GEOG 431

California State University San Marcos • NEW COURSE • FORM C

ORIGINATOR'S SECTION:

1. College:

☒ CHABSS ☐ CoBA
☐ CoEHHS ☐ CSM

Desired Term and Year of Implementation (e.g., Fall 2008):

Fall 2017

2.Course is to be considered for G.E.? (If yes, also fill out appropriate GE form*) ☐ Yes ☒ No

3. Course will be a variable-topics (generic) course? ☐ Yes ☒ No
("generic" is a placeholder for topics)

4. Course abbreviation and Number:* GEOG 431

5. Title: ***(Titles using jargon, slang, copyrighted names, trade names, or any non-essential punctuation may not be used.)***
Remote Sensing and Applications

6. Abbreviated Title for PeopleSoft:
(no more than 25 characters, including spaces)
Remote Sensing Apps

7. Number of Units: 3

8. Catalog Description: ***(Not to exceed 80 words; language should conform to catalog copy. Please consult the catalog for models of style and format; include all necessary information regarding consent for enrollment, pre- and/or corequisites, repeated enrollment, crosslisting, as detailed below. Such information does not count toward the 80-word limit.)***

Introduces the concepts and techniques of remote sensing including how remote sensing data are acquired, displayed, restored, enhanced, and analyzed. Presents methods and techniques for obtaining and integrating with Geographic Information Systems (GIS) quantitative and qualitative geospatial information from aerial and satellite images, maps, and Global Positioning Systems (GPS). *Prerequisite: Completion of GEOG 335 with a grade of C (2.0) or better.*

9. Why is this course being proposed?

This course serves two programmatic needs: as a required course for the proposed Spring 2019 launch of the Bachelor of Science in Wildfire Science, and as an option for students starting the proposed Advanced Geographic Information Science (GIS) certificate.

The curriculum of the B.S., Wildfire Science, is broken into three areas: 1) Wildfire Science and the Urban Interface; 2) Fire Fighter Health and Safety; and 3) GIS. The list of courses to meet the GIS component of the degree represent needs expressed by the regional GIS practitioners and employers in fire management, analysis, and risk management. Students in the Advanced GIS certificate program benefit from development and implementation of the course, as they also pursue employment with some of the same, or similar employers, as the Fire Science students. The skills and techniques acquired in the course are transferable outside of fire-specific contexts, and increase the competiveness of students seeking employment in any GIS or remote sensing-related fields.

10. Mode of Instruction*
For definitions of the Course Classification Numbers:
http://www.csusm.edu/academic_programs/curriculumscheduling/catalogcurricula/DOCUMENTS/Curricular_Forms_Tab/Instructional%20Mode%20Conventions.pdf

Type of Instruction	Number of Credit Units	Instructional Mode (Course Classification Number)
Lecture	3	C2
Activity		
Lab		

11. Grading Method:*
☒ Normal (N) *(Allows Letter Grade +/-, and Credit/No Credit)*
☐ Normal Plus Report-in-Progress (NP) *(Allows Letter Grade +/-, Credit/No Credit, and Report-in-Progress)*
☐ Credit/No Credit Only (C)
☐ Credit/No Credit or Report-in-Progress Only (CP)

12. If the (NP) or (CP) grading system was selected, please explain the need for this grade option.

13. Course Requires Consent for Enrollment? ☐ Yes ☒ No

RECEIVED
APR 27 2017
BY:

* If Originator is uncertain of this entry, please consult with Program/Department Director/Chair.

☐ Faculty ☐ Credential Analyst ☐ Dean ☐ Program/Department - Director/Chair

14. Course Can be Taken for Credit More than Once? ☐ Yes ☒ No
If yes, how many times? (including first offering)

15. Is Course Crosslisted: ☐ Yes ☒ No

If yes, indicate which course and check "yes" in item #22 below.

16. Prerequisite(s): ☒ Yes ☐ No GEOG 335

17. Corequisite(s): ☐ Yes ☒ No

18. Documentation attached:
☐ Syllabus ☒ Detailed Course Outline

19. If this course has been offered as a topic, please enter topic abbreviation, number, and suffix:*

20. How often will this course be offered once established?* At least once per year.

PROGRAM DIRECTOR/CHAIR - COLLEGE CURRICULUM COMMITTEE SECTION:
(Mandatory information – all items in this section must be completed.)

21. Does this course fulfill a requirement for any major (i.e., core course or elective for a major, majors in other departments, minors in other departments)? ☒ Yes ☐ No

If yes, please specify:
This course is required as part of the proposed Bachelor of Science, Wildfire Science, offered through CSUSM-Temecula. In addition, this course also serves as one course option for students working to fulfill the Advanced Geographic Information Systems (GIS) certificate requirements.

22. Does this course impact other discipline(s)? ***(If there is any uncertainty as to whether a particular discipline is affected, check "yes" and obtain signature.)*** ☒ Yes ☐ No

If yes, obtain signature(s). Any objections should be stated in writing and attached to this form.

Wildfire Science Discipline — see attached email — Signature — Date — ✓ Support ____ Oppose

Discipline — ____ Signature — ____ Date — ____ Support ____ Oppose

SIGNATURES : (COLLEGE LEVEL) :

Elizabeth Ridder — 11 April 2017
1. Originator (please print or type name) — Date

2. Program Director/Chair — 4/12/17 — Date

3. College Curriculum Committee — Date

4. College Dean (or Designee) — 4/12/17 — Date

(UNIVERSITY LEVEL)

5. UCC Committee Chair — Date

6. Vice President for Academic Affairs (or Designee) — Date

7. President (or Designee) — Date

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Office of Academic Programs — Banner — Catalog — Revised 3/28/2007

* If Originator is uncertain at this entry, please consult with Program/Department Director/Chair

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GEOG 431: Remote Sensing and Applications
Official Course Description

Introduces the concepts and techniques of remote sensing including how remote sensing data are acquired, displayed, restored, enhanced, and analyzed. Presents methods and techniques for obtaining and integrating with Geographic Information Systems (GIS) quantitative and qualitative geospatial information from aerial and satellite images, maps, and Global Positioning Systems (GPS). *Prerequisite: Completion of GEOG 335 with a grade of C (2.0) or better.*

Student Learning Outcomes

Upon completion of the course, students will be able to

1. Describe sensors and image acquisition methods.
2. Analyze and explain remote sensing purposes, advantages, and limitations.
3. Describe and acquire industry-specific image sources.
4. Generate geospatial information by processing digital remotely sensed data.
5. Evaluate the opportunities and methods for integrating remote sensing data and products with GIS.

Required Materials and Technology

Text: Lillesand, Thomas M., Kiefer, Ralph W., and Chipman, Jonathan W., 2015, *Remote Sensing and Image Interpretation*, 7th Ed., Hoboken, NJ: John Wiley & Sons, 720 pages. ISBN-13: 978-1118343289.

Technology: Every student must have regular access to a computer with a reliable (and preferably fast) internet connection. All course materials will be posted through Cougar Courses. Applied coursework requires the use of ArcGIS, available through CougarApps.

Course Outline

Remote sensing history
- History of photography
- Digital imagery
- Evolution of platforms

Remote sensing basics
- Data collection
- Earth observation
- Electromagnetic radiation principles
- Atmospheric energy-matter interactions

Image acquisition – passive sensors
- Frame capture
  - Photographic cameras

- Digital cameras
- Scanners
  - Across track scanners
  - Along track scanners
  - Hyperspectral scanners
- Image acquisition – active sensors
  - RADAR
  - LIDAR
    - Vegetation & Urban data
- Image resolution
  - Spatial resolution and sensor types
- Image preprocessing & enhancement
  - Visual image interpretation
  - Data visualization & evaluation
  - Radiometric correction
  - Geometric correction
  - Image derivatives
    - Contrast enhancements
    - Texture transformations
    - Band ratioing
    - Principal Components analysis
    - Vegetation indices
- Image classification
  - Traditional Classifiers
    - Supervised vs. unsupervised
- Field data & accuracy assessment
  - Control points
  - Ground truthing
  - Measures of accuracy
- Integrating Remote Sensing & GIS
  - Raster to vector
  - Image formats (and data sources)

Course Requirements and Graded Components

Exams (2)	50% (25% each)
Lab Exercises	25%
Final Project	25%

All-University Writing Requirement

In this class, the All-University Writing Requirement is met through the submission of lab exercises and a final project. Both exams include questions that require analytic writing in response. Together, these requirements will meet or exceed the 2500-word minimum.

Credit hour policy

For each semester hour of credit that assigned to a Geography course, you should expect to spend minimum of **two** hours per week for each unit of credit, outside the classroom preparing for class sessions. ***In this course, this means you should plan for a minimum of six hours per week outside of class time in preparation.***

Angela Baggett

From: Carrick Williams
Sent: Wednesday, April 12, 2017 9:12 AM
To: Angela Baggett
Subject: Support from Wildfire Science For GEOG courses

Importance: High

From: Matthew Rahn
Sent: Tuesday, April 11, 2017 1:45 PM
To: Elizabeth Ridder <eridder@csusm.edu>
Cc: Carrick Williams <cawilliams@csusm.edu>
Subject: Re: Important: FW: CAPC REVIEW: GEOG 335 and 431
Importance: High

Good morning,
This is excellent timing and good news. The Wildfire Program will definitely be looking for our students to enroll in these courses, and will allow them to be taken as part of their upper division electives (it's a bit too late to get them into the P Form as it has been in review by the College). I am working right now on developing three additional tracks for credit certificate programs for wildfire science, one of which is a concentration in GIS. The forms for these new certificate programs will be completed this summer. This is exactly what we need to increase the rigor of the program, and meet the demands of the fire industry itself.

Matt Rahn, PhD, MS, JD
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Wildfire Research Program
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