classroom behavior: students must refrain from socializing, eating, or other behavior that interferes with the class. No Internet usage during class; cell phones should be on silent, or better yet, OFF.

Missouri State.

Curricular Action Workflow



Missouri State > Computer Services - MIS > Curricular Action Workflow > CAW - Change Course Proposal Form

Change Course Proposal Form

Submitted on 03/28/2018 by D Wait (Alexanderwait@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:

BIO579 Conservation Biology

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:

BIO 579 Conservation Biology

Prerequisite: BIO 235 and BIO 367 and BIO 368. An in-depth examination of the science of conservation from a biological perspective, with an examination of ethical and legal aspects of conservation. May be taught concurrently with BIO 679. Cannot receive credit for both BIO 679 and BIO 579. Public Affairs Capstone Experience course. 4(3-2) D

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**

BIO 579 Conservation Biology

Recommended Prerequisite: GRY 108 or BIO 235 and BIO 367 and BIO 368. An in-depth examination of the science of conservation from a biological perspective, with an examination of ethical and legal aspects of conservation. May be taught concurrently with BIO 679. Cannot receive credit for both BIO 679 and BIO 579. Public Affairs Capstone Experience course. 3(3-0) S

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 lab portion of the course is being dropped. Labs were primarily field trips and computer simulations. Biology has

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Missouri State.

Curricular Action Workflow



Missouri State > Computer Services - MIS > Curricular Action Workflow > CAW - New Program Proposal Form

New Program Proposal Form

Submitted on 03/30/2018 by Toby Dogwiler (TDogwiler@MissouriState.edu).

This form is to be used for internal Missouri State approval of any proposal for a new program involving two or more courses, including any new graduate program, new undergraduate major (whether comprehensive or non-comprehensive), new option within an existing program (whether graduate or undergraduate), new minor, new certificate, or new certification program.

New graduate programs, new undergraduate majors, and certificate programs involving more than 18 credit hours require approval by the CBHE as well as approval through the Missouri State curricular process. CBHE applications for such programs are processed through the Office of Institutional Research. All proposals for new programs requiring CBHE approval should progress through the Missouri State curricular process accompanied by a draft of the required CBHE documentation.

Department:

Geography, Geology, & Planning

Proposed Program Title:

Applied GIS Certificate

Choose One:

- Non-Comprehensive Undergraduate Major Option Certification
- Comprehensive Undergraduate Major Minor Academic Rules
- Graduate Program Certificate Other

Does this program include any new courses?

- No Yes (A corresponding new course form must be submitted to create each new course.)

Select Degree Type (or Select Graduate Certificate or Undergraduate Certificate):

UGCT - Undergraduate Certificate

General Education Courses Required:

GEO 200 Exploring our Digital Earth

Total Hours: 3

6

General Education Courses Recommended:

None

Total Hours: 0

Requirements (Including Admission) and Limitations for Specific Degree/Program:

0

Total Hours: 0

Courses Required in Department:

GEO 200, 363, 551, 561; select at least three additional hours from following list of approved courses which integrate applied Geospatial Science topics and hands-on skills within their disciplinary context: GEO 360, 569, GLG 340, 412, 547, BIO 547

Total Hours: 13-14

Courses Required in Other Departments:

None, but in the future we hope to work with faculty from other disciplines to help them integrate GIS topics and hands-on exercises into additional courses that can be included in this certificate.

Total Hours: 0

Prerequisites for Required Courses:

GEO 200: 12 hours of university credit
GEO 363: 30 hours of university credit
GEO 551: GRY 360
GEO 561: GEO 363
See course catalog for prerequisites for courses from the list of electives.

Recommended Electives in Department:

None

Total Hours: 0

Recommended Electives in Other Departments:

None

Total Hours: 0

Limitations on Electives:

None

Please attach the following documents: (only one file may be attached for each requirement; accepts file types of PDF, DOC or DOCX)

- 1. Statement of Rationale: *Attached*
- 2. Estimated costs for first five years: *Attached*
- 3. Complete catalog description (including new courses and course changes pending approval): *Attached*

6

4. If proposal is for a new degree program, you must submit an application to the Missouri Department of Higher Education (MDHE).

- A. Use the templates below to create your application.
New Undergraduate Major (or certificate with more than 18 hours) | New Graduate Program (or certificate with more than 18 hours)
- B. Upload and attach the completed MDHE application. *Not Attached*

*If you require assistance to complete the application, contact Julie Masterson, Graduate College, 836-5335.

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

12/8/17

Current Status:

College Council Review

Proposal Progress:

03/30/2018 - Submitted by Department Head (Toby Dogwiler)

Review Comments:

03/30/2018 - Department Head Review - Toby Dogwiler - The new course included in this proposal is GEO 569, which is one of the listed electives. The proposal for this course was submitted earlier this year and is currently out for challenge.

[Redacted]

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Rationale for Applied GIS Certificate

The Applied GIS certificate program is being developed to promote the application of GIS methodologies and technologies across disciplines. Faculty and students from a number of MSU departments have supported the need for a GIS program focused on applying GIS to solve "real world" problems, in contrast to the existing GIS certificate, which is focused on the theories and foundations of GIS. The courses required in this program all focus on applications that are broadly relevant to many disciplines, including Geology, Biology, Archaeology, Agriculture, Environmental Science, Geography, Planning, and potentially the social sciences. After the certificate is established the Geospatial Science faculty plan to work with faculty from other disciplines to assist with the development of hands-on GIS exercises, assignments, or labs in their courses so that they can be included in the list of certificate electives.

6

Projected Costs:

This certificate program is strategically comprised of current Geospatial Science courses and existing courses from other disciplines. The required courses are all regularly taught within the load of existing faculty. No new courses, faculty, or other resources are required to support this certificate.

6

Applied GIS Certificate

The certificate in Applied Geospatial Science provides a 13-14 hour undergraduate level program for students and professionals who desire knowledge and credentials in the application of Geographic Information Science as a tool for solving problems in various disciplines.

Completion Requirements:

Must obtain a grade of C or better in all courses used to fulfill the certificate requirements.

Admission Criteria

Admission to Missouri State University

Program requirements (13-15 hours)

- A. GEO 200(3), 363(4), 551(3), 561(3)
- B. Three to four additional hours from the following list of approved courses which integrate Geospatial Science topics and hands-on skills within their disciplinary context: GEO 360, 569, GLG 340, 412, 547, BIO 547

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Missouri State.

Curricular Action Workflow



Missouri State > Computer Services - MIS > Curricular Action Workflow > CAW - New Program Proposal Form

New Program Proposal Form

Submitted on 03/30/2018 by Toby Dogwiler (TDogwiler@MissouriState.edu).

This form is to be used for internal Missouri State approval of any proposal for a new program involving two or more courses, including any new graduate program, new undergraduate major (whether comprehensive or non-comprehensive), new option within an existing program (whether graduate or undergraduate), new minor, new certificate, or new certification program.

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Department:

Geography, Geology, & Planning

Proposed Program Title:

Globalization and Sustainability Certificate

Choose One:

- Non-Comprehensive Undergraduate Major Option Certification
- Comprehensive Undergraduate Major Minor Academic Rules
- Graduate Program Certificate Other

Does this program include any new courses?

- No Yes (A corresponding new course form must be submitted to create each new course.)

Select Degree Type (or Select Graduate Certificate or Undergraduate Certificate):

UGCT - Undergraduate Certificate

General Education Courses Required:

GRY 100 World Regional Geography (3)
 GRY 108 Principles of Sustainability (3)
 PLN 100 Understanding Cities (3)

Total Hours: 9

7

General Education Courses Recommended:

None

Total Hours: 0

Requirements (including Admission) and Limitations for Specific Degree/Program:

None

Total Hours: 0

Courses Required in Department:

GRY 100, 108; PLN 100; Select from GRY 305, 308, 316, 318, 320, 321, 322, 323, 351, 353, 470 or approved Study Away program

Total Hours: 12

Courses Required in Other Departments:

None

Total Hours: 0

Prerequisites for Required Courses:GRY 321 and 351 require 30 semester hours of college credit prior to enrollment.
GRY 353 and 470 require permission for enrollment.**Recommended Electives in Department:**

None

Total Hours: 0

Recommended Electives in Other Departments:

None

Total Hours: 0

Limitations on Electives:

None

Please attach the following documents: (only one file may be attached for each requirement; accepts file types of PDF, DOC or DOCX)

1. Statement of Rationale: *Attached*
2. Estimated costs for first five years: *Attached*
3. Complete catalog description (including new courses and course changes pending approval): *Attached*
4. If proposal is for a new degree program, you must submit an application to the Missouri Department of Higher Education (MDHE).

- A. Use the templates below to create your application.
[New Undergraduate Major \(or certificate with more than 18 hours\)](#) | [New Graduate Program \(or certificate with more than 18 hours\)](#)
- B. Upload and attach the completed MDHE application. *Not Attached*

7

*If you require assistance to complete the application, contact Julie Masterson, Graduate College, 836-5335.

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

12/08/2017

Current Status:

College Council Review

Proposal Progress:

03/30/2018 - Submitted by Department Head (Toby Dogwiler)

Review Comments:

No comments have been added to this proposal.



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Rationale for Globalization and Sustainability Certificate

'Globalization and Sustainability' are themes that run through much of the Geography curriculum. The sense of "Place", which is a central tenet of Geography informs the ideas of globalization and sustainability in an ever-more interconnected world and its politics, economies, tourism, and conservation efforts. This certificate will provide students with a foundational knowledge surrounding 'Globalization and Sustainability' that will complement their studies in their area of major concentration.

Additionally, this certificate is designed to meet the University goal and College goals of "stackable" credentials. The requirements of this certificate program are foundational for the Geography major and can be completed by students early in their academic career. Students completing this certificate will be able to build on and apply this knowledge to upper-level courses in a variety of majors.

7

Projected Costs:

This certificate program is strategically comprised of current Geography courses. The required courses are all regularly taught within the load of existing faculty. No new courses, faculty, or other resources are required to support this certificate.

7

Globalization and Sustainability Certificate

The Globalization and Sustainability undergraduate certificate provides a 12 hour foundational experience in the areas of Geography that informs students about the political and economic forces leading to global interconnectedness and the concurrent challenges of sustaining economic and environmental systems in a rapidly evolving world.

Completion Requirements:

Must obtain a grade of C or better in all courses used to fulfill the certificate requirements.

Admission Criteria

Admission to Missouri State University

Program Requirements (12 hours)

- A. GRY 100(3), 108(3); PLN 100(3)
- B. Three additional hours from: GRY 305, 308, 316, 318, 320, 321, 322, 323, 351, 353, 470 or approved Study Away program

Missouri State.**Curricular Action Workflow**Missouri State > Computer Services - MIS > Curricular Action
Workflow > CAW - New Program Proposal Form**New Program Proposal Form****Submitted on 03/30/2018 by Toby Dogwiler (TDogwiler@MissouriState.edu).**

This form is to be used for internal Missouri State approval of any proposal for a new program involving two or more courses, including any new graduate program, new undergraduate major (whether comprehensive or non-comprehensive), new option within an existing program (whether graduate or undergraduate), new minor, new certificate, or new certification program.

New graduate programs, new undergraduate majors, and certificate programs involving more than 18 credit hours require approval by the CBHE as well as approval through the Missouri State curricular process. CBHE applications for such programs are processed through the Office of Institutional Research. All proposals for new programs requiring CBHE approval should progress through the Missouri State curricular process accompanied by a draft of the required CBHE documentation.

Department:

Geography, Geology, & Planning

Proposed Program Title:

Engineering Geology Certificate

Choose One:

- Non-Comprehensive Undergraduate Major Option Certification
 Comprehensive Undergraduate Major Minor Academic Rules
 Graduate Program Certificate Other

Does this program include any new courses?

- No Yes (A corresponding new course form must be submitted to create each new course.)

Select Degree Type (or Select Graduate Certificate or Undergraduate Certificate):

UGCT - Undergraduate Certificate

General Education Courses Required:

GLG 110 Physical Geology (4 cr)

Total Hours: 4



General Education Courses Recommended:

None

Total Hours: 0

Requirements (including Admission) and Limitations for Specific Degree/Program:

None

Total Hours: 0

Courses Required in Department:

GRY 275
 GLG 110(4)
 GLG 573(3)
 GLG 572 OR GLG 590 OR GLG 580

Total Hours: 13

Courses Required in Other Departments:

In lieu of GLG 573, 590, or 580, students in the Cooperative Engineering program may substitute one course from the "Water Resources Engineering", "Environmental Engineering", or "Geotechnical Engineering" Depth and Technical Elective Pools listed in the Civil Engineering Undergraduate Program requirements (<https://www.missouristate.edu>)

Total Hours: 0

Prerequisites for Required Courses:

GRY 275: MTH 138 or MTH 181 or MTH 261 or MTH 287
 GLG 110: None
 GLG 573: GLG 333 and either MTH 261 or MTH 287
 GLG 572: GLG 314; and either MTH 261 or MTH 287
 GLG 590: either PHY 124 or PHY 204; and either MTH 280 or MTH 288
 GLG 580: GLG 332

Recommended Electives in Department:

None

Total Hours: 0

Recommended Electives in Other Departments:

None

Total Hours: 0

Limitations on Electives:

None

Please attach the following documents: (only one file may be attached for each requirement; accepts file types of PDF, DOC or DOCX)

- 1. Statement of Rationale: *Attached*



- 2. Estimated costs for first five years: *Attached*
- 3. Complete catalog description (including new courses and course changes pending approval): *Attached*
- 4. If proposal is for a new degree program, you must submit an application to the Missouri Department of Higher Education (MDHE).
 - A. Use the templates below to create your application.
New Undergraduate Major (or certificate with more than 18 hours) | New Graduate Program (or certificate with more than 18 hours)
 - B. Upload and attach the completed MDHE application. *Not Attached*

*If you require assistance to complete the application, contact Julie Masterson, Graduate College, 836-5335.

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

12/8/17

Current Status:

College Council Review

Proposal Progress:

03/30/2018 - Submitted by Department Head (Toby Dogwiler)

Review Comments:

No comments have been added to this proposal.



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Rationale for Engineering Geology Certificate

This certificate bundles together courses that provide students with skill sets in high-demand in the Geotechnical Industry. The Geotechnical Industry employees people with backgrounds in Geology, Engineering, Biology, Geospatial Science, Soils and related fields. The courses required in this certificate program will provide students with the geologic knowledge and skills that are pre-requisite for highly successful careers in the Geotechnical Industry.

Additionally, this certificate, which we anticipate will be attractive to students in the Cooperative Engineering program, will provide a curricular option that engineering students can add to their degree program that will result in a credential from Missouri State University (upon graduation students in the Cooperative Engineering program receive their degree from Missouri Science and Technology—not MSU). Many students in the Cooperative Engineering program already take GRY 275 and GLG 110 to satisfy requirements in their major. Since we are allowing these students to substitute one of their Civil Engineering electives into the certificate, they can complete the requirements by taking one additional course that they would not otherwise typically take (GLG 573).

8

Projected Costs:

This certificate program is strategically comprised of current Geography and Geology courses and existing courses from other disciplines. The required courses are all regularly taught within the load of existing faculty. No new courses, faculty, or other resources are required to support this certificate.



Engineering Geology Certificate

This certificate is designed to be "stackable" within the Geology degree program or the Cooperative Engineering program. Geology majors will be able to document additional competencies relevant to careers in the Geotechnical and Civil/Environmental Engineering fields. Engineering students will gain additional perspectives on the geological aspects of civil engineering. Students from related majors interested in careers in the geotechnical industry will also gain career-relevant skills that complement their area of major study. Students from the Cooperative Engineering program that complete this certificate will earn an MSU credential.

Completion Requirements:

Must obtain a grade of C or better in all courses used to fulfill the certificate requirements.

Admission Criteria

Admission to Missouri State University and/or the Cooperative Engineering program

Program requirements (13-15 hours)

- A. GRY 275 (3), GLG 110(4), GLG 573(3)
- B. GLG 572 OR GLG 590 OR GLG 580
- C. The GLG prerequisites for GLG 573, 572, 580 and GLG 590 may be waived for non-geology majors at the discretion of the instructor, assuming that they have already completed GLG 110 and any MTH pre-requisites for the course.
- D. Students in the cooperative engineering program may contact the Geography, Geology, and Planning Department Head to request to substitute GLG 572, 590, or 580 with one course from those listed under "Water Resources Engineering", "Environmental Engineering", or "Geotechnical Engineering" in the *Guidelines for Depth and Technical Elective* pools listed in the Civil Engineering Undergraduate Program requirements (<https://www.missouristate.edu/egr/civil/FourYear.htm>)

Missouri State.

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Curricular Action WorkflowMissouri State > Computer Services - MIS > Curricular Action
Workflow > CAW - New Program Proposal Form**New Program Proposal Form****Submitted on 04/01/2018 by Toby Dogwiler (TDogwiler@MissouriState.edu).**

This form is to be used for internal Missouri State approval of any proposal for a new program involving two or more courses, including any new graduate program, new undergraduate major (whether comprehensive or non-comprehensive), new option within an existing program (whether graduate or undergraduate), new minor, new certificate, or new certification program.

New graduate programs, new undergraduate majors, and certificate programs involving more than 18 credit hours require approval by the CBHE as well as approval through the Missouri State curricular process. CBHE applications for such programs are processed through the Office of Institutional Research. All proposals for new programs requiring CBHE approval should progress through the Missouri State curricular process accompanied by a draft of the required CBHE documentation.

Department:

Geography, Geology, & Planning

Proposed Program Title:

Environmental Geoscience Certificate

Choose One:

- Non-Comprehensive Undergraduate Major Option Certification
 Comprehensive Undergraduate Major Minor Academic Rules
 Graduate Program Certificate Other

Does this program include any new courses?

- No Yes (A corresponding new course form must be submitted to create each new course.)

Select Degree Type (or Select Graduate Certificate or Undergraduate Certificate):

UGCT - Undergraduate Certificate

General Education Courses Required:

GRY 135(4) Principles of Weather and Climate (Optional with a non-General Education course)
 GLG 171(3) and GLG 172(3) Environmental Geology and Environmental Geology Lab
 GRY 108(3) Principles of Sustainability (Optional with a non-General Education course)

Total Hours: 4-11

9

General Education Courses Recommended:

None

Total Hours: 0

Requirements (including Admission) and Limitations for Specific Degree/Program:

None

Total Hours: 0

Courses Required in Department:

- A. GRY 135(4) OR GRY 351(3)
- B. GLG 171(3) and 172(1)
- C. GLG 580(3) (Optional with CHM 460(3))
- D. GRY 108(3) OR GLG 547(3)

Total Hours: 10-14

Courses Required in Other Departments:

CHM 460(3) (optional with GLG 580)

Total Hours: 0-3

Prerequisites for Required Courses:

GRY 135(4): None
 GRY 351(3): 30 hours
 GLG 171(3) and 172(1): None
 GLG 580(3): GLG 332
 CHM 460(3): *C* or better in CHM 170; and *C* or better in CHM 201 or CHM 342
 GRY 108(3): None
 GLG 547(3): BIO 122 or GLG 110 or GRY 142; and CHM 160 and CHM 161; and MTH 135.

Recommended Electives in Department:

None

Total Hours: 0

Recommended Electives in Other Departments:

None

Total Hours: 0

Limitations on Electives:

None

Please attach the following documents: (only one file may be attached for each requirement; accepts file types of PDF, DOC or DOCX)

9

1. Statement of Rationale: *Attached*
2. Estimated costs for first five years: *Attached*
3. Complete catalog description (including new courses and course changes pending approval): *Attached*
4. If proposal is for a new degree program, you must submit an application to the Missouri Department of Higher Education (MDHE).
 - A. Use the templates below to create your application.
[New Undergraduate Major \(or certificate with more than 18 hours\)](#) | [New Graduate Program \(or certificate with more than 18 hours\)](#)
 - B. Upload and attach the completed MDHE application. *Not Attached*

*If you require assistance to complete the application, contact Julie Masterson, Graduate College, 836-5335.

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

12/08/2017

Current Status:

College Council Review

Proposal Progress:

04/01/2018 - Submitted by Department Head (Toby Dogwiler)

Review Comments:

No comments have been added to this proposal.



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9

Rationale for Environmental Geoscience Certificate

This certificate is designed to bring together Geography, Geology, and Chemistry courses that inform the theories and application of environmental and conservation principles. Many prospective and current students come to these majors motivated by an interest in Environmental Science. Our faculty believe these students are best served in the long-term by majoring in a traditional science field, such as geography, geology, chemistry, biology, and related majors. This certificate program will guide students interested in Environmental Geoscience in selecting a suite of courses that will enhance their major studies with focused understanding of environmental and conservation principles.

9

Projected Costs:

This certificate program is strategically comprised of current courses. The required courses are all regularly taught within the load of existing faculty. No new courses, faculty, or other resources are required to support this certificate.

9

Environmental Geoscience Certificate

The certificate in Environmental Geoscience provides students the opportunity to develop an understanding of the theories and applications of environmental and conservation principles and the problem-solving approaches used to address environmental issues.

Completion Requirements:

Must obtain a grade of C or better in all courses used to fulfill the certificate requirements.

Admission Criteria

Admission to Missouri State University

Program requirements (13-14 hours)

- A. GRY 135(4) OR GRY 351(3)
- B. GLG 171(3) and 172(1)
- C. GLG 580(3) OR CHM 460(3)
- D. GRY 108(3) OR GLG 547(3)

Students enrolled in sections of BIO 547 cross-listed with GLG 547 may count that course in place of GLG 547. The GLG 172 requirement will be waived for students passing GLG 110 with a grade of C or better.

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Missouri State.

Curricular Action Workflow



Missouri State > Computer Services - MIS > Curricular Action Workflow > CAW - New Program Proposal Form

New Program Proposal Form

Submitted on 04/01/2018 by Toby Dogwiler (TDogwiler@MissouriState.edu).

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Department:

Geography, Geology, & Planning

Proposed Program Title:

Geologic Foundations Certificate

Choose One:

- Non-Comprehensive Undergraduate Major
- Comprehensive Undergraduate Major
- Graduate Program
- Option
- Minor
- Certificate
- Certification
- Academic Rules
- Other

Does this program include any new courses?

- No
- Yes (A corresponding new course form must be submitted to create each new course.)

Select Degree Type (or Select Graduate Certificate or Undergraduate Certificate):

UGCT - Undergraduate Certificate

General Education Courses Required:

GLG 110 Physical Geology (4)

Total Hours: 4

10

General Education Courses Recommended:

None

Total Hours: 0

Requirements (including Admission) and Limitations for Specific Degree/Program:

None

Total Hours: 0

Courses Required in Department:

4 cr - GLG 110 Physical Geology
3 cr - GLG 314 Historical Geology
3 cr - GLG 332 Mineralogy
3-4 cr - GLG 333 Igneous and Metamorphic Petrology, OR GLG 334 Sedimentary Geology, OR GLG 340 Structural Geology

Total Hours: 0

Courses Required in Other Departments:

None

Total Hours: 0

Prerequisites for Required Courses:

GLG 110 - None
GLG 314 - GLG 110 (or GLG 171 + 172)
GLG 332 - GLG 110 or both GLG 171 and GLG 172; and CHM 160; and MTH 135 or MTH 138 or MTH 261 or MTH 287
GLG 333 - GLG 332
GLG 334 - GLG 314 and GLG 332
GLG 340 - GLG 314 and GLG 333 and GLG 334 or concurrent enrollment, and either MTH 138 or MTH 181

Recommended Electives in Department:

None

Total Hours: 0

Recommended Electives in Other Departments:

None

Total Hours: 0

Limitations on Electives:

None

Please attach the following documents: (only one file may be attached for each requirement; accepts file types of PDF, DOC or DOCX)

- 1. Statement of Rationale: Attached

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2. Estimated costs for first five years: *Attached*

3. Complete catalog description (including new courses and course changes pending approval): *Attached*

4. If proposal is for a new degree program, you must submit an application to the Missouri Department of Higher Education (MDHE).

- A. Use the templates below to create your application.

[New Undergraduate Major \(or certificate with more than 18 hours\)](#) | [New Graduate Program \(or certificate with more than 18 hours\)](#)

- B. Upload and attach the completed MDHE application. *Not Attached*

*If you require assistance to complete the application, contact Julie Masterson, Graduate College, 836-5335.

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

12/08/2017

Current Status:

College Council Review

Proposal Progress:

04/01/2018 - Submitted by Department Head (Toby Dogwiler)

Review Comments:

No comments have been added to this proposal.

[Redacted]

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Rationale for Geologic Foundations Certificate

This certificate represents the courses within the Geology major that are the foundational basis for the field of geology. Students completing this certificate will have an understanding of the basic principles of geology and a credential that demonstrates this readiness as they compete for geology-related internships, directed research experiences, and admission to geology field camps.

Additionally, this certificate is designed to meet the University goal and College goals of "stackable" credentials. The requirements of this certificate program can be completed by students early in their academic career. Students completing this certificate will be able to build on and apply this knowledge to upper-level courses in a variety of majors. Furthermore, this certificate provides a credential for students for whom a basic understanding of geologic principles will complement their major area of study or students who begin the geology major but are unable to finish for whatever reason.

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Projected Costs:

This certificate program is strategically comprised of current Geology courses. The required courses are all regularly taught within the load of existing faculty. No new courses, faculty, or other resources are required to support this certificate.

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Geologic Foundations Certificate

The certificate in Geological Foundations provides a 13-14 hour undergraduate-level program for students who desire knowledge of the basic principles of geology and a credential that demonstrates this preparation as they compete for geology-related internships, directed research experiences, and admission to geology field camps. This certificate program is also appropriate for students who will benefit from a basic understanding of geologic principles as a complement to their major area of study.

Completion Requirements:

Must obtain a grade of C or better in all courses used to fulfill the certificate requirements.

Admission Criteria

Admission to Missouri State University

Program requirements (13-14 hours)

- A. GLG 110(4), GLG 314(3), GLG 332(3)
- B. GLG 333(3) OR GLG 344(3) OR GLG 340(4)

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Missouri State.**Curricular Action Workflow**Missouri State > Computer Services - MIS > Curricular Action
Workflow > CAW - New Program Proposal Form**New Program Proposal Form****Submitted on 04/01/2018 by Toby Dogwiler (TDogwiler@MissouriState.edu).**

This form is to be used for internal Missouri State approval of any proposal for a new program involving two or more courses, including any new graduate program, new undergraduate major (whether comprehensive or non-comprehensive), new option within an existing program (whether graduate or undergraduate), new minor, new certificate, or new certification program.

New graduate programs, new undergraduate majors, and certificate programs involving more than 18 credit hours require approval by the CBHE as well as approval through the Missouri State curricular process. CBHE applications for such programs are processed through the Office of Institutional Research. All proposals for new programs requiring CBHE approval should progress through the Missouri State curricular process accompanied by a draft of the required CBHE documentation.

Department:

Geography, Geology, & Planning

Proposed Program Title:

Petroleum Geology Certificate

Choose One:

- Non-Comprehensive Undergraduate Major
 Option
 Certification
 Comprehensive Undergraduate Major
 Minor
 Academic Rules
 Graduate Program
 Certificate
 Other

Does this program include any new courses?

- No
 Yes (A corresponding new course form must be submitted to create each new course.)

Select Degree Type (or Select Graduate Certificate or Undergraduate Certificate):

UGCT - Undergraduate Certificate

General Education Courses Required:

None

Total Hours: 0

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General Education Courses Recommended:

None

Total Hours: 0

Requirements (Including Admission) and Limitations for Specific Degree/Program:

None

Total Hours: 0

Courses Required in Department:

3 cr - GLG 570 Principles of Stratigraphy
3 cr - GLG 572 Geohydrology OR GLG 580 Geochemistry
3 cr - GLG 574 Petroleum Geology
3 cr - GLG 590 Applied Geophysics OR GLG 591 Seismic Data Processing

Total Hours: 12

Courses Required in Other Departments:

None

Total Hours: 0

Prerequisites for Required Courses:

GLG 570: GLG 314 and GLG 334
GLG 572: GLG 314; and either MTH 261 or MTH 287
GLG 580: GLG 332
GLG 574: GLG 314
GLG 590: either PHY 124 or PHY 204; and either MTH 280 or MTH 288
GLG 591: GLG 340 (or permission); and either PHY 124 or PHY 204 or concurrent enrollment in either; and either MTH 280 or MTH 288 or concurrent enrollment in either.

Recommended Electives in Department:

None

Total Hours: 0

Recommended Electives in Other Departments:

None

Total Hours: 0

Limitations on Electives:

None

Please attach the following documents: (only one file may be attached for each requirement; accepts file types of PDF, DOC or DOCX)

1. Statement of Rationale: *Attached*

2. Estimated costs for first five years: *Attached*

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3. Complete catalog description (including new courses and course changes pending approval): *Attached*

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New Undergraduate Major (or certificate with more than 18 hours) | New Graduate Program (or certificate with more than 18 hours)

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12/08/2017

Current Status:

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04/01/2018 - Submitted by Department Head (Toby Dogwiler)

Review Comments:

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Rationale for Petroleum Geology Certificate

This certificate represents a suite of courses within the Geology major that together form the basis of Petroleum Geology. Many Geology majors are interested in careers or graduate programs in this well-paying field of geology. It allows students the opportunity to demonstrate competencies that are in demand among employers in the petroleum and gas industry. This certificate will provide incentive for these students to strategically choose their program electives plus additional courses to ensure that they are optimally prepared to compete for these positions. In this way, the certificate is "stackable" on the basic Geology major program. Furthermore, recognizing this additional preparation with a certificate credential allows us to keep the Geology major programs streamlined by avoiding the creation of requirements that are only relevant to a subset of our majors and career opportunities.

(11)

Projected Costs:

This certificate program is strategically comprised of current Geology courses. The required courses are all regularly taught within the load of existing faculty. No new courses, faculty, or other resources are required to support this certificate.

Petroleum Geology Certificate

The certificate in Petroleum Geology provides students the opportunity to demonstrate competencies that are in demand among employers in the petroleum and gas industry.

Completion Requirements:

Must obtain a grade of C or better in all courses used to fulfill the certificate requirements.

Admission Criteria

Admission to Missouri State University

Program requirements (13-14 hours)

- A. GLG 570(3)
- B. GLG 572(3) OR GLG 580(3)
- C. GLG 574(3)
- D. GLG 590(3) OR GLG 591(3)