

Arabic 101A, 101B, 102A, 102B, 201A, 201B  
 Architecture 120, 121, 155  
 Art 100, 102, 104, 105, 165, 166, 167, 168  
 Chicano Studies 100, 105, 110, 115, 130, 135, 155  
 Chinese 101, 102, 130, 201  
 Cinema 100, 102, 103, 110, 120, 122  
 Dance 100, 101, 102, 105  
 English 202, 203, 205, 210, 211, 215, 220, 221, 225, 226, 230, 240, 245, 250, 255, 260, 265, 270, 280, 290  
 English as a Second Language 101, 102, 103  
 Fashion 130  
 Foreign Languages 108A, 108B, 207A, 207B  
 French 101, 102, 201, 202  
 German 101, 102, 201, 202  
 Graphic Communications 101, 102, 110  
 History 105, 106  
 Humanities 100, 101  
 Interior Design 115, 120  
 Italian 101, 102, 201  
 Japanese 101, 102, 201, 202  
 Judaic Studies 106  
 Library Technology 154  
 Multicultural Studies 120, 122, 124, 157  
 Music 100, 101, 102, 103, 170, 171  
 Philosophy 100, 101, 102, 103, 105, 110, 115, 120, 135, 136, 250  
 Photography 125  
 Radio and Television 100  
 Reading 110, 120  
 Religious Studies 101, 105, 106, 108, 110, 124  
 Spanish 101, 101A, 101B, 102, 102A, 102B, 201, 201A, 201B, 202  
 Speech 100, 105, 115  
 Theatre Arts 100, 140, 141, 150, 157

### Emphasis in Science and Mathematics

#### (\*Select 18 units minimum)

Anthropology 100, 101  
 Astronomy 100, 120  
 Biology 100, 101, 102, 105, 106, 110, 114, 118, 130, 131, 135, 185, 200, 201  
 Botany 100, 101  
 Business 110  
 Chemistry 100, 104, 105, 110, 115, 205, 210, 220, 221  
 CSIS-Information Technology 105  
 Earth Sciences 100, 115  
 Engineering 210  
 Family and Consumer Sciences 165, 185  
 Geography 100, 110, 115, 125  
 Geology 100, 110, 120, 125, 150  
 Health 165  
 Mathematics 56, 60, 100, 105, 106, 110, 115, 120, 130, 135, 140, 141, 200, 205, 206, 245  
 Microbiology 200  
 Oceanography 100, 101  
 Physical Science 100, 101  
 Physics 101, 102, 120, 121, 200, 201, 230, 231, 232  
 Psychology 205, 210  
 Sociology 205  
 Zoology 100, 101, 120, 135, 145, 200, 203

\*Although not listed, related lab courses may be included as part of the 18 unit minimum.

### Emphasis in Social and Behavioral Sciences

#### (Select 18 units minimum)

Administration of Justice 100  
 Africana Studies 100, 101, 102, 110, 120, 125, 126  
 Alcohol and Other Drug Studies 150  
 American Indian Studies 101, 102, 110, 115, 120, 125, 130, 140, 165  
 American Studies 104, 110, 200  
 Anthropology 105, 107, 110, 115, 125, 126, 130, 137, 140  
 Chicano Studies 101, 102, 120, 125

Child Development 100, 110, 115  
 Communications 100, 105  
 Counseling 100, 110, 115, 120  
 Economics 100, 101, 102, 110, 115  
 English 150  
 Family and Consumer Sciences 101, 105, 150  
 Fashion 132  
 Geography 103, 105  
 Graphic Communications-Multimedia & Web 100  
 Health 100  
 History 101, 102, 107, 108, 121, 130, 140, 141, 150, 151, 152  
 Judaic Studies 107  
 Legal Studies 121, 240  
 Multicultural Studies 100, 110, 165, 200  
 Political Science 100, 101, 102, 110, 125  
 Psychology 100, 105, 110, 115, 120, 125, 130, 145, 150, 225, 235  
 Religious Studies 102, 107, 108  
 Sociology 100, 105, 110, 115, 120, 125, 130, 135, 145, 150, 200  
 Speech 120, 131  
 \*Military Service

\*Palomar College will accept a minimum of 3 units of ACE recommended credit for completion of Basic/Recruit Training. Refer to the Associate Degree District Requirements, under Health and Kinesiology or see a Counselor for more information.

## Geography (GEOG)

Contact the Earth, Space, and Aviation Sciences Department for further information.

(760) 744-1150, ext. 2512

Office: NS-110G

### Associate in Arts Degree -

AA Degree requirements are listed in Section 6 (green pages).

- Advanced Geographic Information Systems

### Certificates of Achievement -

Certificate of Achievement requirements are listed in Section 6 (green pages).

- Advanced Geographic Information Systems

### Certificates of Proficiency -

Certificate of Proficiency requirements are listed in Section 6 (green pages).

- Geographic Information Systems

## PROGRAM OF STUDY

### Advanced Geographic Information Systems

The Advanced Geographic Information Systems (GIS) Certificate program at Palomar College is designed to provide students with the technical and theoretical knowledge needed to pursue a successful career in growing field of geospatial analysis. Through a combination of lectures, learning modules, case studies, internships, and projects, students will learn to manage, plan, and implement GIS projects.

### A.A. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements	Units
GEOG 120 Intro to Geographic Information Sys/GIS Software	4
GEOG 132 Database Management and Data Acquisition	4
GEOG 134 GIS Applications	2
GEOG 136 Intermediate ArcGIS: GIS Analysis	2
GEOG 138 GIS Internship	2

### Specialized Concentration (Select 2 courses)

GEOG 140 Introduction to Remote Sensing	1
GEOG 141 Transportation Systems Analysis	1
GEOG 142 Environmental Applications of GIS	1
GEOG 143 Introduction to Cartography and Computer Mapping	1

**Electives (Select 1 course)**

CSIT 170	Visual Basic I	4
DT 110	Technical Drafting I with AutoCAD	4

**TOTAL UNITS** 20

**PROGRAM OF STUDY****Geographic Information Systems**

The Geographic Information Systems Certificate program is designed to provide entry-level training for students seeking employment in this fast-growing profession, or to upgrade the skills for those already working in the field of Geographic Information Systems. The program may be completed in one year including summer session.

**CERTIFICATE OF PROFICIENCY**

<b>Program Requirements</b>		<b>Units</b>
GEOG 120	Intro to Geographic Information Sys/GIS Software	4
GEOG 132	Database Management and Data Acquisition	4
GEOG 136	Intermediate ArcGIS: GIS Analysis	2
GEOG 138	GIS Internship	2

**Electives (Select 1 course)**

CSIT 170	Visual Basic I	4
GEOG 134	GIS Applications	2

**TOTAL UNITS** 14 - 16

**COURSE OFFERINGS****GEOG 100 Physical Geography (3)**

3 hours lecture

**Transfer acceptability:** CSU; UC

A study of earth's physical environment with emphasis on weather, climate, landform, soils, and natural vegetation and the interrelationship between these elements within unique physical landscapes.

**GEOG 100L Physical Geography Laboratory (1)**

3 hours laboratory

**Prerequisite:** A minimum grade of 'C' in GEOG 100, or concurrent enrollment in GEOG 100

**Transfer acceptability:** CSU; UC

Laboratory and field investigations in weather elements, climate regions, soils, world ecosystems, and Earth's landform features. Satisfies laboratory requirement in physical sciences.

**GEOG 103 World Regional Geography (3)**

3 hours lecture

**Transfer acceptability:** CSU; UC

Critical survey of the major world regions with specific focus on physical and cultural components, such as development, economics, population and migration, political structure, and natural resources and the physical environment.

**GEOG 105 Introduction to Human Geography (3)**

3 hours lecture

**Transfer acceptability:** CSU; UC

Human elements of geography, including population distribution, general land use patterns, religion, trade and economy, and their correlation with the physical elements. Emphasis on world cultural regions with attention paid to interdependence and globalization.

**GEOG 110 Meteorology: Weather and Climate (3)**

3 hours lecture

**Transfer acceptability:** CSU; UC

Elements of weather including temperature, moisture, air pressure, and circulation of the atmosphere; air masses, storms, and their geographical distribution. Practical applications in the use of weather instruments, and the reading and interpretation of weather maps and climatological data.

**GEOG 115 Natural Disasters and Environmental Hazards (3)**

3 hours lecture

**Note:** Cross listed as ES 115

**Transfer acceptability:** CSU; UC

Examination and analysis of natural disasters and environmental hazards including earthquakes, tsunamis, volcanic activity, hurricanes, flooding, air and water pollution, and global climate change.

**GEOG 120 Introduction to Geographic Information Systems and GIS Software (4)**

3 hours lecture - 3 hours laboratory

**Recommended preparation:** GEOG 100 and CSIT 105

**Transfer acceptability:** CSU; UC

An introduction to the mapping sciences with a primary focus on Geographic Information Systems (GIS). Covers the trends, history, structure, application, hardware and software, and basic operations of GIS in order to provide a foundation for the use of GIS software. Related geographic technologies to be examined include mapping, aerial and satellite imagery, and Global Positioning Systems (GPS). The lab portion will provide introductory training in the use of ArcGIS software including identifying, evaluating, and inputting spatial data, developing and using raster and vector data sets, converting data from one form to another, and applying programming with GIS software.

**GEOG 125 California Geology and Geography (3)**

3 hours lecture

**Note:** Cross listed as GEOL 125

**Transfer acceptability:** CSU; UC

Emphasizes the physical geographic and geologic factors that have combined to form the varied landscapes of California. Climate and vegetation patterns, as well as the various geomorphic processes will be studied.

**GEOG 132 Database Management and Data Acquisition (4)**

4 hours lecture

**Prerequisite:** A minimum grade of 'C' in GEOG 120, or concurrent enrollment in GEOG 120

**Transfer acceptability:** CSU

Course provides students with knowledge and practical experience in the fundamentals of database management, and the acquisition, conversion, and creation of spatial data within Geographic Information Systems (GIS). Topics to include strategic design, querying, modeling techniques, data appropriateness and accuracy, hardware and software requirements, conversion of digital data, creating digital data using digitizers, scanners and Global Positioning Systems (GPS), and utilization of remote sensing, photogrammetry, and web-based data. This course provides hands-on experience with database management and data acquisition using ArcGIS software.

**GEOG 134 GIS Applications and Programming (2)**

1 hour lecture - 3 hours laboratory

**Prerequisite:** A minimum grade of 'C' in GEOG 120

**Transfer acceptability:** CSU

Provides students with advanced knowledge and practical experience in developing Geographic Information Systems (GIS) applications. Students will learn the fundamentals of GIS and database programming, as well as the customization of GIS applications. The lab provides hands-on experience with GIS programming using Visual Basic for Applications (VBA), data management using geodatabases, and applications development using ArcObjects.

**GEOG 136 Intermediate ArcGIS: GIS Analysis (2)**

1 hour lecture - 3 hours laboratory

**Prerequisite:** A minimum grade of 'C' in GEOG 120

**Transfer acceptability:** CSU

Focus on performing complex operations using the ArcGIS software. Students will gain hands-on experience in advanced querying operations, Spatial Analyst and Network Analyst, coordinate geometry, ArcGIS ModelBuilder, and the application of ArcGIS in a variety of disciplines.

**GEOG 138 GIS Internship (2)**

6 hours laboratory

**Prerequisite:** A minimum grade of 'C' in GEOG 120

**Transfer acceptability: CSU**

The Geographic Information Systems (GIS) internship is a directed program allowing students to apply classroom instruction to real-world GIS problem solving by working with a government or private agency. Students will be under the supervision of an instructor from the college and an advisor from the agency while working in one or more aspects of GIS operations.

**GEOG 140 Introduction to Remote Sensing (1)**  
1 hour lecture

**Recommended preparation:** Basic familiarity with computers and the windows operating system.

**Transfer acceptability: CSU**

Provides students with a basic understanding of remote sensing theory and implementation. Topics include satellite imagery, data acquisition, and image interpretation.

**GEOG 141 Transportation Systems Analysis (1)**  
1 hour lecture

**Prerequisite:** A minimum grade of 'C' in GEOG 120

**Transfer acceptability: CSU**

Provides students with more advanced practical experience in applying GIS to transportation systems. Students will gain more advanced hands-on experience using GIS as a tool to help model transportation planning, find the shortest routes, and analyze service areas and optimum routing. Introduces students to ESRI's network analyst extension and the various ways this tool can enhance transportation analysis.

**GEOG 142 Environmental Applications of GIS (1)**  
1 hour lecture

**Prerequisite:** A minimum grade of 'C' in GEOG 120

**Transfer acceptability: CSU**

Provides students with knowledge and practical experience in the application of GIS in an environmental setting. We will explore how location-based GIS tools are used in many areas of environmental management such as natural disasters, biodiversity, water resources, and pollution. Case studies will be used to explore and understand how GIS is being used to help preserve the earth's resources and environment.

**GEOG 143 Introduction to Cartography and Computer Mapping (1)**  
1 hour lecture

**Prerequisite:** A minimum grade of 'C' in GEOG 120

**Transfer acceptability: CSU; UC**

Provides the technical and design skills needed to create an effective map using Geographic Information Systems (GIS). Students will receive a review on map projection, coordinate systems, and datum transformation issues. In addition, students will learn about map templates, map annotations, and other tools that are used to enhance spatial data presentation.

**GEOG 195 Regional Field Studies in Geography (1, 2, 3)**  
½, 1, or 1½ hours lecture - 1½, 2, 2½, 3, 3½, 4, or 4½ hours laboratory  
hours lecture hours lecture/laboratory

**Transfer acceptability:** CSU; UC – Credit determined by UC upon review of course syllabus.

Extended field studies of the geography of selected regions. Emphasis upon field observation and interpretation of climate, meteorology, vegetation, soils, and landforms.

**GEOG 295 Directed Study in Geography (1, 2, 3)**  
3, 6, or 9 hours laboratory

**Prerequisite:** Approval of project or research by instructor

**Note:** May be taken 4 times for a maximum of six units

**Transfer acceptability:** CSU; UC – Credit determined by UC upon review of course syllabus.

Independent study for students who have demonstrated skills and/or proficiencies in geography subjects and have the initiative to work independently on projects or research outside the context of regularly scheduled classes. Students will work under the personal supervision of an instructor.

**Geology (GEOL)**

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Office: NS-110G

**Associate in Arts Degrees -**

AA Degree requirements are listed in Section 6 (green pages).

• Geology

**PROGRAM OF STUDY****Geology**

Provides the student with sufficient background to begin upper division coursework and will prepare the student for entry-level jobs that require basic geologic knowledge. The student is advised to check with the school to which he/she may wish to transfer for additional courses which may be required.

**A.A. DEGREE MAJOR**

Program Requirements		Units
<b>Group One</b>		
GEOL 100	Basic Geology	3
GEOL 100L	Basic Geology Laboratory	1
GEOL 150	Dinosaurs and Earth History	3
GEOL 150L	Dinosaurs and Earth History Laboratory	1
GEOL 195	Regional Field Studies in Geology	2
<b>Group Two (Select at least two sets of courses listed below)</b>		
<b>Set 1</b>		
MATH 140 and	Calculus/Analytic Geometry, First Course	5
MATH 141	Calculus/Analytic Geometry, Second Course	4
<b>Set 2</b>		
PHYS 120 and	General Physics	8
PHYS 121		
or		
PHYS 230 and	Principles of Physics	10
PHYS 231		
<b>Set 3</b>		
CHEM 110	General Chemistry	3
CHEM 110L	General Chemistry Laboratory	2
CHEM 115	General Chemistry	3
CHEM 115L	General Chemistry Laboratory	2
<b>Group Three (Select at least 8 units)</b>		
Any other courses in Group Two not taken above		8-10
GEOL 110	General Geology: National Parks	3
GEOL/		
GEOL 125	California Geology and Geography	3
GEOL 195	Regional Field Studies in Geology	1, 2, 3
GEOL 197	Geology Topics	1, 2, 3
GEOL 295	Directed Study in Geology	1, 2, 3
ASTR 100	Principles of Astronomy	3
BIOL 100	General Biology	4
MATH 205	Calculus/Analytic Geometry, Third Course	4
MATH 206	Calculus/Differential Equations	4
OCN 100	Oceanography	3
OCN 100L	Oceanography Laboratory	1
PHYS 232	Principles of Physics	4
<b>TOTAL UNITS</b>		<b>35 - 38</b>