<table>
<thead>
<tr>
<th>SECTION A</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Division:</td>
<td>Mathematics and Science</td>
</tr>
<tr>
<td>2. Department:</td>
<td>Earth, Space, and Environmental Science</td>
</tr>
<tr>
<td>3. Subject Code:</td>
<td>GIS</td>
</tr>
<tr>
<td>4. Course Number:</td>
<td>101</td>
</tr>
<tr>
<td>5. Course Title:</td>
<td>Introduction to Geographic Information Systems</td>
</tr>
<tr>
<td>6. Discipline:</td>
<td>Geography - Masters</td>
</tr>
<tr>
<td></td>
<td>Interdisciplinary Studies - Masters</td>
</tr>
<tr>
<td></td>
<td>Earth Science - Masters</td>
</tr>
</tbody>
</table>

**7. Rationale for adding this course to the curriculum:**

a. What is the rationale for offering this course? How will this course meet student and community needs and improve the college curriculum?

This is the introductory class for the proposed Geographic Information Systems certificate program. This class has the potential to be incorporated into several other current and future college programs.

b. How does this course differ from other courses with similar content?

The only class with similar content is GEOG 151. Geog 151 is planned to be deleted and replaced with this course proposal.

<table>
<thead>
<tr>
<th>SECTION B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Program Information:</td>
<td></td>
</tr>
<tr>
<td>a. Is course in a current associate degree or certificate?</td>
<td></td>
</tr>
<tr>
<td>☐ Yes</td>
<td>☑ No</td>
</tr>
<tr>
<td>b. Requesting course to be added to an associate degree or certificate?</td>
<td></td>
</tr>
<tr>
<td>☑ Yes</td>
<td>☐ No</td>
</tr>
<tr>
<td>2. TOPS code information:</td>
<td></td>
</tr>
<tr>
<td>Program title - TOPS Code:</td>
<td>Geographic Information Systems- 220610</td>
</tr>
<tr>
<td>3. SAM Code:</td>
<td></td>
</tr>
<tr>
<td>☐ A: Apprenticeship</td>
<td>☑ D: Possibly Occupational</td>
</tr>
<tr>
<td>☐ B: Advanced Occupational</td>
<td>☐ E: Non-Occupational</td>
</tr>
<tr>
<td>☐ C: Clearly Occupational</td>
<td></td>
</tr>
</tbody>
</table>
**SECTION C**

**General Education Information:**

1. College Associate Degree GE Applicability:

   Elective

2. CSU GE Applicability (Recommended-requires CSU approval):

3. IGETC Applicability (Recommended-requires CSU/UC approval):

**SECTION D**

**Articulation Information:**

1. I am requesting this course be articulated. Mark all that apply:
   - [ ] CSU Transferable.
   - [ ] UC Transferable.
   - [ ] CSU/UC major requirement.
     *If CSU/UC major requirement, list campus and major.*

2. List one community college and its comparable course. If requesting CSU and/or UC transferability also list a CSU/UC campus and comparable lower division course.

   - **Rio Hondo College GIS 120**
   - **American River College GEOG 330**

**SECTION E**

**Resources:**

Please consider the identified concerns below:

1. **Library:** Please identify the implications to the library

   *none*

2. **Computer Support Services:** Please identify the implications to Computer Support Services:

   *CSS will need to train at least one member of the staff to assist in the maintenance of the GIS hardware and software. In addition, there may be a cost for obtaining real data to use in the course.*

3. **TLC Lab:** What are the implications to the TLC lab of this course being offered?
## SECTION F

1. Maximum Class Size (recommended): 35
2. If recommended class size is not standard, then provide rationale:
   GIS computer educational lab pack (single-use) consists of 25 licenses.

## SECTION G

### Department Planning:

Explain how this course meets the goals of the department and/or fits into the overall curriculum and program(s) of this department.

1. **Facilities:**
   Briefly describe teaching facilities needed including classroom, lab, multi-media, etc. Include detailed information on any new facilities that this course will require.

   A computer lab with a minimum of 24 computers plus instructor computer workstation will be needed.

2. **Equipment:**
   List new equipment, teaching aids, etc., that will be required for this course. Estimate costs and provide information on funding sources.

   The computers will need to have ArcGIS installed (already present in Boykin-211).

3. **Expendable Supplies:**
   Will additional funding sources be needed to provide supplies for this course?

## SECTION H

### General Course Information

1. **Units:** 3.0  
   Variable units n/a  
   (*Units of credit are based on: 1 unit of credit per one hour of lecture (plus 2 hours of outside class independent study); 1 unit of credit per three hours of activity or lab.)

2. **This Course is:**
   Associate Degree Applicable - CSU transferable

3. **Is this course cross listed with another course? If yes, include course name and title:**
   not crosslisted

### Course Format and Duration

4. **Maximum Contact Hrs per Term**
   
   Lecture/Discussion: 54
   Lab:
   Activity:
By Arrangement:

Total Maximum Contact Hrs per Term

54 - 0

Methods of Instruction

5. Check all instructional methods used to present course content.
- Lecture
- Distance Ed (requires supplemental form)
- Lab
- Work Experience
- Activity
- Other:

Course Preparation – (Supplemental forms required)

6a. Prerequisite(s): (Course and/or other preparation/experience that is REQUIRED to be completed previous to enrollment in this course.)

none

6b. Co-requisite(s): (Courses and/or other preparation that is REQUIRED to be taken concurrently with this course.)

none

6c. Recommended: (Minimum preparation RECOMMENDED in order to be successful in this course. Also known as “Course Advisory”.)

none

Catalog Description and Other Catalog Information

7. Repeatability: Not Repeatable

Please Note: 7. (Repeatability) does not refer to repeating courses because of substandard grades or a lapse of time since the student took the course. A course may be repeated only if the course content differs each time it is offered and the student who repeats it is gaining an expanded educational experience as stipulated in Title V.

- Skills or proficiencies are enhanced by supervised repetition and practice within class periods.
- Active participatory experience in individual study or group assignments is the basic means by which learning objectives are attained.
- Course content differs each time it is offered.

Explanation for above repeatability selection:

n/a

8a. Catalog Description:

Introduces the fundamental concepts, methods, and applications of
Geographic Information Systems (GIS) and its role in spatial analysis and decision making.

8b. Class Schedule Description: (One or two sentences describing course content for the prospective student. Does not require as much detail as the Catalog description.)
Introduces the fundamental concepts, methods, and applications of Geographic Information Systems (GIS) and its role in spatial analysis and decision making.

8c. Grading Option: LR - Letter Grade Only

Course Outline Information

9. Student Learning Outcomes: (List 1-3 overarching goals. Outcomes must be related to Catalog Description, Course Content, and Objectives.
The student will be able to:
Analyze databases for their applicability in constructing geospatial maps using Geographic Information Systems.

Objectives:
1. Define GIS and provide examples of how it can be applied to solve real world problems.
2. Describe coordinate systems.
3. Assess various geospatial data models.
4. Classify, query, and symbolize spatial data.
5. Evaluate the use of geoprocessing tools.
6. Produce maps using GIS.
7. Compare and contrast GIS software.

10. Course Content Outline: (Provides a comprehensive, sequential outline of the course content, including all major subject matter and the specific body of knowledge covered.)

I. Introduction to GIS
A. Definitions of a Geographic Information System
B. Definitions of GIS terminology and concepts
C. Geographic Information Science
D. History of computer aided mapping
E. History of Geographic Information Systems
II. Survey of GIS applications
A. Science
B. Business
C. Government
D. Public Safety and Emergencies
III. Geographic/Spatial Information and Scale
A. Spatial Properties and Spatial Awareness
B. Spatial Location
C. Measurement Scales
D. Spatial Patterns
E. Continuity
F. Topology
G. Data Models
IV. Coordinate Systems
A. Longitude and Latitude
B. UTM
C. State Plane
D. Models of Earth: Spheroid, Ellipsoid, and Geoid
E. Reference Ellipsoid and Datums
F. Types of Map Projections
V. Geospatial Data Models and Structures
A. Vector data structures
1. Points, Lines, Areas
2. Nodes, Arcs, Polygons
B. Raster data structures
1. Grid Cells
2. Resolution
C. Applications using vector and raster
1. Advantages and disadvantages of each
2. Combining both
D. Database Management Structures
1. Hierarchical
2. Relational
E. Feature Classes
F. Records and Attributes
VI. Classification and Symbolization of Spatial Data
A. Number of Classes
B. Equal Interval Method
C. Quantile Method
D. Natural Breaks
E. Qualitative vs. Quantitative Symbolization
F. Counts vs. densities/percents
VII. Data Query, Selection, and Measurement
A. Single and Multiple Attribute Query
B. Standard Query Language
C. Logical Expressions
D. Spatial Queries
1. Buffer and Proximity
2. Containment
3. Intersection
E. Measuring Length, Shape, Polygons, and Distance
VIII. Cartographic Design applied to GIS
A. Cartographic Design Process
B. Elements of A Map
C. Typography
D. Balance
E. Visual Hierarchy
F. Contrast
G. Figure Ground

IX. Data Acquisition, Data Management, and Data Quality
A. Sources of Existing Data: Open Source, Private Business, Government
B. Digitizing
C. Surveying
D. Geocoding
E. Data Conversion
F. Data Management
G. Data Quality
   1. Scale and level of detail
   2. Sources of errors
   3. Positional and attribute accuracy
   4. Consistency, Completeness, and Lineage
G. Conflation

X. Processing of Geospatial Data
A. Aggregation of feature and attributes
B. Map Overlay
C. Coordinate System Transformations
D. Clip, union, intersection, dissolve, sliver polygons

XI. Relational Databases
A. Components of a database
B. Common field or common key
C. Geodatabases
D. Joins and Relates
E. Editing of Joined Tables

XII. Spatial Joins, Summary Tables, and Metadata
A. Spatial Joins Based On
   1. Relative location
   2. Proximity
   3. Containment
   4. Intersection
B. Summary and Aggregation of Attribute tables
C. Metadata
   1. Paper versus digital maps
   2. Mapping Standards
   3. Federal Geographic Data Committee (FGDC)
   4. Clearing Houses
   5. What to include and not to include in Metadata

XIII. Basic Spatial Statistics and Data Normalization
A. Transformation of raw data values
B. Enumeration Units, quotient, percentage, rates
C. Density, proportions, relationships
D. Normalization
E. Statistical Summaries

XIV. Spatial Analysis and Modeling
A. Spatial Arrangement
  1. Point, area, and line arrangements and patterns
  2. Connectivity
  3. Distance and Adjacency
  4. Nearest Neighbor Analysis
B. Statistical Surfaces
  1. Types of surfaces
  2. DEM Digital Elevation Model
  3. Methods of Interpolation
C. Map Overlay
D. Vector Analysis
E. Raster Analysis
F. Terrain Analysis
  1. Slope, elevation, aspect, view shed, shape
G. Modeling and Model Components
H. Role of spatial analysis in spatial decision making
XV. Survey of GIS Software
A. The GIS Software Industry
B. ESRI ArcGIS Products
C. AutoCadMap
D. GRASS
E. IDRISI
F. Other proprietary and open source GIS software

11. Methods of Evaluating Student Achievement: (All courses must provide for measurement of student performance in terms of stated student performance objects, Area 10, and culminate in a formal recorded grade based on uniform standards.)

Exams
Written assignments
Projects

12. Typical Assignments: (Credit courses require two hours of independent work outside of class per unit of credit for each lecture hour. List types of assignments, including library assignments.)

a. Reading Assignments: (Submit at least 2 examples)
Text Readings.
Articles.

b. Writing, Problem Solving or Performance: (Submit at least 2 examples)
1. The students will produce maps using GIS to interpret geographically referenced data.
2. Write an essay describing the role of GIS in professional applications.
3. Complete an exercise using GIS software that incorporates data query, selection, classification and symbolization. Submit a printed map for evaluation.
c. Other (Terms projects, research papers, portfolios, etc.)

Create a map using GIS software that uses public demographic data loaded onto a local base map.

13. Required Materials:

a. EXAMPLES of typical college-level textbooks (for degree-applicable courses) or other print materials.

Book 1:
Author: Clarke, Keith C.
Title: Getting Started with Geographic Information Systems
Publisher: Prentice Hall
Date of Publication: 2010
Edition: 5th

Book 2:
Author: Bolstad, P.
Title: GIS Fundamentals
Publisher: Atlas Books
Date of Publication: 2008
Edition: 3rd

b. Other materials and/or supplies required of students:

Student versions of ArcGIS.

SECTION I – Required of All Courses

SCANS COMPETENCIES AND FOUNDATION SKILLS
Indicate which components of the SCANS competencies and Foundation Skills are addressed by this course. Check all that apply.

<table>
<thead>
<tr>
<th>1. SCANS Competency</th>
<th>2. Foundation Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resources</strong></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Reading</td>
</tr>
<tr>
<td>Money</td>
<td>Writing</td>
</tr>
<tr>
<td>Material &amp; Facilities</td>
<td>Arithmetic/Math</td>
</tr>
<tr>
<td>Human Resources</td>
<td>Listening</td>
</tr>
<tr>
<td><strong>Interpersonal-Team</strong></td>
<td>Speaking</td>
</tr>
<tr>
<td>Participates as team member</td>
<td></td>
</tr>
<tr>
<td>Teaches others new skills</td>
<td>Creative Thinking</td>
</tr>
<tr>
<td>Serves clients/customers</td>
<td>Decision Making</td>
</tr>
<tr>
<td>Exercises leadership</td>
<td>Knowing how to learn</td>
</tr>
<tr>
<td>Negotiates</td>
<td>Problem Solving</td>
</tr>
<tr>
<td>Works with diversity</td>
<td>Seeing with the mind's eye</td>
</tr>
<tr>
<td><strong>Information</strong></td>
<td></td>
</tr>
<tr>
<td>Acquires and evaluates</td>
<td>Reasoning</td>
</tr>
<tr>
<td>Organizes and maintains</td>
<td>Self-Esteem</td>
</tr>
<tr>
<td>Interprets and communicates</td>
<td>Sociability</td>
</tr>
<tr>
<td>Uses computers to process</td>
<td>Integrity/Honesty</td>
</tr>
<tr>
<td><strong>Systems</strong></td>
<td></td>
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<tr>
<td>Understands systems</td>
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<tr>
<td>Monitors/corrects performance</td>
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<tr>
<td>Improves or designs</td>
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<tr>
<td><strong>Technology</strong></td>
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<tr>
<td>Selects technology</td>
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<tr>
<td>Applies technology to task</td>
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</tr>
<tr>
<td>Maintains/troubleshoots equip.</td>
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</tbody>
</table>