

Bachelor of Science in Geomatics

The Bachelor of Science (BS) in Geomatics prepares students for a career in surveying and mapping, Geographic Information Systems (GIS), remote sensing, and related professional fields. Geomatics integrates disciplines of land surveying and mapping, geodesy, hydrography, remote sensing, photogrammetry, LiDAR/point clouds, and GIS. The Geomatics program is the only program statewide to provide the level of education required by the State of Alaska in obtaining professional land surveyor licenses.

The Bachelor of Science in Geomatics is accredited by the Applied and Natural Sciences Accreditation Commission of ABET, <https://www.abet.org> (<https://www.abet.org>).

Licensure and/or Certification

Graduates of the BS in Geomatics gain four years of education credit toward obtaining a professional land surveyor license in Alaska.

This program is designed to meet the educational requirements for professional licensure or certification in the State of Alaska. However, the program might not meet the educational requirements for professional licensure or certification in other states. Please see UAA's Licensure and Certification website (<https://www.uaa.alaska.edu/academics/office-of-academic-affairs/licensure.cshml/>) for more information.

Admission Requirements

- Complete the Admission Requirements for Baccalaureate Degrees (<http://catalog.uaa.alaska.edu/academicpoliciesprocesses/admissions/undergraduate/>).

Special Considerations

- Students who intend to enroll in this degree of study are strongly encouraged to complete the following courses in high school with a C or better: Mathematics - Algebra and Trigonometry (2 semesters), Natural Science such as Chemistry, Physics, Biology, or Geology (1 year), English Composition - Skill level as demonstrated by ACT, SAT, or approved placement test to qualify for enrollment in WRTG A111. Insufficient preparation may increase the number of semesters required to complete the degree.
- A student who is unable to earn a minimum grade of C in a major requirement course during their initial enrollment may attempt to earn a satisfactory grade one additional time on a space-available basis. Failure to earn a minimum grade of C on the second attempt may result in removal from the geomatics program.

Graduation Requirements

- Complete the General University Requirements for Baccalaureate Degrees (<http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/>).

- Complete the General Education Requirements for Baccalaureate Degrees (<http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/gers/>).
 - The 3 credit Tier 1 Quantitative Skills GER will be met and exceeded by the following degree requirements: (MATH A151 & MATH A152) or MATH A155, MATH A251 or MATH A251F, and MATH A252 or MATH A252F.
 - The 7 credit Tier 2 Natural Science GER will be met and exceeded by the 11-12 credit Natural Sciences Elective degree requirement.
 - For 3 credits of Tier 2 Humanities GER, choose PHIL A305.
- Complete the following major requirements with a minimum grade of C:

Code	Title	Credits
Core Courses		
BA A241	Business Law I	3
BA A300	Organizational Theory and Behavior	3
ESM A450	Economic Analysis and Operations	3
GIS A101	Introduction to Geographic Information Systems	3
GIS A201	Intermediate Geographic Information Systems	3
GIS A351	Remote Sensing	3
GEO A460	Geomatics Capstone Project	3
MATH A151 & MATH A152 or MATH A155	College Algebra for Calculus and Trigonometry Precalculus	5-7
MATH A251 or MATH A251F	Calculus I F.A.T. Calculus I	4-6
MATH A252 or MATH A252F	Calculus II F.A.T. Calculus II	4-6
MATH A314	Linear Algebra	3
PHIL A305	Professional Ethics	3
STAT A253	Applied Statistics for the Sciences	4
Complete 11-12 credits from the following with at least one lab and 3 credits in PHYS		11-12
ASTR A103 & A103L	Solar System Astronomy and Solar System Astronomy Laboratory	
BIOL A102 & BIOL A103	Introductory Biology and Introductory Biology Laboratory	
BIOL A178 or GEOL A178	Introduction to Oceanography	
BIOL A179	Introduction to Oceanography Laboratory	
CHEM A105 & A105L	General Chemistry I and General Chemistry I Laboratory	

ENVI A211	Environmental Science: Systems and Processes	
GEOG A111	Discovering Alaska and Earth's Physical Geography: From Weather to Glaciers	
GEOL A111 & A111L	Planet Earth and Planet Earth Laboratory	
GEOL A115 & A115L	Dangerous Earth and Dangerous Earth Laboratory	
PHYS A123 & A123L	College Physics I and College Physics I Laboratory	
or PHYS A211 & A211L	General Physics I and General Physics I Laboratory	
PHYS A124 & A124L	College Physics II and College Physics II Laboratory	
or PHYS A212 & A212L	General Physics II and General Physics II Laboratory	
Choose one of the following concentration areas: surveying or geographic information systems (GIS).		42-44
Total		97-106

Surveying Concentration

Code	Title	Credits
GEO A146	Geomatics Computations	3
GEO A156 & A156L	Geospatial Measurement I and Geospatial Measurement I Laboratory	3
GEO A267	Boundary Law I	3
GEO A357	Photogrammetry	3
GEO A359	Geodesy and Map Projections	3
GEO A256 & A256L	Engineering Surveying and Engineering Surveying Laboratory	3
GEO A266 & A266L	Geospatial Measurement II and Geospatial Measurement II Laboratory	3
GEO A364	Spatial Data Adjustments	3
GEO A369	Cadastral Surveys	1
GEO A410	High-Density Surveying	3
GEO A420	Point Cloud Analysis	3
GEO A457	Boundary Law II	3
GEO A466 & A466L	Geopositioning and Geopositioning Laboratory	3
KIN A112	First Aid and CPR for Professionals	1
Complete 6 credits from the following:		6
CSCE A101	Introduction to Computer Science	
ES A106	Engineering Graphics	
GEO A433	Hydrographic Surveying	
GEO A490	Selected Advanced Topics in Geomatics	

GIS A301	Web GIS	
GIS A458	Spatial Data Management	
GIS A466	Spatial Analysis	
GIS A467	Image Analysis	
GIS A498	Individual Research ¹	
Total		44

Geographic Information Systems (GIS) Concentration

Code	Title	Credits
CSCE A101	Introduction to Computer Science	3
GIS A301	Web GIS	3
GIS A458	Spatial Data Management	3
GIS A466	Spatial Analysis	3
GIS A467	Image Analysis	3
Complete 12 credits from the following (at least 6 credits must be upper-division courses):		12
CSCE A490	Selected Topics in Computer Science and Computer Systems Engineering	
ES A106	Engineering Graphics	
GEO A146	Geomatics Computations	
GEO A156 & A156L	Geospatial Measurement I and Geospatial Measurement I Laboratory	
GEO A359	Geodesy and Map Projections	
GEO A490	Selected Advanced Topics in Geomatics	
GEOG A475	Geospatial and Cartographic Techniques for the Sciences	
GIS A498	Individual Research ¹	
Complete an additional 15 credits in CSCE, MATH (excluding MATH A420 and MATH A495A), STAT, GEOG, ECON, BA, or HS. Six of these credits must be upper-division courses.		15
Total		42

¹ A maximum of 6 credits of may be applied to degree requirements.

A minimum of 120 credits is required for the degree, of which 39 must be upper-division.

Honors in Geomatics

The Bachelor of Science in Geomatics recognizes distinguished achievement by conferring programmatic honors in geomatics. In order to receive honors in geomatics, a student must meet the following requirements:

- Complete all requirements for a BS in Geomatics;
- Meet the UAA requirements for Graduation with Honors (<http://catalog.uaa.alaska.edu/academicpoliciesprocesses/academicstandardsregulations/graduation/>);

- Have a minimum GPA of 3.50 in their courses required for the major;
- Document a minimum of eight weeks of work experience while a student at the University of Alaska Anchorage in geomatics or related position.

Program Student Learning Outcomes

Students graduating with a Bachelor of Science in Geomatics will be able to:

- Identify, formulate, and solve broadly-defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.
- Formulate or design a system, process, procedure or program to meet desired needs.
- Develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions
- Communicate effectively with a range of audiences
- Understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts
- Function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.
- Apply knowledge in all six areas of surveying and mapping:
 - Field surveying and methods;
 - Photogrammetric mapping, image interpretation and remote sensing;
 - Surveying calculation and data adjustment;
 - Geodetic coordinates and astronomy;
 - Cartographic representation, projections, and map production;
 - Computer-based multipurpose cadastre, geographic information systems.

Sample Plan

The academic plan below is one pathway through the degree/certificate. It includes all requirements, taking into account recommendations from program faculty. Each student’s plan may vary according to their initial course placement (<http://catalog.uaa.alaska.edu/academicpoliciesprocesses/academicstandardsregulations/courseplacement/>), intended course load, additional majors and/or minors, and their placement into required prerequisite courses. Any change in the plan below can have an unforeseen impact on the rest of the plan. **Therefore, it is very important to meet with your academic advisor to verify your personal academic plan.**

Please review the following terms, definitions, and resources associated with the sample academic plan below.

- Each course in the far left column links to a pop-up bubble with a course description, prerequisite requirements, and associations with university requirements. For example, if a course fulfills a general education requirement, you will see that in the pop-up bubble.
- **GER:** indicates a General Education Requirement (<http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/gers/>). GERs that also count toward

degree/certificate requirements appear as a specific course in the plan. For these courses, "GER" is not indicated explicitly in the table, but if you click on the course, you will see the course's GER status in the pop-up bubble.

- **Program Elective:** indicates a specific course selection determined by program faculty to fulfill a degree/certificate requirement. Students should seek assistance from their academic advisor.
- **Elective:** indicates an open selection of 100-400 level university courses to fulfill elective credits needed to meet the minimum total credits toward the degree/certificate.
- **Upper Division Program Elective:** indicates a specific 300-400 level course selection determined by the program faculty to fulfill a degree/certificate requirement. Students should seek assistance from their academic advisor.
- **Upper Division Elective:** indicates an open selection of 300-400 level courses to fulfill elective credits needed to meet the minimum total credits toward the degree/certificate. These courses must be upper division in order to meet General University Requirements for the particular degree/certificate type.

Sample Plan - GIS

First Year

Fall		Credits
CSCE A101	Introduction to Computer Science	3
GIS A101	Introduction to Geographic Information Systems	3
MATH A151	College Algebra for Calculus	4
WRTG A111	Writing Across Contexts	3
Credits		13

Spring

MATH A152	Trigonometry	3
GER Humanities ¹		3
GER Oral Communication Skills		3
GER Social Sciences ¹		3
GER Written Communication Skills (200-level)		3
Credits		15

Second Year

Fall

BA A241	Business Law I	3
MATH A251	Calculus I	4-6
	or F.A.T. Calculus I	
	MATH A251F	
STAT A253	Applied Statistics for the Sciences	4
GER Fine Arts		3
Program Elective ²		3
Credits		17-19

Spring

GIS A201	Intermediate Geographic Information Systems	3
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MATH A252	Calculus II	4-6
or	or F.A.T. Calculus II	
MATH A252F		
GER Social Sciences		3
Program Elective (w/ Lab) ²		4
Elective		3
Credits		17-19
Third Year		
Fall		
GIS A301	Web GIS	3
GIS A351	Remote Sensing	3
MATH A314	Linear Algebra	3
Program Elective (GIS Concentration)		3
Program Elective ²		3
Credits		15
Spring		
BA A300	Organizational Theory and Behavior	3
GIS A466	Spatial Analysis	3
PHIL A305	Professional Ethics	3
Program Elective (GIS Concentration)		3
Elective		3
Credits		15
Fourth Year		
Fall		
GIS A458	Spatial Data Management	3
GIS A467	Image Analysis	3
Program Elective		3
Upper Division Program Elective (GIS Concentration)		3
Elective		3
Credits		15
Spring		
ESM A450	Economic Analysis and Operations	3
GEO A460	Geomatics Capstone Project	3
Upper Division Program Elective (GIS Concentration)		3
Upper Division Elective		3
Upper Division Elective		3
Credits		15
Total Credits		122-126

¹ Choose a course that also fulfills the Alaska Native-Themed GER.

² Three Natural Science Program Electives must be a PHYS selection.

Sample Plan - Surveying

First Year

Fall		Credits
GEO A146	Geomatics Computations	3
GEO A156 & A156L	Geospatial Measurement I and Geospatial Measurement I Laboratory	3

MATH A151	College Algebra for Calculus	4
WRTG A111	Writing Across Contexts	3
Program Elective ¹		3
Credits		16

Spring

KIN A112	First Aid and CPR for Professionals	1
MATH A152	Trigonometry	3
GER Oral Communication Skills		3
GER Social Sciences ²		3
GER Written Communication Skills (200-level)		3
Program Elective ¹		3
Credits		16

Second Year

Fall

GEO A266 & A266L	Geospatial Measurement II and Geospatial Measurement II Laboratory	3
GIS A101	Introduction to Geographic Information Systems	3
MATH A251 or MATH A251F	Calculus I or F.A.T. Calculus I	4-6
STAT A253	Applied Statistics for the Sciences	4
GER Fine Arts ²		3
Credits		17-19

Spring

GEO A267	Boundary Law I	3
GIS A201	Intermediate Geographic Information Systems	3
MATH A252 or MATH A252F	Calculus II or F.A.T. Calculus II	4-6
GER Humanities ²		3
GER Social Sciences		3
Credits		16-18

Third Year

Fall

BA A241	Business Law I	3
GEO A256 & A256L	Engineering Surveying and Engineering Surveying Laboratory	3
GEO A359	Geodesy and Map Projections	3
GIS A351	Remote Sensing	3
MATH A314	Linear Algebra	3
Credits		15

Spring

BA A300	Organizational Theory and Behavior	3
GEO A357	Photogrammetry	3
GEO A364	Spatial Data Adjustments	3
GEO A369	Cadastral Surveys	1

PHIL A305	Professional Ethics	3
Program Elective (w/ Lab) ¹		4
Credits		17
Fourth Year		
Fall		
ESM A450	Economic Analysis and Operations	3
GEO A410	High-Density Surveying	3
GEO A466 & A466L	Geopositioning and Geopositioning Laboratory	3
Program Elective (Surveying Concentration)		3
Program Elective		3
Credits		15
Spring		
GEO A420	Point Cloud Analysis	3
GEO A457	Boundary Law II	3
GEO A460	Geomatics Capstone Project	3
Program Elective (Surveying Concentration)		3
Credits		12
Total Credits		124-128

¹ Three Natural Science Program Electives must be a PHYS selection.

² Choose a course that also fulfills the Alaska Native-Themed GER.