

## SPATIAL STUDIES

### THE ADVISORY COMMITTEE

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### THE FIELD OF STUDY

Spatial thinking is the use of two- and three-dimensional representations of information to structure problems, find answers, and express solutions. The ability to visualize and interpret location, distance, direction, relationships, movement and change through space is fundamental to content understanding and problem solving. Spatial literacy is a critical skill in the sciences, humanities, and social sciences; indeed, a spatial approach helps to reveal the interdisciplinary, interconnected nature of many problems. Learning to think spatially is a form of learning how to learn.

### THE MINOR

Spatial Studies is an interdisciplinary program that includes courses from a wide array of departments. Requirements include two core spatial courses and four electives chosen from a diverse range of programs at the University of Redlands.

6 courses/ 22–24 credits

Students minoring in Spatial Studies must complete six courses totaling 22–24 credits, including the following requirements:

I. Two Core courses, taken from the following (ideally to be completed before the end of the sophomore year but can be taken at any point):

- SPA 100 Foundations of Spatial Thinking (4)
- SPA 110 Introduction to Spatial Analysis and GIS (4)
- SPA 210 Advanced Spatial Analysis and GIS (4)

II. Four Elective Courses, taken from at least two of the following categories:

- Physical World
- Culture and Communities
- Methods and Representations

At least two of the electives must be taken at the 200-level or higher.

#### PHYSICAL WORLD ELECTIVE COURSES

- BIOL 111 Introduction to Marine Biology (4)
- CHEM 290 Mile High Chemistry: Field Experience in Environmental Chemistry (3)
- CHEM 312 Advanced Environmental Chemistry (4)
- CHEM 311 Environmental Chemistry Field Experience: Environmental Modeling (3)
- EVST 205 Great Environmental Disasters (4)
- EVST 220 Physical Geography (4)
- EVST 230 Biodiversity (4)
- EVST 250 Environmental Design Studio I (4)
- EVST 350 Environmental Design Studio II (4)
- EVST 283 Mapping Animals (3)
- EVST 290 Environmental Geology (4)
- EVST 305 Ecology for Environmental Scientists (4)
- EVST 351 PanaMapping: Geodesign to Conserve the Rainforest (3)
- EVST 451 PanaMapping: Geodesign to Conserve the Rainforest (3)
- EVST 391 Environmental Hydrology (4)
- EVST 392 Oceanography (4)
- EVST 430 Advanced Geology Seminar (4)
- PHYS 360 Topics in Physics (4)\*

#### CULTURE AND COMMUNITIES ELECTIVE COURSES

- BUS 333 Labor in the Global Economy (4)
- ENGL 334 Representing the Holocaust (4)
- HIST 251 Mapping African History (4)
- HIST 227 Modern African American History (4)
- HIST 376 California Indian Seminar (4)
- MUS 347 History of Opera (4)
- POLI 202 Statistical Analysis and Mapping of Social Science Data (4)
- POLI 227 Political Geography (3)
- REL 125 Introduction to World Religions (4)\*
- REL 206 The 'Other' Jesus (4)
- REL 252 African-American Religion and Spirituality (4)
- REL 308 Christian Scriptures (4)
- REST 330 Black History of the Inland Empire (4)
- SOAN 305 Mapping People, Mapping Place (4)

#### METHODS AND REPRESENTATIONS ELECTIVE COURSES

- ART 132 2-D Design (4)
- ART 145 Introduction to Sculpture (4)
- ART 252 Introduction to Graphic Design (4)
- BUS 351 GIS & Spatial Analysis for Organizations (4)
- GIS 411 Fundamentals of Geographic Information, Research, and Applications (4)
- GIS 467 Introduction to Programming for GIS (2)
- MATH 221 Calculus III (4)
- MATH 222 Vector Calculus (3)
- MATH 231 Introduction to Mathematical Modeling (4)\*
- MATH 241 Linear Algebra (4)
- MATH 251 College Geometry (4)

- PHYS 107 Sound Physics (4)
- PHYS 232 General Physics II (4)
- PHYS 332 Electricity and Magnetism (4)
- SPA 230 GIS Field Methods (3)
- SPA 260 Applied GIS (4)
- SPA 260 Topics in Spatial Thinking & GIS (4)
- SPA 360 Advanced Topics in Spatial Thinking & GIS (4)
- SPA 425 Remote Sensing Image Analysis (4)

\* Eligible if instructor includes spatial content

#### NEGOTIABLE ELECTIVES

Appropriate additional courses from a variety of departments may be counted toward the SPA minor. To be eligible, a course must include significant attention to spatial studies in an explicit, rather than implicit, fashion. Students should discuss the potential of a course counting toward the minor with the instructor as early as possible (ideally, before the course has begun) and negotiate special assignments or projects in consultation with the instructor and the Spatial Studies Advisory Committee. Negotiable courses must be approved by the Advisory Committee for credit toward the minor.

#### STUDENT PORTFOLIOS

Although not required, a Senior Story Map Spatial Portfolio is highly recommended to showcase student work and to use as a resume piece. See your SPA minor advisor for details.

#### COURSE DESCRIPTIONS (SPA)

100 Foundations of Spatial Thinking.

Fall (4), Spring (4), May Term (3).

Everything is related to everything else, but near things are more related than far things. How does this “First Law of Geography” affect you? In this class, we will study our world—from the global to the local—in spatial or geographic terms. We will become better spatial thinkers as we learn to recognize patterns and the processes that generate them.

110 Introduction to Spatial Analysis and GIS.

Fall (4), Spring (4).

Introduction to concepts of spatial analysis and geographic information systems (GIS). Emphasis on spatial reasoning and analysis. Topics include the spatial data models, data requirements and acquisition, spatial analysis using GIS, implementation within an organization, and especially the application of GIS to problem-solving in other disciplines.

210 Advanced Spatial Analysis and GIS.

Fall (4), Spring (4).

This course is directed at developing more advanced geospatial skills in students who have already been initiated in the basic concepts of geographical information systems. Students will use advanced GIS tools as well as be introduced to raster data processing in both ArcGIS Pro and ERDAS Imagine.

Prerequisite: SPA 110.

### 230 GIS Field Methods.

May Term (3).

This course focuses on developing the technical skills used for GIS data collection and analysis in the field. Each week we will go out into the field and learn field techniques, such as drones, ArcGIS apps, GPS units, etc.

Prerequisite: SPA 110.

Offered as needed.

Course fee applies.

### 260 Topics in Spatial Thinking & GIS.

Fall (2-4), Spring (2-4).

Topics of current interest in Geographic Information Sciences, Spatial Thinking, and Applied Spatial Analysis. May be repeated for degree credit.

Offered as needed.

### 350 Geo-Design Studio.

Spring (4).

This course is an introduction to Geodesign techniques and system thinking strategies for planning and designing at different geographical scales.

Prerequisites: SPA 110.

Offered as needed.

Numeric grade only.

### 360 Advanced Topics in Spatial Thinking & GIS.

Fall (2-4), Spring (2-4).

Advanced topics in Geographic Information Science, Spatial Thinking, and Applied Spatial Analysis. May be repeated for degree credit.

Offered as needed.

### 425 Remote Sensing Image Analysis.

Spring (4).

This course discusses the theoretical foundation of remote sensing and applied skills in image understanding and image interpretation that students can apply in their respective disciplines. Utilizing image analysis software, students work on a progression of tasks and assignments focusing on image data format, image display, image data collection, and image analysis and classification.

Prerequisite: SPA 100 or permission of the instructor.