

**I. CATALOG INFORMATION**

A. Discipline: GEOGRAPHIC INFORMATION SYSTEMS (GIS)

B. Subject Code and Number: GIS M24

C. Course Title: Intermediate GIS Applications

D. Credit Course units:

Units: 3

Lecture Hours per week: 3

Lab Hours per week : 0

Variable Units : No

E. Student Learning Hours:

Lecture Hours:

Classroom hours: 52.5 - 52.5

Laboratory/Activity Hours:

Laboratory/Activity Hours 0 - 0

**Total Combined Hours** in a 17.5 week term: 52.5 - 52.5

F. Non-Credit Course hours per week \_\_\_\_\_

G. May be taken a total of:  1  2  3  4 time(s) for credit

H. Is the course co-designated (same as) another course: No  Yes

If YES, designate course Subject Code & Number: \_\_\_\_\_

I. Course Description:

Uses the ArcGIS ArcView software to explore intermediate topics in GIS applications. Includes geodatabase creation and editing, geoprocessing models, geocoding, and working with annotation.

J. Entrance Skills

\*Prerequisite: No  Yes  Course(s)

GIS M01

\*Corequisite: No  Yes  Course(s)

\_\_\_\_\_

Limitation on Enrollment: No  Yes

\_\_\_\_\_

Recommended Preparation: No  Yes  Course(s)

\_\_\_\_\_

Other: No  Yes

\_\_\_\_\_

K. Other Catalog Information:

## II. COURSE OBJECTIVES

Upon successful completion of the course, a student will be able to:

		<b>Methods of evaluation will be consistent with, but not limited by, the following types or examples.</b>
1	explain and apply the terminology used to describe spatial objects in ArcGIS software.	Summative abstracts Essay exam
2	perform advanced spatial analysis using the Model Builder.	In-class exercises Summative abstracts Practical exam Capstone project in applied GIS
3	develop and maintain a geodatabase.	In-class exercises Summative abstracts Practical exam Capstone project in applied GIS
4	employ ArcGIS and structured query language (SQL) coding to create, manipulate, and query tables of geospatial data.	In-class exercises Summative abstracts Practical exam Capstone project in applied GIS
5	perform network analysis.	In-class exercises Summative abstracts Practical exam Capstone project in applied GIS
6	perform geospatial analysis with both raster and vector data models.	In-class exercises Summative abstracts Practical exam Capstone project in applied GIS
7	identify and correct errors in topology using the topological editor.	In-class exercises Summative abstracts Practical exam Capstone project in applied GIS

### III. COURSE CONTENT

Estimated %	Topic	Learning Outcomes
<b>Lecture</b> (must total 100%)		
15.00%	Geodatabases - creating, developing and editing geodatabases	3, 7
10.00%	Geospatial analysis using raster and vector data models	1, 2, 3, 4, 5, 6, 7
10.00%	GIS modelling - use vector and raster tools in a sequence of operations and apply ModelBuilder to automate workflows	1, 2, 3, 6
10.00%	Selection processes: - boolean operators - SQL - spatial queries	1, 4
5.00%	Geocoding - converting street addresses to coordinates on Earth's surface	1, 3
10.00%	Coordinate systems - map projections - datums - map formats	1
10.00%	Network analysis - network applications - dynamic segmentation	5
10.00%	Advanced editing - fixing errors - edgematching - topological and non-topological editing	1, 6, 7
10.00%	Linking attribute and spatial data	3, 4, 7
10.00%	Geographic regions - applications of regions data model - create regions - attribute data - regions-based queries	1, 3, 4

### IV. TYPICAL ASSIGNMENTS

#### A. Writing assignments

Writing assignments are required. Possible assignments may include, but are not limited to:	
1	summarize the results of in-class exercises that use advanced GIS techniques in a professional abstract format.
2	write a persuasive essay advocating for the use of geodatabases that discusses the pitfalls of poor data management.
3	write a research proposal for an intermediate-level GIS campaign that includes the subject of the project, why it is important, a research timetable, a materials list, and references to background material.
4	communicate the results of an applied research project that utilizes intermediate GIS techniques. The technical writing style required by the GIS industry must be used.

#### B. Appropriate outside assignments

Appropriate outside assignments are required. Possible assignments may include, but are not limited to:	
1	collect network data of the paths on campus using GPS. Post-process these data using network analysis.
2	conduct peer-review of other students' capstone projects and summarize findings in a technical writing style.
3	read and summarize technical manuals on advanced GIS software techniques.

C. Critical thinking assignments

Critical thinking assignments are required. Possible assignments may include, but are not limited to:	
1	use ModelBuilder to automate a workflow that performs raster math and reclassification tasks on land cover data.
2	geocode a series of house locations from a mock voter roll.
3	perform a series of advanced editing techniques to post-process a shapefile of regions served by a local utility district.
4	design, as part of a capstone project, an intermediate-level GIS campaign. The project must one or more of the tasks outlined in the Course Content section and the results will be presented in a technical poster presentation.

V. METHODS OF INSTRUCTION

Methods of instruction may include, but are not limited to:

- Distance Education – When any portion of class contact hours is replaced by distance education delivery mode (Complete DE Addendum, Section XV)
- Lecture/Discussion
- Laboratory/Activity
- Other (Specify)  
Lecture time will be interspersed with hands-on computer exercises demonstrating the topic  
Class activities  
Guest speakers  
Collaborative group work will also be applied.
- Optional Field Trips
- Required Field Trips

VI. METHODS OF EVALUATION

Methods of evaluation may include, but are not limited to:

- |                                                          |                                                          |                                                         |
|----------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------|
| <input checked="" type="checkbox"/> Essay Exam           | <input checked="" type="checkbox"/> Classroom Discussion | <input checked="" type="checkbox"/> Skill Demonstration |
| <input checked="" type="checkbox"/> Problem Solving Exam | <input type="checkbox"/> Reports/Papers/Journals         | <input checked="" type="checkbox"/> Participation       |
| <input checked="" type="checkbox"/> Objective Exams      | <input checked="" type="checkbox"/> Projects             | <input checked="" type="checkbox"/> Other (specify)     |

- Capstone project in which students evaluate a problem that can be solved with advanced GIS techniques. They will access the appropriate data, post-process and analyze it, and present the results to the class.

- Quizzes

- Summative papers

**VII. REPRESENTATIVE TEXTS AND OTHER COURSE MATERIALS**

Price, Maribeth. Mastering ArcGIS. 8th ed. McGraw-Hill Education, 2018.

Longley, Paul, et al. Geographic Information Science and Systems. 4th ed. Wiley, 2015.

Allen, David. GIS Tutorial 2: Spatial Analysis Workbook. 4th ed. Esri Press, 2016.

**VIII. STUDENT MATERIALS FEES**

No  Yes

**IX. PARALLEL COURSES**

College	Course Number	Course Title	Units
LA Pierce College	GEOS/GIS 33	Intermediate GIS Applications	3
Cuesta College	GEOL 226	Advanced Geographic Information Systems	3
Santa Monica College	GIS 23	Intermediate Geographical Information Systems	3
Palomar College	GEOG 136	Intermediate ArcGIS: GIS Applications	2

**X. MINIMUM QUALIFICATIONS**

**Courses Requiring a Masters Degree:**  
 Master's degree in geology, geophysics, earth sciences, meteorology, oceanography, or paleontology  
 OR bachelor's degree in geology AND master's degree in geography, physics, or geochemistry OR  
 the equivalent.

**XI. ARTICULATION INFORMATION**

A. Title V Course Classification:

1. This course is designed to be taken either:

Pass/No Pass only (no letter grade possible); or

Letter grade (P/NP possible at student option)

2. Degree status:

Either  Associate Degree Applicable; or  Non-associate Degree Applicable

B. Moorpark College General Education:

1. Do you recommend this course for inclusion on the Associate Degree General Education list?

Yes:  No:  If YES, what section(s)?

A1 - Natural Sciences - Biological Science

A2 - Natural Sciences - Physical Science

B1 - Social and Behavioral Sciences - American History/Institutions

B2 - Social and Behavioral Sciences - Other Social Behavioral Science

- C1 - Humanities - Fine or Performing Arts
- C2 - Humanities - Other Humanities
- D1 - Language and Rationality - English Composition
- D2 - Language and Rationality - Communication and Analytical Thinking
- E1 - Health/Physical Education
- E2 - PE or Dance
- F - Ethnic/Gender Studies

C. California State University(CSU) Articulation:

1. Do you recommend this course for transfer credit to CSU? Yes:  No:

2. If YES do you recommend this course for inclusion on the CSU General Education list?

Yes:  No:  If YES, which area(s)?

- |                             |                             |                             |                             |                              |                             |                             |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|-----------------------------|
| A1 <input type="checkbox"/> | A2 <input type="checkbox"/> | A3 <input type="checkbox"/> | B1 <input type="checkbox"/> | B2 <input type="checkbox"/>  | B3 <input type="checkbox"/> | B4 <input type="checkbox"/> |
| C1 <input type="checkbox"/> | C2 <input type="checkbox"/> | D1 <input type="checkbox"/> | D2 <input type="checkbox"/> | D3 <input type="checkbox"/>  | D4 <input type="checkbox"/> | D5 <input type="checkbox"/> |
| D6 <input type="checkbox"/> | D7 <input type="checkbox"/> | D8 <input type="checkbox"/> | D9 <input type="checkbox"/> | D10 <input type="checkbox"/> | E <input type="checkbox"/>  |                             |

D. University of California (UC) Articulation:

1. Do you recommend this course for transfer to the UC? Yes:  No:

2. If YES do you recommend this course for the Intersegmental General Education Transfer Curriculum (IGETC)? Yes:  No:

IGETC Area 1: English Communication

- English Composition
- Critical Thinking-English Composition
- Oral Communication

IGETC Area 2: Mathematical Concepts and Quantitative Reasoning

- Mathematical Concepts

IGETC Area 3: Arts and Humanities

- Arts
- Humanities

IGETC Area 4: Social and Behavioral Sciences

- Anthropology and Archaeology
- Economics
- Ethnic Studies
- Gender Studies
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- Geography
- History
- Interdisciplinary, Social & Behavioral Sciences
- Political Science, Government & Legal Institutions
- Psychology
- Sociology & Criminology

IGETC Area 5: Physical and Biological Sciences (mark all that apply)

- Physical Science Lab or Physical Science Lab only (non-sequence)
- Physical Science Lecture only (non-sequence)
- Biological Science
- Physical Science Courses
- Physical Science Lab or Biological Science Lab Only (non-sequence)
- Biological Science Courses
- Biological Science Lab course
- First Science course in a Special sequence
- Second Science course in a Special Sequence
- Laboratory Activity
- Physical Sciences

IGETC Area 6: Language other than English

- Languages other than English (UC Requirement Only)
- U.S. History, Constitution, and American Ideals (CSU Requirement ONLY)
- U.S. History, Constitution, and American Ideals (CSU Requirement ONLY)

**XII. REVIEW OF LIBRARY RESOURCES**

A. What planned assignment(s) will require library resources and use?

The following assignments require library resources: None

B. Are the currently held library resources sufficient to support the course assignment?

YES:  NO:

If NO, please list additional library resources needed to support this course.

**XIII. PREREQUISITE AND/OR COREQUISITE JUSTIFICATION**

Requisite Justification for GIS M01

A. Sequential course within a discipline.

1. demonstrate proficiency in using industry-standard geographic information system (GIS) software.

2. define and identify various map components (scale, coordinate system, legend, compass).
3. classify data into ranges and produce thematic maps using both traditional and modern GIS methods.
4. explain the difference between spatial (geographic) data and attribute (tabular) data.
5. describe various mapping inaccuracies, why they occur and the factors affecting accuracy in various map projections.
6. differentiate between discrete and continuous data and give examples for point, line and polygon features.
7. describe the differences between raster and vector systems of data storage.
8. define terms such as orientation, arrangement, diffusion, pattern, dispersion, density and spatial arrangement and be able to use them when discussing geographic phenomena.
9. identify the industry-standard conventions used to represent features.
10. use GIS to perform buffer analyses (finding features inside, nearby, within or intersecting other features).
11. perform geocoding (assign coordinates) to a database using GIS software.
12. search for, perform quality assessment, and obtain geographic data from various sources.
13. demonstrate an ability to merge data tables based on their recognition of common attributes and spatial relationships.
14. produce professional, presentation-quality graphics.
15. create, preserve and disseminate data (spatial and attribute) by means of basic spatial and statistical analyses.

- B. Standard Prerequisite or Corequisite required by universities.
- C. Corequisite is linked to companion lecture course.
- D. Prerequisite or Corequisite is authorized by legal statute or regulation.  
Code Section: \_\_\_\_\_
- E. Prerequisite or Corequisite is necessary to protect the students' health and safety.
-



F. Computation or communication skill is needed.

G. Performance courses: Audition, portfolio, tryouts, etc. needed.

#### **XIV. WORKPLACE PREPARATION**

Required for career technical courses only. A career technical course/program is one with the primary goal to prepare students for employment immediately upon course/program completion, and/or upgrading employment skills.

Detail how the course meets the Secretary of Labors Commission on the Achievement of Necessary Skills (SCANS) areas. (For a description of the competencies and skills with a listing of what students should be able to do, go to:

<http://www.ncrel.org/sdrs/areas/issues/methods/assment/as7scans.htm>)

The course will address the SCANS competency areas:

1. Resources: the students will retrieve geospatial data from governmental or academic sources, organize those data using proper data management techniques, and analyze their data according to a time schedule articulated at the start of the semester.
2. Interpersonal: the students will work in groups of 2-3 students to create and execute a workflow that will answer a geospatial question in a manner that simulates a real workplace environment. Students will communicate the results of this work to the class and will, in part, be evaluated by peer-review.
3. Information: the students will use the Internet to acquire geospatial data sets and GIS software to analyze those data. Students will communicate the results of their analyses in written abstracts and in verbal and poster presentations.
4. Systems: the students will understand their roles as Geographic Information Systems technicians by setting up and executing data analysis workflows, troubleshooting and modifying these workflows when problems arise.
5. Technology: the students will apply GIS software every day in class and on every out-of-class assignment.

The course also addresses the SCANS skills and personal qualities:

1. Basic Skills: the students will use reading, writing and mathematics to access geospatial data, analyze those data, and present their results to the class in a professional conference-style poster presentation. Emphasis is placed upon the technical writing and speaking style demanded by the industry.
2. Thinking Skills: the students will apply creative and critical thinking to answer geospatial questions using the tools of a GIS technician, solving problems when they arise.
3. Personal Qualities: the students will conduct themselves in a responsible, professional manner when completing an industry-level capstone project applying remote sensing tools. Projects will be completed in a timely fashion, so students must set realistic goals and manage time appropriately to meet them. During the peer-review process, students will behave in a critical, yet polite, fashion when giving feedback.

**XV. DISTANCE LEARNING COURSE OUTLINE ADDENDUM**

GIS M24: Not Applicable

**XVI. GENERAL EDUCATION COURSE OUTLINE ADDENDUM**

GIS M24: Not Applicable

**XVII. STUDENT MATERIALS FEE ADDENDUM**

GIS M24: Not Applicable

**XVIII. REPEATABILITY JUSTIFICATION TITLE 5, SECTION 55041**

GIS M24: Not Applicable

**XIX. CURRICULUM APPROVAL**

Course Information:

Discipline: GEOGRAPHIC INFORMATION SYSTEMS (GIS)

Discipline Code and Number: GIS M24

Course Revision Category: New Course

Course Proposed By:

Originating Faculty Roger Putnam 09/26/2018

Faculty Peer: \_\_\_\_\_

Curriculum Rep: \_\_\_\_\_

Department Chair: Robert Keil 10/24/2018

Division Dean: Mary Rees 10/14/2018

Approved By:

Curriculum Chair: Jerry Mansfield 12/07/2018

Executive Vice President: \_\_\_\_\_

Articulation Officer: Letrisha Mai 11/01/2018

Librarian: Mary LaBarge 10/31/2018

Implementation Term and Year: Fall 2019

Approval Dates:

Approved by Moorpark College Curriculum Committee: 11/06/2018

Approved by Board of Trustees (if applicable): 12/11/2018

Approved by State (if applicable): 02/22/2019