MEMORANDUM TO: Ogden College of Science and Engineering Curriculum Committee

Dr. Melanie Autin
Dr. Nahid Gani
Dr. Scott Grubbs
Dr. Ting-Hui Lee
Dr. Andy Mienaltowski
Dr. Les Pesterfield
Dr. Todd Willian
Mr. Jason Wilson
Dr. Bangbo Yan

FROM: Dr. Stuart Burris, Chair

SUBJECT: Agenda for <u>Thursday, December 7, 2023</u>

A. OLD BUSINESS:

I. Consideration of the minutes of the November 2, 2023 meeting.

B. NEW BUSINESS:

Type of item	Description of Item & Contact Information
Informational Proposals not attached.	**<u>The following items were sent through the expedited process:</u>** **Add or Revise Course Student Learning Outcomes & Content Outlines** AGED 200, 470, 471, 475, 489 AGRI 175, 269, 291, 315, 323, 355, 369, 397, 398, 399, 475, 491, 493, 494 AGRO 418 ANSC 130, 131, 140, 140, 232, 240, 241, 330, 331, 334, 338, 340, 347, 431, 432, 437, 438, 440, 442, 443, 446, 447, 448, 475 AS 151, 163, 251, 263, 273, 305, 351, 369, 373, 378, 463, 469, 470, 488, 490 BIOL 212, 222, 223, 224, 225, 226, 227, 231, 275, 285, 303, 312, 315, 316, 319, 321, 322, 325 CM 250, 261, 282, 346, 363, 462, 490 CS 146, 157, 170, 175, 180, 239, 245, 290, 299, 315, 325, 331, 339, 351, 381, 389, 396, 406, 443, 445, 450, 456, 475, 476, 496 MATH 136, 240,306, 405, 406, 470, 473 MFGE 205, 217, 227, 271, 303, 310, 328, 342, 343, 352, 356, 370, 371, 381, 390, 394, 396, 430 SEAS 401 **Add LO/Outline plus one other expedited change** AGED 300 (routed to PEC) **Suspend/Delete** BIOL 199, 318, 324, 405, 460 CS 121, 221, 250 ENGR 175 MATH 315, 350, 371, 423 **Change an Internal Pre-req** GEOG 499

Action	**Proposal to Make a Program Change** Ref. 623: Chemistry, Bachelor of Science Contact: Lawrence Hill, Lawrence.hill@wku.edu, x2136
Action	**Proposal to Make Multiple Changes to a Course** GEOG 295: Introduction to Research Methodology Contact: Jason Polk, jason.polk@wku.edu, x5015

C. OTHER BUSINESS

Minutes – OCSE Curriculum Committee **November 2023**

Members Present:
Dr. Melanie Autin
Dr. Nahid Gani
Dr. Scott Grubbs
Dr. Dr. Ting-Hui Lee
Dr. Andy Mienaltowski
Dr. Todd Willian
Dr. Bangbo Yan

Guests: Dr. Alex Lebedinsky, Mr. Patrick Brown, Ms. Leslie Plumlee, Ms. Robin Ayers, Dr. Mike Carini, and Dr. Kevin Schmaltz.

FROM: Dr. Stuart Burris, Chair

The meeting was called to order at 4:00pm.

OLD BUSINESS:

Minutes from the October 2023 meeting were approved as posted.

NEW BUSINESS:

Action Agenda:
Data 399: Willian/Autin; approved
Data 499: Autin/Gani; approved
Data Science, Bachelor of Science: Grubbs/Willian; approved
MATH 112E: Autin/Grubbs; approved
MATH 123E: Willian/Autin; approved
MATH 382: Autin/Gani; approved
MATH 482: Mienaltowski/Grubbs; approved
Autin moved to bundle and approve Ref. 528P/528 Mathematics, Ref. 728P/728 Mathematics & Ref. 730P/730 Mathematics: Autin/Willian; approved
Ref. 731: Mathematical Economics: Grubbs/Willian; approved
PHYS 170: Willian/Lee; approved
PHYS 171: Grubbs/Lee; approved
PHYS 312: Autin/Lee; approved
ME 492: Autin/Grubbs; approved

Other Business:

Adjourned at 4:41pm

Program Change Request

Date Submitted: 11/17/23 2:53 pm

Viewing: 623 : Chemistry, Bachelor of Science

Last approved: 04/12/23 3:33 pm

Last edit: 11/17/23 2:53 pm

Changes proposed by: lwr75865

Catalog Pages
Using this Program
Chemistry, Bachelor of Science (623)

Proposed Action

In Workflow

1. **CHEM Approval**
2. **SC Dean**
3. **SC Curriculum Committee**
4. Professional Education Council
5. Undergraduate Curriculum Committee
6. University Senate
7. Provost
8. Program Inventory

Approval Path

1. 11/17/23 2:56 pm Kevin Williams (kevin.williams): Approved for CHEM Approval
2. 12/01/23 3:28 pm Stuart Burris (stuart.burris): Approved for SC Dean

History

1. May 25, 2021 by Rheanna Plemons (rheanna.plemons)
2. Sep 27, 2021 by Jennifer Hammonds (jennifer.hammonds)
3. Mar 9, 2022 by Jeremy Maddox (jeremy.maddox)
4. Jul 12, 2022 by Ryan Wilson (ryan.wilson)
5. Apr 12, 2023 by Jennifer Hammonds

(jennifer.hammonds)

Active

Contact Person

Name	Email	Phone
Lawrence Hill	lawrence.hill@wku.edu	2707452136

Term of Implementation: 2024-2025

Program Reference Number: 623

Review Type: Full Review

Academic Level: Undergraduate

Program Type: Major

Degree Types: Bachelor of Science

Department: Chemistry

College: Science and Engineering

Program Name (eg. Biology): Chemistry, Bachelor of Science

Will this program have concentrations?

Yes

Concentrations

Concentrations

ACS Approved (CHCR)
General Chemistry (CHGC)
Teacher Education (TCHR)
Pre-Jump Chemistry Advising (PJMP)
Foundations Chemistry Major (FCHM)

CIP Code: 40.0501 - Chemistry, General.

Will this program lead to teacher certification?: Yes

Does the proposed program contain 25% or more new content not previously taught in another course at WKU? If yes, contact the Office of the Provost for additional SACSCOC proposal requirements

No

Catalog Content

Program Overview (Catalog field: Overview tab)

The major in chemistry requires a minimum of 33 semester hours and leads to the Bachelor of Science degree. Requirements of the major include selecting one of four concentrations: ACS-Approved, Foundations, General, or Teacher Certification. The ACS-Approved Concentration does not require a minor or second major and is typically for students desiring graduate education in chemistry. The Foundations Concentration requires a minor or a second major and is appropriate for a wide range of career targets. The General Concentration requires a second major and is typically chosen by those in pre-health concentrations. The Teacher Certification Concentration is for students desiring Secondary Teacher Certification and requires a second major in Science and Mathematics Education (Reference Number 774). Prior to a selection of a program of study, a student should consult with a chemistry advisor to determine the most appropriate option.

Curriculum Requirements (Catalog field: Program Requirements)

Program Requirements (33-53 hours)

Approved Shared Content from /shared/undergraduate-major-requirements/
Last Approved: Jul 6, 2023 12:58pm

A baccalaureate degree requires a minimum of 120 unduplicated semester hours. More information can be found at www.wku.edu/registrar/degree_certification.php.
Students who began WKU in the Fall 2014 and thereafter should review the Colonnade requirements located at: https://www.wku.edu/colonnade/colonnaderequirements.php.

ACS Approved Concentration (53 hours)

WKU is on the approved list of the Committee on Professional Training of the American Chemical Society. For the Chemistry Department to certify graduates in this concentration, the completion of a minimum of 53 hours of chemistry courses, 16-18 hours of math and science cognate courses, and the Colonnade general education courses for the Bachelor of Science is required. Required chemistry courses for the ACS Approved concentration are:

CHEM 120 & CHEM 121	College Chemistry I and College Chemistry I Laboratory	5
CHEM 222 & CHEM 223	College Chemistry II and College Chemistry II Laboratory	5
CHEM 320	Inorganic Chemistry I	3
CHEM 330	Quantitative Analysis	5
CHEM 340 & CHEM 341	Organic Chemistry I and Organic Chemistry Laboratory I	5
CHEM 342 & CHEM 343	Organic Chemistry II and Organic Chemistry II Laboratory	5
CHEM 398	Undergraduate Seminar	1
CHEM 399	Research Problems in Chemistry	2
CHEM 420 & CHEM 421	Inorganic Chemistry II and Inorganic Chemistry Laboratory	4

CHEM 435	Instrumental Analysis	5
& CHEM 436	and Instrumental Analysis Laboratory	
CHEM 446	Biochemistry I	3
CHEM 450	Physical Chemistry I	5
& CHEM 451	and Physical Chemistry I Laboratory	
CHEM 452	Physical Chemistry II	5
& CHEM 453	and Physical Chemistry II Laboratory	
Total Hours		53

Required Support Courses for ACS Approved Concentration (16-18 hours)[1]

MATH 136	Calculus I	4
MATH 137	Calculus II	4
Select one series from the following:		8-10
PHYS 231	Introduction to Physics and Biophysics I	
& PHYS 232	and Laboratory for Physics and Biophysics I	
& PHYS 332	and Introduction to Physics and Biophysics II	
& PHYS 233	and Laboratory for Physics and Biophysics II	
or		
PHYS 255	University Physics I	
& PHYS 256	and University Physics I Lab	
& PHYS 265	and University Physics II	
& PHYS 266	and University Physics II Laboratory	
Total Hours		16-18

[1] Students initially ineligible for MATH 136 should consult their academic advisor for the proper first course in mathematics. It is recommended that students in this program take MATH 237, MATH 307 and MATH 331 in addition to the minimum math requirements listed above. The University Physics track is strongly recommended for this concentration.

Foundations Concentration (37 hours)

Required Courses:		
CHEM 120	College Chemistry I	5
& CHEM 121	and College Chemistry I Laboratory	
CHEM 222	College Chemistry II	5
& CHEM 223	and College Chemistry II Laboratory	
CHEM 320	Inorganic Chemistry I	3
CHEM 330	Quantitative Analysis	5
CHEM 340	Organic Chemistry I	5
& CHEM 341	and Organic Chemistry Laboratory I	
CHEM 342	Organic Chemistry II	5
& CHEM 343	and Organic Chemistry II Laboratory	

CHEM 398	Undergraduate Seminar	1
CHEM 446	Biochemistry I	3
CHEM 450 & CHEM 451	Physical Chemistry I and Physical Chemistry I Laboratory	5
A minor or second major is required for this concentration		
Total Hours		37

Required Support Courses for the Foundations Concentration (8-9 hours)

MATH 136	Calculus I	4
Select one of the following course sequences:		
PHYS 231 & PHYS 232	Introduction to Physics and Biophysics I and Laboratory for Physics and Biophysics I	4-5
or PHYS 255 & PHYS 256	University Physics I and University Physics I Lab	
Total Hours		8-9

General Chemistry Concentration (33 hours)

The General Chemistry Concentration is recommended for pre-health professions students majoring in chemistry and other students who desire a double major.

CHEM 120 & CHEM 121	College Chemistry I and College Chemistry I Laboratory	5
CHEM 222 & CHEM 223	College Chemistry II and College Chemistry II Laboratory	5
CHEM 330	Quantitative Analysis	5
CHEM 340 & CHEM 341	Organic Chemistry I and Organic Chemistry Laboratory I	5
CHEM 342 & CHEM 343	Organic Chemistry II and Organic Chemistry II Laboratory	5
CHEM 320	Inorganic Chemistry I	3
or CHEM 446	Biochemistry I	
CHEM 450 & CHEM 451	Physical Chemistry I and Physical Chemistry I Laboratory	5
A second major is required for this concentration.		
Total Hours		33

Additional Support Courses for the General Chemistry Concentration (8-9 hours)

MATH 136	Calculus I	4

Select one of the following sequences:		
PHYS 231 & PHYS 232	Introduction to Physics and Biophysics I and Laboratory for Physics and Biophysics I	4-5
or PHYS 255 & PHYS 256	University Physics I and University Physics I Lab	
Total Hours		8-9

Chemistry Major with Teacher Certification Concentration (33 hours)

Students interested in teaching chemistry must declare a second major in Science and Mathematics Education (SMED) available through the College of Education and Behavioral Sciences.

Chemistry Major Requirements		
CHEM 120 & CHEM 121	College Chemistry I and College Chemistry I Laboratory	5
CHEM 222 & CHEM 223	College Chemistry II and College Chemistry II Laboratory	5
CHEM 320	Inorganic Chemistry I	3
CHEM 330	Quantitative Analysis	5
CHEM 340 & CHEM 341	Organic Chemistry I and Organic Chemistry Laboratory I	5
CHEM 446 & CHEM 447	Biochemistry I and Biochemistry Laboratory	5
CHEM 450 & CHEM 451	Physical Chemistry I and Physical Chemistry I Laboratory	5
Total Hours		33

Required Support Courses for Teacher Education (16 hours)

MATH 136	Calculus I	4
PHYS 231 & PHYS 232	Introduction to Physics and Biophysics I and Laboratory for Physics and Biophysics I	4
PHYS 332 & PHYS 233	Introduction to Physics and Biophysics II and Laboratory for Physics and Biophysics II	4
GEOL 111 & GEOL 113	The Earth and The Earth Laboratory	4
Total Hours		16

SMED Major Requirements (34 hours)

SMED 101	Step 1: Introduction to Inquiry-Based Approaches to Teaching	3
SMED 102	Step 2: Introduction to Inquiry-Based Lesson Design	3
SMED 310	Knowing and Learning in Mathematics and Science	3

SMED 320	Classroom Interactions	3
SMED 340	Perspectives on Mathematics and Science	3
SMED 360	Research Methods for Math and Science Teachers	3
SMED 470	Project-Based Instruction	3
SMED 489	SMED Student Teaching Seminar	3
SEC 490	Student Teaching	10
Total Hours		34

The Department of Chemistry offers a Joint Undergraduate Master's Program (JUMP) which provides academically outstanding students the opportunity to complete both an undergraduate and graduate degree in an accelerated timeframe. See https://catalog.wku.edu/graduate/enrollment/ or contact the chemistry graduate program coordinator for additional information. This JUMP program allows students to start working toward their MS in chemistry while completing their bachelor's of science degree in chemistry. Undergraduate students admitted into JUMP may take graduate courses that count toward both undergraduate and graduate degrees. Up to 9 credit hours can be double-counted toward both degrees, and up to 12 hours of graduate courses can be taken while a student is completing the undergraduate degree. The key benefit of the JUMP program is that it allows students to earn a bachelor's and a master's degree in an accelerated timeframe. For more information, see https://www.wku.edu/chemistry/.
A student must be a chemistry or biochemistry major, and they must have completed at least one semester long research experience with a faculty member in the Department of Chemistry to be considered for admission to the chemistry JUMP program. Note that admissions are competitive and dependent upon graduate program capacity.
~~Required Support Courses for Teacher Education (16 hours) SMED Major Requirements (34 hours)~~

4-Year Plan

ACS Approved Concentration

First Year

Fall	Hours	Spring	Hours
CHEM 120 & CHEM 121	5	CHEM 222 & CHEM 223	5
MATH 136	4	MATH 137	4
ENG 100	3	COMM 145	3
Colonnade - Social & Behavioral Sciences	3	ENG 200	3
	15		15

Second Year

Fall	Hours	Spring	Hours
CHEM 330	5	CHEM 340 & CHEM 341	5
PHYS 255 & PHYS 256	5	PHYS 265 & PHYS 266	5
CHEM 320	3	MATH 237	4
ENG 300	3		
	16		14

Third Year

Fall	Hours	Spring	Hours
CHEM 342 & CHEM 343	5	CHEM 399	1
CHEM 398	1	CHEM 446	3

First Year

Fall	Hours	Spring	Hours
CHEM 399	1	CHEM 452 & CHEM 453	5
CHEM 450 & CHEM 451	5	Colonnade - Arts & Humanities	3
HIST 101 or HIST 102	3	Colonnade - Social & Cultural	3
	15		15

Fourth Year

Fall	Hours	Spring	Hours
CHEM 399	1	CHEM 399	1
CHEM 435 & CHEM 436	5	CHEM 420 & CHEM 421	4
Colonnade - Local to Global	3	Colonnade - Systems	3
General Elective	3	General Elective	3
General Elective	3	General Elective	4
	15		15

Total Hours 120

General Concentration

First Year

Fall	Hours	Spring	Hours
CHEM 120 & CHEM 121	5	CHEM 222 & CHEM 223	5
MATH 136	4	COMM 145	3
ENG 100	3	Elective or Course in 2nd Major	3
Elective or Course in 2nd Major	3	ENG 200	3
	15		14

Second Year

Fall	Hours	Spring	Hours
CHEM 340 & CHEM 341	5	CHEM 342 & CHEM 343	5
PHYS 231 & PHYS 232	4	PHYS 332 & PHYS 233	4
ENG 300	3	HIST 101 or HIST 102	3
Elective or Course in 2nd Major	3	Elective or Course in 2nd Major	3
	15		15

Third Year

Fall	Hours	Spring	Hours
CHEM 446 or CHEM 320	3	CHEM 330	5
Elective or Course in 2nd Major	3	Colonnade - Social & Cultural	3
Colonnade - Arts & Humanities	3	Elective or Course in 2nd Major	3
Colonnade - Social & Behavioral Sciences	3	Elective or Course in 2nd Major	3
Colonnade - Natural & Physical Sciences w/ no lab	3		
	15		14

Fourth Year

First Year

Fall	Hours	Spring	Hours
Fall	Hours	Spring	Hours
CHEM 450 & CHEM 451	5	Colonnade - Systems	3
Colonnade - Local to Global	3	Elective or Course in 2nd Major	3
Elective or Course in 2nd Major	3	Elective or Course in 2nd Major	3
Elective or Course in 2nd Major	3	Elective or Course in 2nd Major	3
Elective or Course in 2nd Major	3	Elective or Course in 2nd Major	3
	17		15

Total Hours 120

Foundations Concentration

First Year

Fall	Hours	Spring	Hours
CHEM 120 & CHEM 121	5	CHEM 222 & CHEM 223	5
MATH 136	4	MATH 137	4
ENG 100	3	COMM 145	3
Elective or Course in Minor	3	ENG 200	3
	15		15

Second Year

Fall	Hours	Spring	Hours
CHEM 330	5	CHEM 340 & CHEM 341	5
PHYS 255 & PHYS 256	5	PHYS 265 & PHYS 266	5
CHEM 320	3	HIST 101 or HIST 102	3
ENG 300	3	Elective or Course in Minor	3
	16		16

Third Year

Fall	Hours	Spring	Hours
CHEM 342 & CHEM 343	5	CHEM 399	3
CHEM 398	1	CHEM 446	3
Colonnade - Arts & Humanities	3	Colonnade - Social & Cultural	3
Colonnade - Social & Behavioral Sciences	3	Elective or Course in Minor	3
Colonnade - Natural & Physical Sciences w/ no lab	3	Elective or Course in Minor	3
	15		15

Fourth Year

Fall	Hours	Spring	Hours
CHEM 450 & CHEM 451	5	Colonnade - Systems	3
Colonnade - Local to Global	3	Elective or Course in Minor	3
Elective or Course in Minor	3	Elective or Course in Minor	3
Elective or Course in Minor	3	Elective or Course in Minor	3

First Year

Fall	Hours	Spring	Hours
		Elective or Course in Minor	3
	14		15

Total Hours 121

Teacher Certification Concentration

First Year

Fall	Hours	Spring	Hours
CHEM 120 & CHEM 121	5	CHEM 222 & CHEM 223	5
MATH 117	3	MATH 136	4
SMED 101	3	SMED 102	3
ENG 100	3	COMM 145	3
HIST 101 or HIST 102	3	ENG 200	3
	17		18

Second Year

Fall	Hours	Spring	Hours
CHEM 330	5	CHEM 340 & CHEM 341	5
PHYS 231 & PHYS 232	4	PHYS 332 & PHYS 233	4
SMED 310	3	SMED 340	3
SMED 320	3	ENG 300	3
	15		15

Third Year

Fall	Hours	Spring	Hours
CHEM 320	3	SMED 360	3
GEOL 111 & GEOL 113	4	CHEM 450 & CHEM 451	5
SPED 330	3	LTCY 421	3
Colonnade - Arts & Humanities	3	Colonnade - Local to Global	3
Colonnade - Social & Cultural	3		
	16		14

Fourth Year

Fall	Hours	Spring	Hours
CHEM 446 & CHEM 447	5	SEC 490	10
SMED 470	3	SMED 489	3
Colonnade - Systems	3		
General Elective	1		
	12		13

Total Hours 120

Will this program be managed or owned by more than one department?

No

Does this program include courses from outside your department?

Please insert one Learning Outcome per box. Click green plus sign for additional LO boxes

Learning Outcomes and Measurement Plan

	List all student learning outcomes of the program.	Measurement Plan
SLO 1	Communicate effectively in written form.	Rubric analysis of laboratory reports in CHEM 451 (Physical Chemistry Lab). The measurement instrument is assessed in a fashion consistent with the Written Communication VALUE Rubric from AAC&U.
SLO 2	Interpret and explain data about chemical systems.	American Chemical Society Exam in Analytical Chemistry: This is a nationally-normed 50-question multiple choice exam given at the conclusion of the CHEM 330 (Quantitative Analysis) course (required of all majors and minors).
SLO 3	Describe and discuss structure-property-function relationships for a variety of molecules.	American Chemical Society Exam in Organic Chemistry: This is a nationally-normed 70-question multiple choice exam given at the conclusion of the CHEM 342 (Organic Chemistry 2) course.

Assessment Template: https://www.wku.edu/academicaffairs/ee/assurance_learning_resources.php

Upload Assessment Plan

Delivery Mode

Is 25% or more of this program offered at a location other than main campus?

No

Enter Location(s) and Percentage of Program Offered at Location(s)

Is 50% or more of this program offered by distance education (online asynchronous, online synchronous, connected classrooms, etc.)?

No

Do you plan to offer 100% of this program online?

No

If no, enter the percentage of the program that will be taught online.

0

Do you plan to offer 100% of this program face-to-face?

Yes

Do you plan to offer at least 25% of this program as a direct assessment competency-based educational program?

No

See the SACSCOC Policy on Direct Assessment Competency-based Educational Programs.
https://www.sacscoc.org/pdf/081705/DirectAssessmentCompetencyBased.pdf

Library Resources

Attach library resources

Rationale for the program proposal?

The proposed revision is to add language to the Program Description about the Chemistry JUMP program. Given the recent approval of a university-wide JUMP policy, the language being added brings our JUMP program in alignment with the policy.

The graduate courses accepted for the undergraduate program meet student learning outcomes for both the undergraduate and graduate programs linked in this JUMP program.

Consistent with the WKU JUMP policy, the Department of Chemistry proposes to allow no more than 9 hours from the following graduate CHEM courses to be used by students in the JUMP program toward their bachelor's degree: 420G, 435G, 446G, 450G, 452G, 520, 531, 535, 540, 541, 550, and 562.

Learning outcomes in the undergraduate program are fulfilled through core courses or restricted electives, and every graduate course listed above maps directly onto one of these learning outcomes. Thus, all learning outcomes of the undergraduate program are maintained, but at a more rigorous level, through completion of these graduate courses.

Additional Attachments

Additional information or attachments

Reviewer Comments

Key: 333

Course Change Request

Date Submitted: 11/15/23 3:52 pm

Viewing: GEOG 295 : Introduction to Research Techniques ~~Methodology~~

Last approved: 04/28/23 3:17 am

Last revision: 11/18/23 9:47 am

Changes proposed by: jsn15309

Catalog Pages referencing this course

Department of Earth, Environmental, and Atmospheric Sciences
Geography (GEOG)

Proposed Action

Active

Contact(s)

Name	E-mail	Phone
Jason Polk ~~Amy Nemon~~	jason.polk@wku.edu ~~amy.nemon@wku.edu~~	270-745-5015 ~~270-745-3082~~

Review Type: Full Review

Term for implementation: Fall 2024

In Workflow

1. **GEO Approval**
2. **SC Dean**
3. **SC Curriculum Committee**
4. Undergraduate Curriculum Committee
5. University Senate
6. Provost
7. Course Inventory

Approval Path

1. 11/18/23 9:50 am Leslie North (leslie.north): Approved for GEO Approval
2. 12/01/23 3:27 pm Stuart Burris (stuart.burris): Approved for SC Dean

History

1. Apr 28, 2023 by Amy Nemon (amy.nemon)

Academic Level	Undergraduate		
Course prefix (subject area)	GEOG - Geography	Course number	295
Department	Geography & Geology		
College	Science and Engineering		

Course title

Introduction to Research Techniques ~~Methodology~~

Abbreviated course title	INTRO TO RESEARCH TECHNIQUES ~~METHOD~~

Course description

This course will introduce basic environmental, sustainability, and geographical research methods and techniques, provide exposure to lab and field environments, and focus on methods for data analysis. The main components will include interdisciplinary methods and techniques ~~This course is designed to familiarize research-oriented students with the fundamentals~~ of data collection, processing and analysis ~~choosing a research topic, performing a bibliographical search on a subject, classification~~ of data, synthesizing and communicating methods and datasets, ~~instruments, principles of data collection,~~ professional ethics, ~~ethics~~ and/or other research-oriented topics. Field trips and application-based exercises may be required.

Credit hours	3 ~~1-3~~

Repeatable

No ~~Yes~~

Default grade type	Standard Letter	Alternate grade type(s)

Is this course intended to span more than one term?

No

Schedule type

Applied Learning

Lecture

CIP Code	450701 - Geography.

Does this course have prerequisites

No

Corequisites

Equivalent Courses

Restrictions:

College restriction?	No

Field of study restriction/major?	No
Classification restriction?	No
Departmental Restrictions	

Reason for changing the course

~~Add Learning Outcomes and ContentOutlines.~~Revising ~~Clarified language in the description~~ to support previous ~~reflect the focus of the~~ course ~~and differentiate it from other courses in ESCS; there will be no~~ changes in the major to provide opportunities for research intensive experiences. ~~the learning outcomes or content delivered in the course.~~ Changed title from 'methodology' to 'techniques' to make sure students understand they are not developing a methodology like they do in GEOG 300, but rather they are learning different types of techniques used to collect data. Updated description to reflect content of course and to indicate that the focus is shifting towards providing applied research methods skills to support independent research and training for students, not just developing a methodology since that is covered in other courses now. Changed to standard 3-hour course to allow majors to count for elective credit and take once. Updated SLOs and course outline to emphasize differences from other courses (eliminate redundancy). ~~The course DOES count toward for majors of EEAS, so that line was removed.The number of credit hours will vary based upon the particular cohort and teaching needs of the particular student group.1-credit hour course should be repeatable up to 3 hours, particularly as different methodology topics could be covered in different semesters.~~

Is this related to other courses at WKU?

No

What departments/programs have been consulted concerning potential impact (e.g. to possible duplication or conflict, changed corequisite or prerequisite for equivalent courses, etc.)? Please provide names and dates for individuals consulted.

na

Is this course part of a program that leads to teacher certificate?	No
Are you seeking Colonnade approval for this course?	No
Student Learning Outcomes	

#	Student Learning Outcomes
1	Describe basic methods and techniques utilized in the environmental, sustainability, and geographical disciplines to plan methods-based research. ~~Experience the fundamentals of choosing a research topic~~
2	Demonstrate an understanding of methods and techniques for collecting field-based, lab-based, remotely-sensed, mixed-methods, and cloud-based types of data ~~Perform a bibliographical search on a subject~~
~~3~~	~~Classify instruments relevant to the geoscience~~
4	Operate equipment, software, ~~Collect~~ and instrumentation for ~~analyze~~ data collection and analysis
5	Demonstrate the ability to synthesize and analyze different types of datasets ~~Apply professional ethics~~
6	Discuss the importance and relevance of ethics in research
7	Describe and critique methods and techniques for data collection, processing, and analysis
8	Synthesize and communicate datasets and interpret patterns and lack of patterns in them.
9	Demonstrate the ability to present data interpretations in standard written scientific format.

Content outline

#	Topic
1	• Designing environmental, sustainability, and geographical research and data collection methods • Field-based data collection techniques • Lab-based data collection techniques • Remotely-sensed and cloud-based data collection techniques • Qualitative and mixed-methods Data collection techniques • Research data notes and quality control • Analyzing and interpreting data • Data presentation and communicating research • Course content may vary by semester to accommodate the cohort of students taking the course. •Field trips and application-based exercises are mandatory parts of the course. ~~Select a research topic~~ ~~Outline timeline for completion of research~~ ~~Review previous published studies on the topic~~ ~~Decide on instruments used to perform research~~ ~~Collect data needed to complete study~~ ~~Analyze collected data~~ ~~Adhere to proper research protocols~~

Student expectations and requirements

Tentative texts and course materials

Special equipment, materials, or library resources needed

Additional information

Supporting documentation

Reviewer Comments

Key: 4025