Term Information

Effective Term	Spring 2023
Previous Value	*Spring 2021*

Course Change Information

What change is being proposed? (If more than one, what changes are being proposed?)

We request to change the course number from 5223 to 6222.

What is the rationale for the proposed change(s)?

We would like to use this as an advanced course in the curriculum of a new professional masters program, which will be proposed soon in Autumn 2021. This course in its current form contains advanced topics that is suitable to professional masters students.

What are the programmatic implications of the proposed change(s)?

(e.g. program requirements to be added or removed, changes to be made in available resources, effect on other programs that use the course)?

In the attached explanation document entitled Geography Curriculum Mapping: Summary of Changes, we explain that such a change will not affect the coverage of the proficiencies of our undergraduate program.

Is approval of the requrest contingent upon the approval of other course or curricular program request? No

Is this a request to withdraw the course? No

General Information

Course Bulletin Listing/Subject Area	Geography
Fiscal Unit/Academic Org	Geography - D0733
College/Academic Group	Arts and Sciences
Level/Career	Graduate, Undergraduate
Course Number/Catalog	6222
Previous Value	*5223*
Course Title	Design and Implementation of GIS
Transcript Abbreviation	GIS Design & Imple
Course Description	Practice-oriented development, design, implementation and evaluation of spatial databases, with an emphasis on local problems.
Semester Credit Hours/Units	Fixed: 3

Offering Information

Length Of Course	14 Week, 12 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	Yes
Is any section of the course offered	100% at a distance
Grading Basis	Letter Grade
Repeatable	No
Course Components	Lecture
Grade Roster Component	Lecture
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never

Campus of Offering	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	Prereq: A grade of C- or above in 5222, or permission of instructor.
Exclusions	Not open to students with credit for 5223
Previous Value	
Electronically Enforced	Yes

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code	11.0802
Subsidy Level	Doctoral Course
Intended Rank	Masters, Doctoral
Previous Value	*Junior, Senior, Masters, Doctoral*

Requirement/Elective Designation

Required for this unit's degrees, majors, and/or minors
The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Understand the tasks of GIS customization
- Understand event-driven and object-oriented programming techniques
- Write code to implement GIS tools in open-source and commercial GIS
- Understand the fundamentals of agile project management
- Put together and manage a project to automate GIS tasks

Content Topic List

- Software development processes
- Programming interactivity in QGIS
- Processing and mapping vector data in QGIS
- QGIS processing algorithms
- QGIS plugins
- Agile principles and practices
- Product vision and roadmap
- User stories and planning
- ArcPy: spatial data sets and processing
- ArcGIS Pro custom tools
- ArcGIS Pro data rendering
- ArcGIS Pro project

Sought Concurrence No

Attachments

- GEOG6222-inperson-gis-development.docx: Syllabus (in-person)

  (Syllabus. Owner: Xiao,Ningchuan)
- GEOG6222-online-gis-development.docx: Syllabus (online)

  (Syllabus. Owner: Xiao,Ningchuan)
- GEOG6222-asctech-review.docx: ASCTech review (online)

  (Syllabus. Owner: Xiao,Ningchuan)
- GEOG5223-inperson-gis-design-implementation.docx: Syllabus (in-person) - current

  (Syllabus. Owner: Xiao,Ningchuan)
- Curriculum_map_GEOG_GIS_ONLY.pdf: GIS curriculum maps

  (Other Supporting Documentation. Owner: Xiao,Ningchuan)
- Curriculum_map_summary_GIS-all.docx: Summary of changes in curriculum maps

  (Other Supporting Documentation. Owner: Xiao,Ningchuan)
- GEOG6222-inperson-gis-development-v2.docx: Syllabus (in-person, updated)

  (Syllabus. Owner: Xiao,Ningchuan)
- GEOG6222-online-gis-development-v2.docx: Syllabus (online, updated)

  (Syllabus. Owner: Xiao,Ningchuan)

Comments

- Please see the updated syllabi (marked as -v2 in file names). The schedule now is on a day-by-day basis. Page ranges are also included in the schedule for the readings. The class meets twice a week for two 80-minute sessions (on page 1). Finally, detailed explanation of the exercises can be found under the section of "Assignment information" (page 3 in person or page 4 online). *(by Xiao,Ningchuan on 12/08/2021 01:52 AM)*
- Please see Panel feedback e-mail sent 12/03/21. *(by Cody,Emily Kathryn on 12/03/2021 02:27 PM)*
- The course number has not been changed in curriculum.osu.edu *(by Vankeerbergen,Bernadette Chantal on 11/12/2021 09:37 AM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Xiao,Ningchuan	11/09/2021 12:49 AM	Submitted for Approval
Approved	Xiao,Ningchuan	11/09/2021 12:58 AM	Unit Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	11/12/2021 09:37 AM	College Approval
Submitted	Xiao,Ningchuan	11/12/2021 09:55 AM	Submitted for Approval
Approved	Xiao,Ningchuan	11/12/2021 09:56 AM	Unit Approval
Approved	Vankeerbergen,Bernadette Chantal	11/12/2021 10:30 AM	College Approval
Revision Requested	Cody,Emily Kathryn	12/03/2021 02:27 PM	ASCCAO Approval
Submitted	Xiao,Ningchuan	12/08/2021 01:52 AM	Submitted for Approval
Approved	Xiao,Ningchuan	12/08/2021 01:53 AM	Unit Approval
Approved	Vankeerbergen,Bernadette Chantal	12/17/2021 11:54 AM	College Approval
Pending Approval	Cody,Emily Kathryn Jenkins,Mary Ellen Bigler Hanlin,Deborah Kay Hilty,Michael Vankeerbergen,Bernadette Chantal Steele,Rachel Lea	12/17/2021 11:54 AM	ASCCAO Approval

THE OHIO STATE UNIVERSITY

COLLEGE OF ARTS AND SCIENCES

SYLLABUS: GEOG 6222 (ONLINE)
GIS DEVELOPMENT
SPRING 2022

Course overview

Instructor

Instructor: Prof. Ningchuan Xiao
Email address: xiao.37@osu.edu
Phone number: 614-292-4072
Office hours: by appointment only (CarmenZoom)
Office Location: 1132 Derby Hall

Course description

This course covers topics in developing GIS software tools. There are two main themes of this course. First, we introduce techniques that will help students build custom tools to automate spatial data handling processes, including topics about programming skills, software testing, and verification. The second theme of this course is about agile methods for GIS software development and project management. The course is organized around a set of coding activities, lectures, discussions, and a final project. It is mostly a project-oriented course, where each group of coding exercises will lead to finishing a project using the concepts covered in that workshop, and there is also a group (in-person) or individual (online) final project.

This class meets twice a week for two 80-minute sessions.

Course learning outcomes

By the end of this course, students should successfully be able to:

- Understand the tasks of GIS customization
- Understand event-driven and object-oriented programming techniques
- Write code to implement GIS tools in open-source and commercial GIS

- Understand the fundamentals of agile project management
- Put together and manage a project to automate GIS tasks

How this course works

Mode of delivery: This course is 100% online. There are no required sessions when you must be logged in to Carmen at a scheduled time.

Pace of online activities: This course is divided into **weekly modules** that are released one week ahead of time. Each module is organized around a specific topic (see course schedule below) and consists of introduction videos, coding tutorials, and student activities (see assignment information below). Students are expected to keep pace with weekly deadlines but may schedule their efforts freely within that time frame.

Credit hours and work expectations: This is a 3-credit-hour course. According to Ohio State policy, a 3 credit hour course comprises 3 hours of instruction in class (including online instruction content and Carmen activities) and 6 hours of homework/study time outside class per week, for a total of 9 hours per course per week, for the student to earn a C grade.

Prerequisites

GEOG 5222, or consent of instructor.

Course materials

Required

Layton, Mark C. Ostermiller, Steven J., and Kynaston, Dean J. 2020. *Agile Project Management for Dummies*, (3rd Ed.) John Wiley & Sons, Inc.

Other materials

In addition to the required textbook, we will also use online sources for tool development in QGIS and ArcGIS Pro. Detailed instructions and tutorials will be provided during the semester. There are other readings materials that will be handed out during the class.

Course technology

For help with your password, university e-mail, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at https://ocio.osu.edu/help/hours, and support for urgent issues is available 24x7.

- **Self-Service and Chat support:** http://ocio.osu.edu/selfservice
- **Phone:** 614-688-HELP (4357)
- **Email:** 8help@osu.edu
- **TDD:** 614-688-8743

Baseline technical skills necessary for online courses

- Basic computer and web-browsing skills
- Navigating Carmen

Technology skills necessary for this specific course

- CarmenZoom text, audio, and video chat
- Collaborating in CarmenWiki
- Recording a slide presentation with audio narration
- Recording, editing, and uploading video

Necessary equipment

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed
- Microphone: built-in laptop or tablet mic or external microphone

Necessary software

- OpenOffice is a free and complete suite of software tools for world processing, spreadsheet, and presentations. View their privacy statement at https://www.openoffice.org/privacy.html.
- Microsoft Office 365 ProPlus All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft's Student Advantage program. Each student can install Office on five PCs or Macs, five tablets (Windows, iPad® and Android™) and five phones.
    - Students are able to access Word, Excel, PowerPoint, Outlook and other programs, depending on platform. Users will also receive 1 TB of OneDrive for Business storage.
    - Office 365 is installed within your BuckeyeMail account. Full instructions for downloading and installation can be found https://ocio.osu.edu/kb04733.
- Python: students will install Python 3 and necessary libraries on their own computers and detailed instructions will be provided. You can download Python from https://python.org. The privacy policy for Python can be found at https://www.python.org/privacy/.
- ArcGIS Pro: OSU students can either install ESRI's software on their own computer or through our lab computers. For instructions of installing ArcGIS Pro, please visit the web

page at https://cura.osu.edu/esri#arcgis-pro. Please refer to below about how to access our lab computers through RemoteLab. This is provided through ESRI's Education Site License Program and you may review ESRI's privacy policies at https://www.esri.com/en-us/privacy/overview. For information about accessibility, visit Accessibility in ArcGIS Pro.

- QGIS is a powerful and fully fledged GIS package. It is free and open-source and is widely used in many enterprise applications. You can download the software from here: https://qgis.org/en/site/forusers/download.html. Students can install this on their own computer or use the installations on our lab computers through RemoteLab (see below).
- RemoteLab is a remote desktop access platform provided for OSU students to access computers in our computer labs at remotelab.osu.edu. It is a workaround if installation on your own computers does not work. More instructions about RemoteLab can be found at this Google Doc.

Grading and faculty response

Grades

Category	Points
Exercises	40
Term project	30
Quizzes	20
Participation	10
Total	100

Assignment information

Exercises. The course is organized into weekly modules. Each module contains lectures and/or tutorials. Exercises associated with the lectures are related to the final project and require students to work in teams on various aspects of their projects (e.g., product vision statement and project planning). Tutorials cover programming topics, and the associated exercises require students to work individually on the theme of the tutorials. Exercises are typically due in a week.

Term project. Each student will develop a tool for either QGIS or ArcGIS Pro as the term project for this class. Each project has a few milestones and deliverables as outlined in the course schedule. Each student will make a 10-minute video presentation of the project. Each project will also be peer reviewed by at least two students.

Quizzes. There will be three quizzes throughout the semester.

Participation. Students are required to post and respond to online discussion boards. Each student will also be assigned to peer review two or more term projects.

Late assignments

Late submissions will be accepted up to a week past the due date. One day late will incur a 10% penalty. Two days late will incur 20% penalty. Three days will incur a 30% penalty. Four days late will incur a 40% penalty. Five to seven days late will only receive 50% credit of the grade you would have received if it is submitted on time. If you contact me ahead of time for deadline adjustments, you will not incur any penalty. Please refer to Carmen for due dates.

Grading scale

93–100: A
90–92.9: A-
87–89.9: B+
83–86.9: B
80–82.9: B-
77–79.9: C+
73–76.9: C
70 –72.9: C-
67 –69.9: D+
60 –66.9: D
Below 60: E

Faculty feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call **614-688-HELP** at any time if you have a technical problem.)

Grading and feedback

For large weekly assignments, you can generally expect feedback within **7 days**.

E-mail

I will reply to e-mails within **24 hours on school days**.

Discussion board

I will check and reply to messages in the discussion boards **Monday, Wednesday, and Friday on school days**.

Attendance, participation, and discussions

Student participation requirements

Because this is a distance-education course, your attendance is based on your online activity and participation. The following is a summary of everyone's expected participation:

- **Logging in**: **AT LEAST TWICE PER WEEK**
  Be sure you are logging in to the course in Carmen each week, including weeks with holidays or weeks with minimal online course activity. (During most weeks you will probably log in many times.) If you have a situation that might cause you to miss an entire week of class, discuss it with me *as soon as possible.*
- **Office hours and live sessions**: **OPTIONAL OR FLEXIBLE**
  This course is asynchronous, no live sessions. If you are required to discuss an assignment with me, please contact me at the beginning of the week if you need a time outside my scheduled office hours.
- **Participating in discussion forums**: **4+ TIMES PER WEEK**
  As participation, each week you can expect to post at least four times as part of our substantive class discussion on the week's topics.

Discussion and communication guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style**: While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. Informality (including an occasional emoticon) is fine for non-academic topics.
- **Tone and civility**: Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online.
- **Citing your sources**: When we have academic discussions, please cite your sources to back up what you say. (For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.)
- **Backing up your work**: Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.

Other course policies

Academic integrity policy

- **Quizzes and exams**: You must complete the quizzes yourself, without any external help or communication.
- **Written assignments**: Your written assignments, including discussion posts, should be your own original work. In formal assignments, you should follow Chicago style to cite the ideas and words of your research sources. You are encouraged to ask a trusted person to proofread your assignments before you turn them in--but no one else should revise or rewrite your work.
- **Reusing past work**: In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you've explored in previous courses, please discuss the situation with me.
- **Falsifying research or results**: All research you will conduct in this course is intended to be a learning experience; you should never feel tempted to make your results or your library research look more successful than it was.
- **Collaboration and informal peer-review**: The course includes many opportunities for formal collaboration with your classmates. While study groups and peer-review of major written projects is encouraged, remember that comparing answers on a quiz or assignment is not permitted. If you're unsure about a particular situation, please feel free just to ask ahead of time.

Ohio State's academic integrity policy

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.

Copyright disclaimer

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Statement on title IX (Recommended)

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at http://titleix.osu.edu or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu

Accessibility accommodations for students with disabilities

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Accessibility of course technology

This online course requires use of Carmen (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

- Carmen (Canvas) accessibility
- Streaming audio and video
- Synchronous course tools

Your mental health! (Recommended)

As a student you may experience a range of issues that can cause barriers to 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 or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614- 292-5766. CCS is located on the 4th Floor

of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-800-273- TALK or at suicidepreventionlifeline.org

Course schedule (tentative)

Week	Topics	Dates	Modules
1	Introduction	1/11	Lecture: software development processes Readings: Ch 1 (pp. 7-19)
		1/13	Exercise: market share analysis, a manual approach
2	QGIS plugins	1/18	**Programming interactivity in QGIS** Tutorial: getting started with Python in QGIS
		1/20	Tutorial: QGIS interactivity Exercise: making a map tool in QGIS
3		1/25	**Processing and mapping vector data** Tutorial: working with vector data
		1/27	Tutorial: Dynamic mapping Exercise: dynamic mapping vector data
4		2/1	**QGIS processing algorithms** Tutorial: automating GIS processes
		2/3	Tutorial: QGIS scripts Exercise: making your own GIS layer cookie cutter
5		2/8	**QGIS plugins** Tutorial: tools and interface design

Week	Topics	Dates	Modules
		2/10	Tutorial: Interacting with the map Exercise: developing a QGIS select tool
6		2/15	**QGIS project** Tutorial: calculating areas and other geometries
		2/17	Exercise: QGIS market share tool Quiz 1
7	Agile development methods	2/22	**Agile principles and practices** Readings: Ch 2-4 (pp. 21-88)
		2/24	Readings: Ch 5-8 (pp. 89-158) Exercise: pros and cons of agile methods
8		3/1	**Product vision and roadmap** Readings: Ch 9 (pp. 151-183)
		3/3	Term project: project vision statement
9		3/8	**User stories and planning** Readings: Ch 10 (pp. 183-213)
		3/10	Term project: vision statement revision, user stories and planning Quiz 2
10	Spring break	3/14-3/18	No class
11	ArcGIS Pro development	3/22	**ArcPy: spatial data sets and processing** Tutorial: getting started with ArcPy for ArcGIS Pro
		3/24	

Week	Topics	Dates	Modules
			Tutorial: geoprocessing Exercise: geoprocessing tools Term project: user stories revision
12		3/29	**ArcGIS Pro custom tools** Tutorial: ArcPy queries and cursors
		3/31	Tutorial: script tools Exercise: making user interface for a custom tool
13		4/5	**ArcGIS Pro data rendering** Tutorial: mapping vector data
		4/7	Tutorial: geometry Exercise: data exploration with a mapping tool Term project: prototype/first version
14		4/12	**ArcGIS Pro project** Tutorial: handling geometries using ArcPy Exercise: ArcGIS Pro market share tool
		4/14	Quiz 3
15	Project	4/19	**Term project** Term project: working on the final version
		4/21	Term project: Project final release Project video presentations Peer review of at least two other projects

THE OHIO STATE UNIVERSITY

COLLEGE OF ARTS AND SCIENCES

SYLLABUS: GEOG 6222
GIS DEVELOPMENT
SPRING 2022

Course overview

Instructor

Instructor: Prof. Ningchuan Xiao
Email address: xiao.37@osu.edu
Phone number: 614-292-4072
Office hours: Monday and Wednesday, 10-11:30 AM or by appointment
Office Location: 1132 Derby Hall

Course description

This course covers topics in developing GIS software tools. There are two main themes of this course. First, we introduce techniques that will help students build custom tools to automate spatial data handling processes, including topics about programming skills, software testing, and verification. The second theme of this course is about agile methods for GIS software development and project management. The course is organized around a set of coding activities, lectures, discussions, and a final project. It is mostly a project-oriented course, where each group of coding exercises will lead to finishing a project using the concepts covered in that workshop, and there is also a group (in-person) or individual (online) final project.

This class meets twice a week for two 80-minute sessions.

Course learning outcomes

By the end of this course, students should successfully be able to:

- Understand the tasks of GIS customization
- Understand event-driven and object-oriented programming techniques
- Write code to implement GIS tools in open-source and commercial GIS

- Understand the fundamentals of agile project management
- Put together and manage a project to automate GIS tasks

Prerequisites

GEOG 5222, or consent of instructor.

Course materials

Required

Layton, Mark C. Ostermiller, Steven J., and Kynaston, Dean J. 2020. *Agile Project Management for Dummies*, (3rd Ed.) John Wiley & Sons, Inc.

Other materials

In addition to the required textbook, we will also use online sources for tool development in QGIS and ArcGIS Pro. Detailed instructions and tutorials will be provided during the semester. There are other readings materials that will be handed out during the class.

Course technology

Necessary software

- Python: students will install Python 3 and necessary libraries on their own computers and detailed instructions will be provided. You can download Python from https://python.org. The privacy policy for Python can be found at https://www.python.org/privacy/.
- ArcGIS Pro: OSU students can either install ESRI's software on their own computer or through our lab computers. For instructions of installing ArcGIS Pro, please visit the web page at https://cura.osu.edu/esri#arcgis-pro. Please refer to below about how to access our lab computers through RemoteLab. This is provided through ESRI's Education Site License Program and you may review ESRI's privacy policies at https://www.esri.com/en-us/privacy/overview. For information about accessibility, visit Accessibility in ArcGIS Pro.
- QGIS is a powerful and fully fledged GIS package. It is free and open-source and is widely used in many enterprise applications. You can download the software from here: https://qgis.org/en/site/forusers/download.html. Students can install this on their own computer or use the installations on our lab computers through RemoteLab (see below).

Grading and faculty response

Grades

Category	Points
Exercises	40
Term project	30
Quizzes	20
Participation	10
Total	100

Assignment information

Exercises. The course is organized into weekly modules. Each module contains lectures and/or tutorials. Exercises associated with the lectures are related to the final project and require students to work in teams on various aspects of their projects (e.g., product vision statement and project planning). Tutorials cover programming topics, and the associated exercises require students to work individually on the theme of the tutorials. Exercises are typically due in a week.

Term project. Each student will develop a tool for either QGIS or ArcGIS Pro as the term project for this class. Each project has a few milestones and deliverables as outlined in the course schedule. Each student will make a 10-minute video presentation of the project. Each project will also be peer reviewed by at least two students.

Quizzes. There will be three quizzes throughout the semester.

Participation. Students are required to attend the course lectures and actively participate in-class discussions. Each student will also be assigned to peer review two or more term projects.

Late assignments

Late submissions will be accepted up to a week past the due date. One day late will incur a 10% penalty. Two days late will incur 20% penalty. Three days will incur a 30% penalty. Four days late will incur a 40% penalty. Five to seven days late will only receive 50% credit of the grade you would have received if it is submitted on time. If you contact me ahead of time for deadline adjustments, you will not incur any penalty. Please refer to Carmen for due dates.

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77–79.9: C+
73–76.9: C
70 –72.9: C-
67 –69.9: D+
60 –66.9: D
Below 60: E

Faculty feedback and response time

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E-mail

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Discussion board

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Other course policies

Academic integrity policy

- **Quizzes and exams**: You must complete the quizzes yourself, without any external help or communication.
- **Written assignments**: Your written assignments, including discussion posts, should be your own original work. In formal assignments, you should follow Chicago style to cite the ideas and words of your research sources. You are encouraged to ask a trusted person to proofread your assignments before you turn them in--but no one else should revise or rewrite your work.

- **Reusing past work**: In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you've explored in previous courses, please discuss the situation with me.
- **Falsifying research or results**: All research you will conduct in this course is intended to be a learning experience; you should never feel tempted to make your results or your library research look more successful than it was.
- **Collaboration and informal peer-review**: The course includes many opportunities for formal collaboration with your classmates. While study groups and peer-review of major written projects is encouraged, remember that comparing answers on a quiz or assignment is not permitted. If you're unsure about a particular situation, please feel free just to ask ahead of time.

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Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at http://titleix.osu.edu or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu

Accessibility accommodations for students with disabilities

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Accessibility of course technology

This online course requires use of Carmen (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

- Carmen (Canvas) accessibility
- Streaming audio and video
- Synchronous course tools

Your mental health! (Recommended)

As a student you may experience a range of issues that can cause barriers to 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 or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614- 292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-800-273- TALK or at suicidepreventionlifeline.org

Course schedule (tentative)

Week	Topics	Dates	Modules
1	Introduction	1/11	Lecture: software development processes Readings: Ch 1 (pp. 7-19)
		1/13	Exercise: market share analysis, a manual approach
2	QGIS plugins	1/18	**Programming interactivity in QGIS** Tutorial: getting started with Python in QGIS
		1/20	Tutorial: QGIS interactivity Exercise: making a map tool in QGIS
3		1/25	**Processing and mapping vector data** Tutorial: working with vector data
		1/27	Tutorial: Dynamic mapping Exercise: dynamic mapping vector data
4		2/1	**QGIS processing algorithms** Tutorial: automating GIS processes
		2/3	Tutorial: QGIS scripts Exercise: making your own GIS layer cookie cutter
5		2/8	**QGIS plugins** Tutorial: tools and interface design
		2/10	Tutorial: Interacting with the map Exercise: developing a QGIS select tool
6		2/15	**QGIS project** Tutorial: calculating areas and other geometries

Week	Topics	Dates	Modules
		2/17	Exercise: QGIS market share tool Quiz 1
7	Agile development methods	2/22	**Agile principles and practices** Readings: Ch 2-4 (pp. 21-88)
		2/24	Readings: Ch 5-8 (pp. 89-158) Exercise: pros and cons of agile methods
8		3/1	**Product vision and roadmap** Readings: Ch 9 (pp. 151-183)
		3/3	Term project: project vision statement
9		3/8	**User stories and planning** Readings: Ch 10 (pp. 183-213)
		3/10	Term project: vision statement revision, user stories and planning Quiz 2
10	Spring break	3/14-3/18	No class
11	ArcGIS Pro development	3/22	**ArcPy: spatial data sets and processing** Tutorial: getting started with ArcPy for ArcGIS Pro
		3/24	Tutorial: geoprocessing Exercise: geoprocessing tools Term project: user stories revision
12		3/29	**ArcGIS Pro custom tools** Tutorial: ArcPy queries and cursors

Week	Topics	Dates	Modules
		3/31	Tutorial: script tools Exercise: making user interface for a custom tool
13		4/5	**ArcGIS Pro data rendering** Tutorial: mapping vector data
		4/7	Tutorial: geometry Exercise: data exploration with a mapping tool Term project: prototype/first version
14		4/12	**ArcGIS Pro project** Tutorial: handling geometries using ArcPy Exercise: ArcGIS Pro market share tool
		4/14	Quiz 3
15	Project	4/19	**Term project** Term project: working on the final version
		4/21	Term project: Project final release Project presentations Peer review of at least two other projects

Geography Curriculum Mapping: Summary of Changes

Ningchuan Xiao
November 8, 2021

The Department of Geography is proposing to change our undergraduate Geographic Information Science (GIS) major and to create a new professional masters degree in Geographic Information Science and Technology. The department went through an undergraduate curriculum mapping process in 2019 and 2020. Throughout the process, the faculty have agreed upon a set of program goals, outcomes, and proficiencies, which are detailed in the left column in the attached PDF file (Curriculum_map_GEOG_GIS_ONLY.pdf). After the proficiencies were set, the faculty then mapped their courses to each of the proficiencies. The attached spreadsheet in PDF includes the mapping result for the courses of the Geographic Information Science (GIS) major, under the grouped column called GIS.

It became clear to the GIS faculty that proficiencies under Goals D and E are not sufficiently covered in the current curriculum by our required courses nor by the electives. This is one of the motivations we decided to revise our GIS major curriculum. The courses in the revised curriculum are listed in the attached PDF (under a grouped column called GIS 2).

There are a few main changes in the new curriculum. First, a new course GEOG 5101 (GIST Professionalism and Ethics) is added to provide sufficient coverage of proficiencies in Goals D and E. Second, the new curriculum has a set of 5 core courses that are required, a set of 6 intermediate courses from which students must take at least 3, and several options for students to focus on different substantive areas such as urban and sustainability (see the attached curriculum map for details). Third, two courses in the current curriculum, 5223 and 5226, become 6000 level courses that will be used in a new professional masters program, which will be proposed soon. The following table shows the coverages of the program proficiencies of the current and new curriculums (please note because the electives in the new curriculum have different options, only the core and immediate courses are summarized in the table). It clearly shows sufficient coverage for proficiencies in Goals D and E by the proposed curriculum. Also, the curriculum changes do not affect the proficiencies that are already covered, with the only exception in proficiencies A1c and A1d that are covered by the current electives but not by the core or intermediate courses in the proposed. However, these two proficiencies are covered by most electives (see the attached spreadsheet in PDF). One benefit of moving two 5000 level courses to 6000 level is that such change makes it possible for the department to develop a new professional masters degree in GIS with graduate level courses (the proposal for this program will be submitted soon in Autumn 2021).

Table 1. Coverage of the proficiencies by the courses of the current GIS curriculum (Required and Electives) and the proposed new GIS curriculum. Numbers are the number of times each proficiency is covered by the courses labeled in each column. The actual proficiency descriptions can be found in the attached curriculum map PDF. Electives for the proposed curriculum are not listed, but can be found in the attached spreadsheet in PDF.

			Current		New	
Goals	**Outcomes**	**Proficiencies**	**Required**	**Electives**	**Core**	**Intermediate**
A: Human, Environmental, and Spatial Concepts	1. Conceptualize human, environmental, or spatial problems	a.	2	0	1	1
		b.	3	2	2	2
		c.	0	**1**	0	0
		d.	0	**1**	0	0

		e.	0	2	0	1
	2. Critically evaluate different approaches to describe, explain, or predict real-world experience	a.	8	2	5	4
		b.	2	0	1	1
		c.	5	1	3	3
	3. Appraise the relation between concepts and real-world experience	a.	3	3	3	2
		b.	1	0	1	1
		c.	**0**	**0**	1	0
		d.	0	2	1	1
B: Research Strategies, Methods, and Data	1. Gather information regarding data and their context to draw conclusions	a.	3	0	2	1
		b.	2	0	1	1
		c.	2	0	2	0
		d.	**0**	**0**	1	0
	2. Evaluate research strategies and methods to engage problems	a.	2	1	1	2
		b.	1	0	1	0
		c.	**0**	**0**	1	0
		d.	2	1	1	2
	3. Apply strategies and methods	a.	8	3	4	5
		b.	3	1	3	2
		c.	0	0	0	0
		d.	**0**	**0**	1	0
		e.	4	1	1	3
		f.	5	2	3	4
		g.	0	1	1	2
		h.	6	3	3	5
C: Communication and Engagement	1. Disseminate knowledges	a.	2	0	0	1
		b.	0	0	1	0
		c.	0	0	1	0
		d.	0	1	1	1
		e.	0	1	1	1
		f.	0	0	0	0
		g.	2	2	0	3
		h.	0	0	0	0
		i.	0	0	0	0
		j.	0	0	0	0
	2. Collaborate in learning and research	a.	0	0	0	0
		b.	0	0	0	0
		c.	0	0	0	0
		d.	0	1	0	1
D: Critical Thinking and Ethical Engagement	1. Critically engage real-world problems	a.	2	0	1	1
		b.	2	0	1	1
		c.	**0**	**0**	1	0
		d.	**0**	**0**	1	0
		e.	1	0	1	1
	2. Appraise ethical issues in research	a.	1	0	1	0
		b.	1	0	1	0
		c.	**0**	**0**	1	0
		d.	**0**	**0**	1	0
		e.	1	0	1	0

E: Professional Development	1. Make use of their values to guide their careers	a.	**0**	**0**	1	0
		b.	**0**	1	1	1
		c.	**0**	**0**	1	0
	2. Deploy their skills relative to a changing job market	a.	**0**	**0**	1	0
		b.	**0**	**0**	1	0
		c.	0	1	1	1
	3. Creatively use skills to solve problems beyond those encountered in formal training	a.	1	2	1	3
		b.	1	0	1	1
		c.	1	0	1	1

Levels indicated for proficiencies:

B: beginning
I: intermediate
A: advanced

Course colors:
green: courses taught by the same person
blue: courses among which students

Codes for mapping proficiencies to your courses:

y: yes, covered and evaluated

c: covered but not currently evaluated
OR *could be* covered and evaluated

blank: not covered; no intention to cover

Campus	GIS																GIS 2 (to be proposed)																																	
	Geog 4103	Geog 5200	Geog 5201	Geog 5210	Geog 5212	Geog 5222	Geog 5223	Geog 5225	Geog 5225	Required	Geog 4191	Geog 5103	Geog 5226	Geog 5229			Geog 4103	Geog 5200	Geog 5210	Geog 5225	Geog 5225	Geog 5101	Core		Geog 4191	Geog 5103	Geog 5201	Geog 5212	Geog 5222	Geog 5229	Intermediate			Geog 5501	Geog 5502	Geog 5503	Geog 5300	Geog 5301		Urban		Geog 3597.03	Geog 3702	Geog 3800	Geog 5402	Geog 5700	Geog 5802	Geog 5803		ustainabilit
Instructor	DL	EC	YS	EC	EC	NX	NX	YS	DL	**Total "y"**	NE	ER	YS	YQ	**Total "y"**		DL	EC	EC	YS	DL		**Total "y"**		NE	ER	YS	EC	NX	YQ	**Total "y"**	**Total "y"**		MD	NE	MW	HL	HM	Total "y"	Total "y"		JW	ER	BKM	DM	JW	MD	YQ	Total "y"	**Total "y"**
Goal A: Human, Environmental, and Spatial Concepts Students understand various conceptual approaches and their context to interpret patterns, processes and their relation.																																																		
1. Conceptualize human, environmental, or spatial problems																																																		
a. Describe the spatial and historical context of a problem (B)	y	c	c	c		y	c	c	y	**2**			c	c	**0**		y	c	c	c	y		**1**				c		y	c	**1**	**2**		y	y	y	y	y	5	7		y	y	y	y	y	y	y	7	9
b. Identify the 'ecological fallacy' (the inappropriate homogenization or aggregation of differentiated phenomena within a unit of analysis, using scale as an analytical unit) (B)	y			c		y	c	y	y	**3**		y	y		**2**		y		c	y	y		**2**			y			y		**2**	**4**		y	y				2	6				c	c		y		1	5
c. Examine dynamics within a place's or system's boundaries, and implications for real-world problems (I)	c				c			y	c	**0**			y	c	**1**		c			y	c		**0**					c		c	**0**	**0**		y	y	y		y	4	4		y	y	y	y	y	y	y	7	7
d. Examine dynamics that connect places or systems across space, and implications for real-world problems (I)					c			y	c	**0**			y	c	**1**					y	c		**0**					c		c	**0**	**0**		y	y	y	y	y	5	5		y	y	y	y	y	y	y	7	7
e. Evaluate processes that operate at different scales and their effects (A)	c							c	c	**0**		y	y	c	**2**		c			c	c		**0**			y				c	**1**	**1**		y	y	y	y	y	5	6		y	c	y	y	y	y	c	5	6
2. Critically evaluate different approaches to describe, explain, or predict real-world experience																																																		
a. Describe the strengths and weaknesses of various approaches for their utility in interpreting real-world experience (B, I)	y	y	y	y	y	y	y	y	y	**8**		y	y	c	**2**		y	y	y	y	y	y	**5**			y	y	y	y	c	**4**	**9**		y	y	y	y		3	12		y	y	y	y	y	y		6	15
b. Explain the contexts in which various approaches were developed (A)	c	c	c		c	y	y	c	c	**2**			c	c	**0**		c	c		c	c	y	**1**				c	c	y	c	**1**	**2**		y	y	c	y		3	5		c		y		c	y		2	4
c. Critically evaluate various approaches in their field of study (A)	c	y	y		c	y	y	y	y	**5**		y	c		**1**		c	y		y	y	y	**3**			y	y	c	y		**3**	**6**		y	y	y	c		3	9		y		y		y	y		4	10
3. Appraise the relation between concepts and real-world experience																																																		
a. Interpret patterns (B)	y	c		y		c		y	y	**3**		y	y	y	**3**		y	c	y	y	y		**3**			y			c	y	**2**	**4**		y	y	y	y		4	8		c		y	y	c	y	y	4	8
b. Critique how knowledges in their fields are used in developing solutions to real-world problems (I)	c	c	y	c				y	c	**1**		c	c	c	**0**		c	c	c	y	c	y	**1**			c	y			c	**1**	**2**		y	y		y		3	5		c	c	y		y	y	y	4	6
c. Relate research findings to debates about different approaches to research (A)						c		c	c	**0**			c	c	**0**					c	c	y	**1**						c	c	**0**	**1**		y	y	y		c	3	4				y		c	y		2	3
d. Relate patterns to processes to assess causal relations (A)	c								c	**0**		y	y	c	**2**		c				c	y	**1**			y				c	**1**	**2**		y	y	y	c		3	5		c	c			y	y	c	2	4
Goal B: Research Strategies, Methods and Data Students are able to apply appropriate methods and data, to transform data into actionable knowledges to support ethical scholarship and decision making.																																																			
1. Gather information regarding data and their context to draw conclusions																																																		
a. Identify relevant data sources and their quality (B)	y	c	y	c		c	c	y	y	**3**				c	**0**		y	c	c	y	y		**2**				y		c	c	**1**	**3**				y	c		1	4		c	c		c	y		c	1	4
b. Collect data from relevant sources (I)	c	c	y	c		c	c	y	y	**2**				c	**0**		c	c	c	y	y		**1**				y		c	c	**1**	**2**				y			1	3			c			y		c	1	3
c. Design feasible data-collection procedures (I)	y							y	y	**2**				c	**0**		y			y	y		**2**							c	**0**	**2**				y	c		1	3						c		y	1	3
d. Explain how context shapes conclusions drawn from data (A)		c						c		**0**				c	**0**			c		c		y	**1**							c	**0**	**1**			y	c			1	2		c				c		y	1	2
2. Evaluate research strategies and methods to engage problems																																																		
a. Identify available research strategies and methods (B)						y	y	c		**2**		y	c	c	**1**					c		y	**1**			y			y	c	**2**	**3**			y	y	y		3	6		c			y	c		c	1	4
b. Explain how strategies and methods may be used constructively and destructively in real-world applications (B, I)						c	y	c		**1**		c		c	**0**					c		y	**1**			c			c	c	**0**	**1**			y	c	y		2	3		c			y	c		c	1	2
c. Provide empirical examples of constructive and destructive applications of methods (I)							c	c		**0**		c			**0**					c		y	**1**			c					**0**	**1**			y	c	c		1	2						c		c	0	1
d. Assess the strengths and limitations of available research strategies and methods (I, A)						y	y	c		**2**		y	c		**1**					c		y	**1**			y			y		**2**	**3**			y	c	c		1	4		c				c		c	0	3
3. Apply strategies and methods																																																		
a. Visualize patterns through mapping, graphing, or using GIS techniques (B)	y	y	y	y	y	y	y	y	y	**8**		y	y	y	**3**		y	y	y	y	y		**4**		y	y	y	y	y		**5**	**8**					y		1	9			c					y	1	9
b. Identify sources of uncertainty or partial knowledges (B, I)	y	c	y	y		c		c	y	**3**		y			**1**		y	c	y	c	y	y	**3**		y	y		c			**2**	**5**					c		0	5		c				c			0	5
c. Analyze how errors propagate through data processing (I)	c		c						y	**0**		c			**0**		c				y		**0**		c	c					**0**	**0**					c		0	0									0	0
d. Examine the impacts of sources of uncertainty or partial knowledges on the reliability of data (I)	c	c	c					c	c	**0**		c			**0**		c	c		c	c	y	**1**		c	c					**0**	**1**							0	1									0	1
e. Apply interactive and dynamic visualization techniques (I, A)	c		y			y	y	y	y	**4**			y	c	**1**		c			y	y		**1**			y			y	c	**2**	**3**							0	3									0	3
f. Analyze patterns using appropriate methods (I, A)	y		y	y		y	c	y	y	**5**		y	y	c	**2**		y		y	y	y		**3**		y	y			y	c	**3**	**6**							0	6		c				c			0	6
g. Apply strategies to mitigate or constructively engage the effects of uncertainty or partial knowledges (A)	c	c	c						y	**0**		y			**1**		c	c			y	y	**1**		y	c					**1**	**2**							0	2		c							0	2
h. Interpret data and results using appropriate methods (A)	y	c	y	y	y	y		y	y	**6**		y	y	y	**3**		y	c	y	y	y		**3**		y	y	y	y	y		**5**	**7**			y				1	8								y	1	8
Goal C: Communication and Engagement The successful student will be able to share and receive knowledge by engaging with diverse audiences, participants, and stakeholders.																																																			
1. Disseminate knowledges																																																			
a. Identify modes by which knowledges can be disseminated (B)		c		c		y	y			**2**				c	**0**			c	c				**0**						y	c	**1**	**1**					c		0	1		c		c			c		0	1
b. Recognize that different audiences will have different degrees of familiarity with subject being presented (B)		c		c	c	c	c			**0**				c	**0**			c	c			y	**1**					c	c	c	**0**	**1**		y			c		1	2		c		c	y		c		1	2
c. Summarize an author's argument in their own words (B)										**0**					**0**							y	**1**								**0**	**1**		y	y	y	y	y	5	6		y		y	y	y	y		5	6
d. Deliver oral presentations (B)		c		c	c	c	c		y	**0**				y	**1**			c	c		y	y	**1**					c	c	y	**1**	**1**		y	y	y	y	y	5	6		c			y		y	y	3	4
e. Adjust the language and technical level of oral or written presentation relative to different audiences (B, I)						c				**0**				y	**1**							y	**1**						c	y	**1**	**1**		y			c		1	2				y			c		1	2
f. Evaluate the standard modes of dissemination of knowledges for their strengths and weaknesses in a given context (I)		c								**0**					**0**			c					**0**								**0**	**0**							0	0									0	0
g. Use visual methods to enhance oral or written presentation (B, I)		c		c	c	y	y			**2**		y		y	**2**			c	c				**0**			y		c	y	y	**3**	**2**		y		y	c	y	3	5					y		y	y	3	5
h. Construct other output or products using diverse media, art, activism, or other strategies to convey messages from academic research (I)										**0**					**0**								**0**								**0**	**0**		c	c	c		y	1	1							y		1	1
i. Synthesize material from several sources (I)						c	c			**0**				c	**0**								**0**						c	c	**0**	**0**		y	y	y	y	y	5	5		c		y	y	y	y		4	4
j. Generate a document that develops an argument drawing from multiple sources (A)										**0**					**0**								**0**								**0**	**0**		y	y	y	y	y	5	5		c		y	y	y	y		4	4
2. Collaborate in learning and research																																																		
a. Demonstrate responsiveness to others (B)		c		c	c	c	c		c	**0**				c	**0**			c	c		c		**0**					c	c	c	**0**	**0**		y	c	y	y	c	3	3		c	y	c	y		y		3	3
b. Demonstrate ability to work with a division of labor in a collaborative project (B, I)		c		c	c		c		c	**0**					**0**			c	c		c		**0**					c			**0**	**0**		y	c	y	c		2	2			y		y		y		3	3
c. Demonstrate ability to work with people of varying cultures, backgrounds, abilities, ideas, ideals, and status (B, I)							c			**0**				c	**0**								**0**							c	**0**	**0**		y	c	y	c		2	2		c	y	c	c		y		2	2
d. Employ teamwork to achieve results (B, I, A)		c		c	c		c		y	**0**				y	**1**			c	c		y		**0**					c		y	**1**	**0**		y	c	c	y		2	2			y		y		y		3	3
Goal D: Critical Thinking and Ethical Engagement The successful student is intellectually curious, interested in scrutinizing their assumptions, and is aware of the ethical dimensions of their professional activity regarding real-world problems to work towards justic e.																																																			
1. Critically engage real-world problems																																																			
a. Identify multiple sides of a problem (B)		c		c		y	y			**2**				c	**0**			c	c			y	**1**						y	c	**1**	**2**		y	y	y	y	y	5	7		y	y	y	y	c	y	c	5	7
b. Explain multiple sides of a problem (I)		c				y	y			**2**				c	**0**			c				y	**1**						y	c	**1**	**2**		y	y	y	y	c	4	6		y	y	y	y	y	y	c	6	8
c. Explain the real-world consequences of different positions regarding a problem (A)		c								**0**				c	**0**			c				y	**1**							c	**0**	**1**		y	y		c	c	2	3		y	y	y	y	c	y		5	6
d. Develop a position based on an understanding of multiple sides of a problem (A)		c								**0**					**0**			c				y	**1**								**0**	**1**		c	y	y	c	c	2	3		y	y	c	y	y	y		5	6
e. Identify linkages among apparently discrete problems (A)						y				**1**				c	**0**							y	**1**						y	c	**1**	**2**		c	c	c		y	1	3		y	c	y	c	c	y		3	5
2. Appraise ethical issues in research																																																			
a. Explain how strategies and methods may be used constructively and destructively in real-world applications (B, I) [identical to b.2.b]		c					y			**1**				c	**0**			c				y	**1**							c	**0**	**1**		y	y		c		2	3		c	c	y	y	c	c		2	3
b. Perceive that everyone, including researchers, implicitly have biases and partial knowledges that can have negative effects on subjects under study (B, I)		c					y			**1**					**0**			c				y	**1**								**0**	**1**		y	y	y	c		3	4		c	c	y	y	c	c		2	3
c. Perceive that subjects under study and those encountered in the field, their values, and their privacy require respect (B, I)										**0**					**0**							y	**1**								**0**	**1**		c					0	1					c		c		0	1
d. Analyze their positionality regarding, for example, class, race/ethnicity, gender, age, citizenship, occupation, and the like relative those under study or encountered in the field (I, A)										**0**					**0**							y	**1**								**0**	**1**		c	c	c			0	1							c		0	1
e. Integrate ethical considerations into formulation of questions and applications of their knowledges (S)							y			**1**					**0**							y	**1**								**0**	**1**		c		c			0	1				c		c	c		0	1
Goal E: Professional Development The successful student understands how to make use of the skills and knowledges developed in their undergraduate program towards securing a job and pursuing a career.																																																			
1. Make use of their values to guide their careers																																																			
a. Identify their value systems relative to career opportunities (B)										**0**	c				**0**							y	**1**		c						**0**	**1**							0	1								c	0	1
b. Describe tensions between their ideals and career realities (I)										**0**	y				**1**							y	**1**		y						**1**	**2**							0	2									0	2
c. Appraise the variety of options and trade-offs in career paths relative to their value systems (A)										**0**	c				**0**							y	**1**		c						**0**	**1**							0	1									0	1
2. Deploy their skills relative to a changing job market																																																			
a. Identify the range of their skills relative to a variety of career paths (B)				c			c			**0**	c				**0**				c			y	**1**		c						**0**	**1**							0	1								c	0	1
b. Identify the strengths and limitations of their range of skills relative to various professional opportunities (I)				c			c			**0**	c				**0**				c			y	**1**		c						**0**	**1**							0	1									0	1
c. Demonstrate the ability to learn new skills (A)							c			**0**	c	y			**1**							y	**1**		c	y					**1**	**2**							0	2					y			c	1	3
3. Creatively use skills to solve problems beyond those encountered in formal training																																																			
a. Apply knowledge from formal training to examine a problem (B)		c	y	c		c	c	c		**1**	y	y	c		**2**			c	c	c		y	**1**		y	y	y		c		**3**	**4**					y		1	5		c					c		0	4
b. Integrate diverse skills from formal training (I)			y	c				c		**1**	c		c		**0**				c	c		y	**1**		c		y				**1**	**2**					y		1	3		c			c				0	2
c. Integrate knowledges from formal training with those acquired independently (A)			y					c		**1**	c		c		**0**					c		y	**1**		c		y				**1**	**2**							0	2							c		0	2

Arts and Sciences Distance Learning Course Component Technical Review Checklist

Course: Geog 6222
Instructor: Ningchuan Xiao
Summary: GIS Development

Standard - Course Technology	Yes	Yes with Revisions	No	Feedback/ Recomm.
6.1 The tools used in the course support the learning objectives and competencies.	X			• Office 365 • Carmen • Python • ArcGIS • QGIS • RemoteLab
6.2 Course tools promote learner engagement and active learning.	X			• CarmenZoom • CarmenWiki • Carmen Discussion Boards
6.3 Technologies required in the course are readily obtainable.	X			All tools are available via OSU site license free of charge.
6.4 The course technologies are current.	X			All are updated regularly.
6.5 Links are provided to privacy policies for all external tools required in the course.		X		Please include all privacy policies (when such exists) for all 3rd party tools (Python, ArcGIS, QGIS).
Standard - Learner Support				
7.1 The course instructions articulate or link to a clear description of the technical support offered and how to access it.	X			Links to 8HELP are provided
7.2 Course instructions articulate or link to the institution's accessibility policies and services.	X			a
7.3 Course instructions articulate or link to an explanation of how the institution's academic support services and resources can help learners succeed in the course and how learners can obtain them.	X			b
7.4 Course instructions articulate or link to an explanation of how the institution's student services and resources can help learners succeed and how learners can obtain them.	X			c
Standard – Accessibility and Usability				
8.1 Course navigation facilitates ease of use.	X			Recommend using the Carmen Distance Learning "Master Course" template developed by ODEE and available in the Canvas Commons to provide student-users with a consistent user experience in terms of navigation and access to course content.
8.2 Information is provided about the accessibility of all technologies required in the course.		X		Please include all accessibility policies (when such exists) for all 3rd party tools (Python, ArcGIS, QGIS).
8.3 The course provides alternative means of access to course materials in formats that meet the needs of diverse learners.	X			Instructions are provided to obtain materials in another format.
8.4 The course design facilitates readability	X			
8.5 Course multimedia facilitate ease of use.	X			All assignments and activities that use the Carmen LMS with embedded multimedia facilitates ease of use. All other multimedia resources facilitate ease of

				use by being available through a standard web browser

Reviewer Information

- Date reviewed: 7/13/20
- Reviewed by: Ian Anderson

Notes: Just a few issues with policy statements.

[a]The following statement about disability services (recommended 16 point font): Students with disabilities (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614- 292-3307, slds@osu.edu; slds.osu.edu.

[b]Add to the syllabus this link with an overview and contact information for the student academic services offered on the OSU main campus. http://advising.osu.edu/welcome.shtml

[c]Add to the syllabus this link with an overview and contact information for student services offered on the OSU main campus. http://ssc.osu.edu. Also, consider including this link in the “Other Course Policies” section of the syllabus.