

Submit original with signatures + 1 copy + electronic copy to Faculty Senate (Box 7500).
See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/> for a complete description of the rules governing curriculum & course changes.

TRIAL COURSE OR NEW COURSE PROPOSAL
(Attach copy of syllabus)

SUBMITTED BY:

Department	CEE	College/School	CEM
Prepared by	Nathan Belz	Phone	907-474-5765
Email Contact	npbelz@alaska.edu	Faculty Contact	Nathan Belz

1. ACTION DESIRED

Trial Course ☐ New Course ☒

2. COURSE IDENTIFICATION:

Dept Course # No. of Credits

Justify upper/lower division status & number of credits:

3. PROPOSED COURSE TITLE:

GIS Applications in Civil Engineering

4. To be CROSS LISTED?

☐ NO If yes, Dept: Course #

NOTE: Cross-listing requires approval of both departments and deans involved. Add lines at end of form for additional required signatures.

5. To be STACKED?*

☐ NO If yes, Dept. Course #

How will the two course levels differ from each other? How will each be taught at the appropriate level?:

* Use only one Format 1 form for the stacked course (not one for each level of the course!) and attach syllabi. Stacked course applications are reviewed by the (Undergraduate) Curricular Review Committee and by the Graduate Academic and Advising Committee. Creating two different syllabi (undergraduate and graduate versions) will help emphasize the different qualities of what are supposed to be two different courses. The committees will determine: 1) whether the two versions are sufficiently different (i.e. is there undergraduate and graduate level content being offered); 2) are undergraduates being overtaxed?; 3) are graduate students being undertaxed? In this context, the committees are looking out for the interests of the students taking the course. Typically, if either committee has qualms, they both do. More info online – see URL at top of this page.

6. FREQUENCY OF OFFERING:

Fall semesters as demand warrants

Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) — or As Demand Warrants

7. SEMESTER & YEAR OF FIRST OFFERING (Effective AY2015-16 if approved by 3/31/2015; otherwise AY2016-17)

Fall 2016

8. COURSE FORMAT:

NOTE: Course hours may not be compressed into fewer than three days per credit. Any course compressed into fewer than six weeks must be approved by the college or school's curriculum council. Furthermore, any core course compressed to less than six weeks must be approved by the Core Review Committee.

COURSE FORMAT:

(check all that apply)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ 6 weeks to full semester

OTHER FORMAT (specify)

Mode of delivery (specify lecture, field trips, labs, etc)

Lectures, labs

9. CONTACT HOURS PER WEEK:

LECTURE hours/weeks LAB hours /week PRACTICUM hours /week

Note: # of credits are based on contact hours. 800 minutes of lecture=1 credit. 2400 minutes of lab in a science course=1 credit. 1600 minutes in non-science lab=1 credit. 2400-4800 minutes of practicum=1 credit. 2400-8000 minutes of internship=1 credit. This must match with the syllabus. See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures-guidelines-for-computing/> for more information on number of credits.

OTHER HOURS (specify type)

10. COMPLETE CATALOG DESCRIPTION including dept., number, title, credits, credit distribution, cross-listings and/or stacking (50 words or less if possible):

CE607 GIS Applications in Civil Engineering 3.0cr (2+3)

Theories and advanced methods of Geographic Information Systems for civil engineering practice. Students will apply and execute concepts related to data integration, analysis, and management in the ArcGIS suite during labs. Prerequisites: CE graduate standing or permission of instructor. Offered Fall, as demand warrants.

11. COURSE CLASSIFICATIONS: Undergraduate courses only. Consult with CLA Curriculum Council to apply S or H classification appropriately; otherwise leave fields blank.

H = Humanities

S = Social Sciences

Will this course be used to fulfill a requirement for the baccalaureate core? If YES, attach form.

YES:

NO:

x

IF YES, check which core requirements it could be used to fulfill:

O = Oral Intensive, Format 6

W = Writing Intensive, Format 7

X = Baccalaureate Core

11.A Is course content related to northern, arctic or circumpolar studies? If yes, a
added in the printed Catalog, and flagged in Banner.

"snowflake" symbol will be

YES

NO

12. COURSE REPEATABILITY:

Is this course repeatable for credit?

YES

NO

x

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).

How many times may the course be repeated for credit?

TIMES

If the course can be repeated for credit, what is the maximum number of credit hours that may be earned for this course?

CREDITS

If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course?

CREDITS

13. GRADING SYSTEM: Specify only one. Note: Changing the grading system for a course later on constitutes a Major Course Change – Format 2 form.

LETTER:

x

PASS/FAIL:

RESTRICTIONS ON ENROLLMENT (if any)

14. PREREQUISITES

CE Graduate standing or permission of instructor.

These will be *required* before the student is allowed to enroll in the course.

15. SPECIAL RESTRICTIONS, CONDITIONS

16. PROPOSED COURSE FEES

\$

Has a memo been submitted through your dean to the Provost for fee approval?

Yes/No

17. PREVIOUS HISTORY

Has the course been offered as special topics or trial course previously? Yes/No

NO

If yes, give semester, year, course #, etc.:

18. ESTIMATED IMPACT

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

This course will require the use of classroom and computer lab space. Course will be added to the Nathan Belz's Fall workload. License for software needed in this course is already owned by the university and is installed in the CE computer lab.

19. LIBRARY COLLECTIONS

Have you contacted the library collection development officer (kljensen@alaska.edu, 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.

No

☒

Yes

☐

Proposed course will not require any materials, collections, equipment, or services beyond that which is already used in other CE courses.

20. IMPACTS ON PROGRAMS/DEPTS

What programs/departments will be affected by this proposed action?

Include information on the Programs/Departments contacted (e.g., email, memo)

Civil and Environmental Engineering / CEM

21. POSITIVE AND NEGATIVE IMPACTS

Please specify **positive and negative** impacts on other courses, programs and departments resulting from the proposed action.

No anticipated impacts on other programs or departments.

JUSTIFICATION FOR ACTION REQUESTED

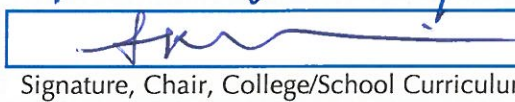
The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. Use as much space as needed to fully justify the proposed course.

The proposed course is anticipated to improve the skills and knowledge base of our engineering graduate students in the area of Geographic Information Systems. This area of study is becoming increasingly popular and is a highly sought after skill set by many employers. As such, this will result in more well-rounded and marketable students obtaining their CE graduate degrees from UAF. The addition of this course is to directly target a need in the CE department to cover specific skills and applications of GIS within our field of study. Currently, there is sufficient interest in our graduate student body to support this course. Should there be sufficient interest from CE undergraduate students, course could easily be converted to a stacked and more regular offering.

CEM Curriculum Committee was concerned with project proposal being due in Week 8 and there would not be sufficient time for project work as it is worth 30% of the grade. I feel confident that there will be ample time for students to develop and produce high quality work as much of the second half of the semester is devoted to the project with three weeks of labs being devoted to project work. In all, project work will span seven and a half weeks of the semester.

APPROVALS: Add additional signature lines as needed.

 Date 9/25/2015
Signature, Chair, Program/Department of: _____

 Date 9-28-15
Signature, Chair, College/School Curriculum Council for: CEM

 Date 10/5/15
Signature, Dean, College/School of: CEM

Offerings above the level of approved programs must be approved in advance by the Provost.

Signature of Provost (if above level of approved programs) Date _____

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE

Signature, Chair Date _____

Faculty Senate Review Committee: ☐ Curriculum Review ☐ GAAC

☐ Core Review ☐ SADAC

ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking)

Signature, Chair, Program/Department of: _____ Date _____

Signature, Chair, College/School Curriculum Council for: _____ Date _____

Signature, Dean, College/School of: _____ Date _____

CE 607 GIS Applications in Civil Engineering
Tentative Fall 2016 Course Syllabus (updated September 25, 2015)

Instructor	Nathan P. Belz, Ph.D. Email: npbelz@alaska.edu Office: 245D Duckering Phone: 907.474.5765
Lectures	Tu/Thr TBD
Office Hours	TBD, Duckering 245D or by appointment via email (time and location TBD)
Catalog Data	CE 607, CRN XXXXX
Course Title	GIS Applications in Civil Engineering
Prerequisites	Graduate standing or permission of instructor <i>→ in CE was started in Format 1 -fk</i>
Course Description and Topics	Theories and advanced methods of Geographic Information Systems for civil engineering practice. Students will apply and execute concepts related to data integration, analysis, and management in the ArcGIS suite during labs.
Credit	3.00 semester hours
Textbook and Readings	<p>Bostad, P. (2012). <i>GIS Fundamentals</i> – 4th Ed. Eider Press.</p> <p>NOTE: Earlier editions of this textbook may be available, but differences in the content and assignment of questions may exist. Students are responsible for the material and content in the 2012 edition.</p> <p>Supplementary readings and notes will be distributed as needed.</p>
Course Objectives	This course is designed to introduce the field of GIS and its application and importance in the field of Civil Engineering; demonstrate concepts and practices for data collection; illustrate concepts of advanced spatial methods with applications for engineering practice and graduate research.
Course Outcomes	At the end of the course, students should know how to and feel comfortable with: using the ArcGIS software suite; collecting and inputting raw data into a georeferenced database; manipulating vector and raster data; maintain and creating metadata; using trade specific language and methods that relate to GIS and spatial analysis in the civil engineering context.

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- Communication** Outside of scheduled lectures & office hours, email is the official form of communication. Students are expected to check their UAF email accounts for course updates. In addition, [UAF Blackboard](#) will be used for general announcements, distribution of course materials and posting of grades.
- Lab Assignments** Lab assignments can be done collaboratively, but it is expected that each student will turn in his/her own copy of the assignment. Blatant copying of another student's work will not be tolerated. Labs are to be handed in electronically at either the end of the lab or before the next lecture if more time is needed.
- Quizzes and Exams** For in-class quizzes and exams, students are responsible for their own writing utensils and calculators. Devices that have communication or computing capabilities (e.g., cell phones, laptops, iPads, etc.) are strictly prohibited. All exams will be open book and open notes; quizzes will be closed book and closed notes. Only writing utensil, calculator, references, scrap paper, and exam will be allowed on the desk during the exam; all other items must be placed on the floor. Students will arrange themselves so there is one empty desk between them and the next student if possible.

Grading	5% Attendance Participation	A	90-100%
	35% Labs	B	80-89%
	30% Project	C	70-79%
	30% Midterm Exams	D	60-69%
		F	0-59%

Project Scoring Rubric

1. Hypothesis Statement and Project Proposal	10 pts
2. Illustrates Advanced Knowledge of GIS Concepts	20 pts
3. Utilizes Vector Data / Includes Vector Manipulation	15 pts
4. Utilizes Raster Data / Includes Raster Manipulation	15 pts
5. Metadata and Documentation	15 pts
4. Clarity and Logic of Report/Presentation	25 pts

- Attendance** Students who are unable to attend class should, if possible, notify the instructor in advance and plan to make up or obtain the material from fellow classmates. There will be no opportunities to make up missed quizzes. If one is unable to take a test due to an absence, an opportunity to make up for a missed test will be given only under special circumstances. These circumstances include: 1) illness or personal injury, 2) university-related extracurricular activities, and 3) legitimate extenuating circumstances. Illnesses and personal injuries include those suffered by the student or a student's spouse or children. Non-illness or injury related reasons must be discussed with the instructor in advance of the scheduled test.
- Mobile Devices** The use of mobile devices in the classroom will be strictly prohibited. If you are using your cell phone or your cell phone goes off during class, you will be asked to leave. The use of laptops for note taking will be permitted. However, if it is clear that you are using it for anything other than course related activities you will be asked to leave and you will be required to obtain class material from a classmate.

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Academic Integrity Offenses against the Code of Academic Integrity and Student Code of Conduct are deemed serious and insult the integrity of the entire academic community. Suspected violations of the code are taken very seriously. Further university policies addressing plagiarism, fabrication, collusion, and cheating can be found on pp. 50-52 in [Academics and Regulations](#). Any student found violating these codes will be given an automatic failing grade for that assignment. More than one violation will result in a failing grade for the course and will involve disciplinary action.

Disabilities Services If you have a formal accommodation plan developed in conjunction with the [UAF Center for Health and Counseling](#) office please contact me as soon as possible at the start of the semester. If you would like to learn more about your options, these services, or discuss the supports that you need in order to learn well in this class, please contact the coordinator of [Disability Services](#) at 474-5655.

Support Services The [UAF Writing Center](#) (located in 801 Gruening) is staffed with English Department teaching assistants and undergraduate students that can assist you in all phases of the writing process. Students are encouraged to take advantage of these services when preparing their project reports. In addition, the [UAF Math Lab](#) offers advice, tutoring, and assistance for classes involving mathematics and statistics.

Tentative Spring 2016 Schedule

Week 1
Lecture: Course overview, introduction to GIS, applications of GIS, overview of the architecture and capabilities of ArcGIS and its components
Lab: How to use the assignment management system; how to navigate through the components of Arc GIS
Reading: Bolstad Chapter 1

Week 2
Lecture: Introduction to data models; choropleth mapping; and legend editing; basics of layouts and cartographic presentation.
Lab: Legend editing and vector choropleth mapping
Reading: Bolstad Chapter 2

Week 3
Lecture: Introduction to computer data storage, databases and attribute data types; attribute queries and field calculations
Lab: Single layer attribute queries, field calculations; introduction to data management and queries; managing geodatabases; joining tables; multi-criteria attribute queries
Reading: Bolstad Chapter 8

Week 4
Lecture: Vector data model, vector representation and scale, spaghetti data, topology, vector data compression; spatial joins; geoprocessing.
Lab: Vector geoprocessing and query tools used to solve a conservation site selection problem; basic multi-layer queries and spatial joins
Reading: Bolstad Chapter 9

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Week 5	<p>Lecture: Raster analysis tools: raster queries and calculations, neighborhood statistics, zonal statistics, distance and proximity, viewshed</p> <p>Lab: Raster lab with site suitability examples using raster queries/calculations, zonal statistics, distance measurements and viewshed analysis</p> <p>Reading: Bolstad Chapter 10</p>
Week 6	<p>Lecture: Introduction to projections, coordinate systems, spheroids and datums</p> <p>Lab: Model builder and Arc Scene.</p> <p>Reading: Bolstad Chapter 3</p>
Week 7	<p>Lecture: Terrain analysis, use of Arc Scene, network analysis; projects discussion</p> <p>Lab: An integrated raster-vector site suitability analysis example</p> <p>Reading: Bolstad Chapter 11</p>
Week 8:	<p>Lecture: Public data</p> <p>Lab: Network analysis</p> <p>Reading: Bolstad Chapter 7</p> <p>Project Proposals Due</p>
Week 9	<p>Lecture: Review Section and project work</p> <p>Lab: MIDTERM</p> <p>Reading: n/a</p>
Week 10	<p>Lecture: Part 1: data quality and metadata; part 2: geocoding and digitizing</p> <p>Lab: Geocoding, basic feature editing, public data integration, ortho photo use</p> <p>Reading: Bolstad Chapter 14</p>
Week 11	<p>Lecture: Part 1: Interpolation and basic geostatistics; part 2: GPS</p> <p>Lab: Project work</p> <p>Reading: Bolstad Chapter 12</p>
Week 12	<p>Lecture: Remote sensing and data collection methods – Part 1</p> <p>Lab: Project work</p> <p>Reading: Bolstad Chapter 5</p>
Week 13	<p>THANKSGIVING BREAK</p>
Week 14	<p>Lecture: Remote sensing and data collection methods – Part 2</p> <p>Lab: Project work</p> <p>Reading: Bolstad Chapter 6</p>
Week 15	<p>Lecture: Project work</p> <p>Lab: Project presentations</p> <p>Reading: n/a</p>