COLTON REDLANDS YUCAIPA
REGIONAL OCCUPATIONAL PROGRAM

2026-2027

Computer Mapping with GIS 1

COURSE OUTLINE

DESCRIPTION:

Computer Mapping with Geographic Information Systems is a foundational course in the Information Support System pathway, designed to provide fundamental concepts of Geographic Information Systems (GIS) and enable students to apply the geographic inquiry process to environmental science, government, and business issues. This course introduces basic computer hardware, software and security management skills and integrates the history of automated mapping and GPS, cartographic principles, coordinate systems and map projections. Topics include project management, data structures, data sources and acquisition, shapefile layers and spatial data. Students will develop intermediate skills in online and desktop platforms, as well as analytical and spatial skills by identifying a hypothesis, gathering and analyzing data, and providing spatial solutions to practical and real life problems. GIS careers will be explored and fundamental concepts reinforced through hands-on activities and work-based learning that connects students to industry and the local community.

INFORMATION:

PRE-REQUISITE:	Successful completion of classes in computer technology, computer based applications, computer networking, or with teacher permission. Previous or concurrent enrollment in Algebra (recommended).
LENGTH:	One Year
SECTOR:	Information and Communications Technology
PATHWAY:	Information Support and Services
ARTICULATED:	Yes
UC A-G APPROVAL:	Yes: College-Preparatory Elective (G) – History / Social Science Requirement

O*NET SOC CODES:

15-1441.00	Database Administrator
15-1199.05	GIS Technicians
17-3031.02	Mapping Technicians

Orientation

A. Introduce the course and facilities.
B. Discuss the syllabus and major objectives.
C. Explain applicable classroom management procedures, and any operational guidelines.
D. Review instructor/student expectations.
E. Explain attendance requirements and procedures.
F. Review grading and student evaluation procedures.
G. Discuss the work-based learning aspect of the program, if applicable.
H. Discuss the “next steps” related to additional education, training, and employment.
I. Review classroom safety, emergency and disaster procedures.

1. Communication Skills

A. Demonstrate positive verbal communication skills using appropriate vocabulary, demeanor, and vocal tone in the classroom and/or worksite.
B. Read and interpret written information and directions.
C. Practice various forms of written communication appropriate to the occupation.
D. Practice positive body language skills.
E. Practice professional verbal skills for resolving a conflict.
F. Demonstrate active listening skills including techniques for checking for understanding, and for obtaining clarification of directions.

2. Interpersonal Skills

A. Demonstrate positive teamwork skills by contributing to a group effort.
B. Practice the importance of diversity awareness and sensitivity in the workplace.
C. Define sexual harassment in the workplace and identify the employee’s role and responsibility.
D. Practice participation skills.
E. Identify different personality types and demonstrate flexibility and adaptability working with diverse individuals.
F. Practice business and social etiquette skills appropriate to the occupation.
G. Evaluate and discuss the role of business and personal ethics in decision making based on various job-related scenarios.
H. Demonstrate the use of time management skills.

3. Employability Skills

A. Demonstrate appropriate attendance and punctuality practices for the classroom (and worksite, if applicable).

B. Prepare a resume, cover letter, and job application.
C. Demonstrate interviewing techniques in seeking employment, using appropriate tone, body language and professional dress and grooming standards.
D. Identify strategies for employment retention.
E. Identify and analyze sources of job information, including electronic sources and the impact of social networking on employability.
F. Identify the need for continuing education, professional development, and professional growth in chosen field.
G. Identify appropriate procedures for leaving a job.
H. Review company policies and current trends in employee compatibility screening, drug screening, and background checks.

4. Leadership

A. Define leadership and identify the responsibilities, competencies, and behaviors of successful leaders.
B. Work with peers to promote divergent and creative perspectives.
C. Demonstrate how to organize and structure work, individually and in teams, for effective performance and the attainment of goals.
D. Explain multiple approaches to conflict resolution and their appropriateness for a variety of situations in the workplace.
E. Employ ethical behaviors and actions that positively influence others.
F. Analyze the short-term and long-term effects a leader's actions and attitudes can have on productivity, morale, and organizational culture.

5. Personal and Occupational Safety

A. Demonstrate procedures to be followed in case of emergencies.
B. Describe and discuss the procedure for reporting a work-related hazard or injury (worker's comp), including ways to report a potential safety hazard to a supervisor.
C. Identify and discuss cyber ethics, cyber safety, and cyber security.
D. Apply personal safety practices to and from the job.
E. Recognize the effects of substance abuse in the workplace.
F. Explain the importance of CAL-OSHA in the industry.
G. Define and discuss ergonomics in relation to the working environment.
H. Discuss the electrical hazards of working with electronic equipment.

6. Foundations of GIS

A. Describe geographical information systems (GIS).
B. Detail the origins and evolution of GIS technological advances.
C. Differentiate between professional and consumer GIS analysis and geospatial technologies.
D. Describe the history of early map making including the development of computer-aided mapping.
E. Define map making and Geographic Information Systems (GIS) using Story Maps.
F. Identify GIS terminology and concepts.
G. Describe the history and purpose of GPS.
H. Identify potential legal and privacy issues associated with GIS and GPS.

7. Basic Hardware and IT Security Information Skills

A. Demonstrate how to start, restart, lock, and shut down a personal computer or mobile device.
B. Define hardware requirements for various GIS platforms.
C. Explain the fundamentals of computer hardware management.
D. Describe various types of networks and their purpose.
E. Perform basic data management practices including storage and management of data.
F. Identify and describe components of peripheral devices.
G. Explain process for configuring a printer and modifying print settings.
H. Identify common security settings and threats.
I. Explain best practices for securing a workstation versus a mobile device.

8. Basic Software Skills for GIS

A. Explain fundamentals of computer software management.
B. Describe standard GIS software.
C. Demonstrate the use of menus, toolbars, icons, and dialog boxes in Windows and MS Word.
D. Demonstrate creating new folder and saving (in alternative file formats), deleting and editing files in Windows and MS Word.
E. Manage spreadsheets and files within MS Excel and understand different file extensions.
F. Practice inputting, editing, and outputting data.
G. Perform simple formulas and functions.

9. Project Management Skills

A. Explain the importance and function of project management.
B. Define the roles of a project management team.

C. Detail the process for initiating the project.
D. Describe the project planning phase including the scope, work breakdown, resources and time-frames.
E. Schedule activities for executing the project including plan for check-ins, modifications and status reports.
F. Evaluate steps for closing and wrapping up a project.
G. Update portfolio for class projects.

10. Introduction to Cartographic Principles

A. Distinguish basic cartographic principles in map production.
B. Apply and use basic cartographic principles and symbology.
C. Recognize map projections and scales.
D. Define what constitutes a map.
E. Identify basic elements and types of map layout.
F. Review techniques to achieve map accuracy.
G. Emphasize the connection between map projection and achieving correct analysis.

11. Coordinate Systems

A. Describe the purpose for coordinate systems.
B. Define various coordinate systems and identify common coordinate systems used in map layout.
C. Identify how latitude and longitude is used in standard map projections.
D. Introduce geographic concepts of projection and datum.
E. Produce maps using the correct map coordinate system and map scales.

12. GIS Data Sources and Management

A. Describe types of data.
B. Interpret a variety of data sources and formats available in GIS including analog and digital sources.
C. Introduce conceptual framework for creating GIS data.
D. Classify GIS data.
E. Manage GIS data.
F. Demonstrate basic concepts used in GIS database manipulation.
G. Describe database management practices including relational database.

13. Managing Geospatial Layers

A. Introduce principles of layers.

B. Compare and contrast raster versus vector data.
C. Manipulate the raster and vector data structures.
D. Define methods and problems associated with acquisition of data and accuracy vs. precision of the data.
E. Define Geocoding, Georeferencing and digitizing.
F. Distinguish which data types are best suited to specific applications (e.g., comma delineated data, excel, KML, CAD file).
G. Compare and contrast which data structure is best suited to specific GIS applications.
H. Convert data to map projections and scale.
I. Describe metadata, how it is created and used to facilitate the use and management of data.

14. Introduction to Spatial Analysis

A. Describe the spatial analysis process.
B. Describe spatial patterns, create queries, and symbolize geospatial data.
C. Define spatial data.
D. Define single and multiple layer operations.
E. Apply GIS to a spatial problem.

15. General Applications of GIS Technology in Environmental Science, Government, Business and Industry

A. Identify various internet applications of GIS technology.
B. Investigate public online mapping websites for various industries such as crimes, Megan's Law, California fires, etc.
C. Document different uses of GIS in environmental science, business, local government, and industry.
D. Produce professional quality map layouts suitable for GIS applications.
E. Describe how GIS is used in transportation, telecommunications, and utilities industries.
F. Describe how GIS is used in mobile applications.
G. Describe how GIS is used in natural resource management, conservation and environmental modeling.
H. Research and collect historical data on changes in climate due to deforestation, construction, mining, landfills, fire containment, etc.
I. Use spatial queries to identify past and future rate of changes to the earth's surface based on human activities.

16. Climate, Weather, and Temperature

A. Define basic geographic terminology such as hemispheres, vegetation zones and major lines of latitude and longitude.
B. Explore the relationship between temperature, lines of latitude and climate zones.
C. Investigate the relationship between temperature and climate due to location, elevation, proximity to ocean and other physical features.
D. Describe patterns of precipitation based on geographic features and land use.

17. Geographic Inquiry Process

A. Explain the geographic inquiry process.
B. Describe the steps for geographic inquiry.

C. Develop geographical questions that drive the inquiry process.
D. Identify geographic resources to support and resolve the questions.

18. Explore Geographic Data

A. Explore and research sources of spatial data.
B. Investigate reliability and relevancy of data sources.
C. Validate reliability of spatial data.
D. Emphasize the importance of including metadata into spatial data.
E. Produce maps for use in interpreting geographically referenced data.

19. Analytical Decision-making

A. Describe GIS as an effective tool in decision-making processes in a specific GIS application.
B. Create and edit digital and analog data.
C. Construct queries to explore data.
D. Identify relationships by highlighting key comparisons and exposing patterns.
E. Construct charts and graphs from analyzed tabular data using GIS software.
F. Visualize, analyze and make decisions based on spatial data.
G. Review the validity of GIS analysis and decision-making.
H. Apply research and spatial analysis skills to resolve problems.

20. Careers in GIS

A. Describe GIS careers.
B. Investigate educational requirements for careers in GIS.
C. Demonstrate communication and interpersonal skills.
D. Practice leadership and employability skills.
E. Prepare resumes, cover letters, and practice job interview techniques.

21. Portfolio

A. Create a professional digital portfolio reflecting employability skills in the relevant industry to include an “About Me” page.
B. Collect original works and documents that demonstrate technical skills and knowledge in the industry.
C. Demonstrate knowledge of competencies by accompanying each selected document or work with a journal entry or summary.
D. Write a brief resume and cover letter to be included in portfolio.
E. Develop interviewing techniques using portfolio materials.
F. Display portfolio materials for critique by a professional panel (industry partners and classmates).
G. Gather feedback and update portfolio.

Key Assignments

Assignment	Competencies	Career Ready Practices	Anchor Standards	Pathway Standards	CCSS
1. Students will participate in mock interviews that represent current industry practices (which includes skills demonstrations, resumes, applications, portfolios, personal websites, etc.).	1A-D, F 2A, D 3A-D, F-J 19A-E	2 3 10	2 3		LS 11-12.6 SLS 11-12.2
2. Students will research and debate the issue of privacy, ownership, and copyright of data in the industry.	1A – F 2A, D 6H	1 2 4 5 9 10 11 12	2 4 5 8 9 10	A1.0 A5.0	LS 11-12.1 LS 11-12.2 LS 11-12.3 LS 11-12.6 SLS 11-12.1 SLS 11-12.1d WS 11-12.6 - 12.9
3. Students will use mobile unit with GPS capability to collect data and upload into a GIS system. Students will measure the height of trees around campus, import the data. Students will observe the spatial patterns and make suggestions as to where the school can improve the landscape, e.g. plant more trees, etc. Students will use project management skills and collaboration skills to manage the process.	1A – F 2A, D 6G, H 9A-F 15F	1 2 4 5 9 10 12	2 4 5 8 9	A2.0 A3.0 A4.0 A8.0	LS 11-12.3 LS 11-12.6 SLS 11-12.2 WS 11-12.6 SEP 4
4. Using project management skills, teams of students will research, import, and manipulate online data resources to produce a map for a specified scenario. Students will present findings in class.	1A – F 2A, D 6A, B 15A - F 10 A-C, E - F	1 2 4 5 9 10 11 12	2 4 5 8 9 10	A1.0 A2.0 A3.0 A4.0 A8.0	LS 11-12.1 - 12.3 LS 11-12.6 SLS 11-12.1 SLS 11-12.1d SLS 11-12.2 WS 11-12.3 - 12.4 WS 11-12.6 - 12.7 SEP 3, SEP 4

Assignment	Competencies	Career Ready Practices	Anchor Standards	Pathway Standards	CCSS
5. Students will create digital maps utilizing the cartographic principles of symbols, colors, legend, scale, north arrow, coordinate systems, techniques for map accuracy and appropriate features or data layers.	1A, B, D 2A, D 6A – H 10A-F 11A-F	1 2 4 5 9 10 12	2 4 5 9 10	A1.0 A2.0 A3.0 A4.0 A6.0	LS 11-12.3 LS 11-12.6 RLST 11-12.4 WS 11-12.6
6. Students will research longitude and latitude, its origins, and current day applications, using Story Maps to document research and present findings using a preferred presentation software. Students will use project management and collaboration skills to manage the process	1A, B, D 2A, D 6A – F 9A-G 11A-F	1 2 4 5 9 10 11 12	2 4 5 8 9 10	A1.0 A4.0 A8.0	LS 11-12.1 - 12.3 LS 11-12.6 SLS 11-12.1 SLS 11-12.1d SLS 11-12.2 WS 11-12.3 - 12.4 WS 11-12.6 - 12.7
7. Students will create a map reflecting temperature patterns associated with changes in latitude, elevation and proximity to the physical features. Students will present findings to class.	1A – F 2D 6F 8F 10A-C, E, F 11B, D, F, G 15D 17E	1 2 4 5 10 12	2 4 5 10	A2.0 A3.0 A4.0	LS 11-12.3 LS 11-12.6 SLS 11-12.2 SLS 11-12.2 WS 11-12.6
8. Using online mapping websites, students will access information to conduct geographical “Hot Spot” analyses covering topics such as crime rates, disasters, traffic patterns and/or accidents, disease outbreaks, fires, etc., and produce a map. Students will use project management and collaboration skills to manage the process.	1A – F 2D 6A, B 9A-F 10A-C, E - F 15A - F	1 2 4 5 9	2 4 5 9 10	A1.0 A2.0 A3.0 A4.0 A8.0	LS 11-12.1 - 12.3 LS 11-12.6 SLS 11-12.1 SLS 11-12.1d SLS 11-12.2

Assignment	Competencies	Career Ready Practices	Anchor Standards	Pathway Standards	CCSS
		10 11 12			WS 11-12.6 SEP 4
9. Students will map their own neighborhoods, identifying geographic hazards and developing a disaster plan for their families. MOVE TO GIS II	1A – F 2D 4C, F 6B, E-H 8F, G 10A - F 13D 15D	1 2 4 5 6 10 12	2 4 5 6 10	A2.0 A3.0 A4.0 A8.0	LS 11-12.3 LS 11-12.6 SLS 11-12.2 WS 11-12.6
10. Using online data resources, students will conduct research as to whether Megan's Law is effectively implemented. Then write a letter to local council members of their analysis and conclusion on the effectiveness of Megan's Law backing their claims with maps, data, documentation and researched information. Students will use presentation software to present findings to class.	1A – F 2A, D 6A, B 10A-C, E - F 15A - F	1 2 4 5 9 10 11 12	2 4 5 8 9 10	A1.0 A2.0 A3.0 A4.0 A8.0	LS 11-12.1 - 12.3 LS 11-12.6 SLS 11-12.1 SLS 11-12.1d SLS 11-12.2 WS 11-12.3 - 12.4 WS 11-12.6 - 12.7
11. Students will research the advantages and disadvantages of online mapping applications, its use and importance to various organizations, businesses and industries and use Story Maps to document resources, research and present findings.	1A – F 2A, D 6A, C-F 15A - F	1 2 4 5 10 11 12	2 4 5 8 10	A1.0 A8.0	LS 11-12.1 LS 11-12.2 LS 11-12.3 LS 11-12.6 WS 11-12.3 WS 11-12.4 WS 11-12.6 – 12.7
12. Students will build data tables based on information relevant to current events.	1A, B, D 2D	1 2	2 4	A2.0 A3.0	LS 11-12.3 LS 11-12.6

Assignment	Competencies	Career Ready Practices	Anchor Standards	Pathway Standards	CCSS
	7A-I 8F, G 12 A-F 13 A-H 15 A-F	4 5 9 10 12	5 9 10	A6.0 A7.0 A8.0	SLS 11-12.2 WS 11-12.6 SIC 6
13. Given a scenario based on current events, students will obtain and analyze relevant data, build data tables and shapefiles, then present their data in the appropriate digital map.	1A – F 2D 6E 8C-G 12B-F 13B-H 14A-E 15A-F 17B,C,E	1 2 4 5 10 11 12	2 4 5 10	A2.0 A3.0 A6.0 A8.0	LS 11.12.3 LS 11-12.6 WS 11-12.4 WS 11-12.6 SEP 3, SEP 8
14. Students will create a digital map utilizing GIS skills such as manipulating layers, zooming in and out, and identifying the attributes of geographic features.	1A–F 2D 4C, F 6B, E-H 8F, G 10A-F 13D 15D	1 2 4 5 10 11 12	2 4 5 10	A2.0 A3.0 A8.0	LS 11-12.3 LS 11-12.6 RLST 11-12.4 WS 11-12.6
15. Based on a scenario, students will formulate a geographic hypothesis (by asking questions), then collect data, visualize that data and create possible solutions (using maps). Students will develop a plan of action to implement the solutions. Students will use project management skills to manage the process. Upload project to portfolio. Students will present findings to class using a preferred presentation software.	1A – F 2D 4C, E, F 6B-E, G 9A-G 10C-G	1 2 4 5 9 10	2 4 5 8 9 10	A1.0 A3.0 A4.0 A6.0 A8.0	LS 11-12.1 - 12.3 LS 11-12.6 SLS 11-12.1 SLS 11-12.1d SLS 11-12.2 WS 11-12.3 - 12.4

Assignment	Competencies	Career Ready Practices	Anchor Standards	Pathway Standards	CCSS
	11C-E, H -J 12A–I 13A –I 15A-I 16A-D 17A-D 18A-E	11 12			WS 11-12.6 - 12.7 SEP 1, SEP 3
16. Students will research and collect historical data to create maps that illustrate changes to the earth's surface based on human activities (i.e. deforestation, changes in climate due to construction, mining, landfills, global warming, fire containment, etc.). Write a report and present findings to class. Students will use project management skills to manage the process. Upload project to portfolio. Students will present findings to class using a preferred presentation software.	1A–F 2D 4C, E, F 6A-F 9A-F 10A-F 11B-E	1 2 4 5 9 10 11 12	2 4 5 8 9 10	A1.0 A3.0 A4.0 A8.0	LS 11-12.1 – 12.3 SLS 11-12.1 SLS 11-12.1d SLS 11-12.2 WHSST 11-12.2 WS 11-12.4 WS 11-12.6 – 12.8 US 11.8.7

Standards Assessed in this Program

Career Ready Practices

1. Apply appropriate technical skills and academic knowledge.
2. Communicate clearly, effectively, and with reason.
3. Develop an education and career plan aligned to personal goals.
4. Apply technology to enhance productivity.
5. Utilize critical thinking to make sense of problems and persevere in solving them.
7. Act as a responsible citizen in the workplace and the community.
8. Model integrity, ethical leadership, and effective management.
9. Work productively in teams while integrating cultural/global competence.
10. Demonstrate creativity and innovation.
11. Employ valid and reliable research strategies.
12. Understand the environmental, social, and economic impacts of decisions.

Anchor Standards

2.0 Communications
- Acquire and use accurately sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats.

3.0 Career Planning and Management
- Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.

4.0 Technology
- Use existing and emerging technology, to investigate, research, and produce products and services, including new information, as required in the sector workplace environment.

5.0 Problem Solving and Critical Thinking
- Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques.

6.0 Health and Safety
- Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the sector workplace environment.

7.0 Responsibility and Flexibility
- Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the sector workplace environment and community settings.

8.0 Ethics and Legal Responsibilities

- Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms.

9.0 Leadership and Teamwork

- Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution.

10.0 Technical Knowledge and Skills

- Apply essential technical knowledge and skills common to all pathways in the sector following procedures when carrying out experiments or performing technical tasks.

Pathway Standards

Information Support and Services Pathway

A1.0 Describe the role of information and communication technologies in organizations.
A2.0 Acquire, install, and implement software and systems.
A3.0 Access and transmit information in a networked environment.
A4.0 Administer and maintain software and systems.
A5.0 Identify requirements for maintaining secure network systems.
A6.0 Diagnose and solve software, hardware, networking, and security problems.
A7.0 Support and train users on various software, hardware, and network systems.
A8.0 Manage and implement information, technology, and communication projects.

Common Core State Standards

ENGLISH LANGUAGE ARTS

Language Standards

LS 11-12.1: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
LS 11-12.2: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
LS 11-12.3: Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
LS 11-12.6: Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the (career and college) readiness level, demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Speaking and Listening Standards

SLS 11-12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions, and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.

SLS 11-12.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners, building on others ideas and expressing their own clearly and persuasively.
SLS 11-12.1d: Respond thoughtfully to diverse perspectives, synthesize comments, claims and evidence made on all sides of an issue, resolve contradictions when possible, and determine what additional information or research is required to deepen the investigation or complete the work.

Writing Standards

WS 11-12.3: Write narratives to develop real or imaged experiences or events using effective technique, well-chosen details, and well-structured event sequences.
WS 11-12.4: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
WS 11-12.6: Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback including new arguments and information.
WS 11-12.7: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem, narrow or broaden the inquiry when appropriate, synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

HISTORY/ SOCIAL SCIENCE

US History and Geography

US 11.8.7: Describe the effects on society and the economy of technological developments since 1945, including the computer revolution, changes in communication, advances in medicine, and improvements in agricultural technology.