

GEOGRAPHIC INFORMATION SYSTEMS

TECHNICAL ONLINE OPTION

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Bismarck State College offers a program certificate, a certificate of completion, and an Associate in Applied Science degree in Geographic Information Systems (GIS). GIS is the only software program available that can capture and store geospatial data, which allows users to ask and answer complex questions about the world around us through complex geographic queries. GIScience is the multidisciplinary science behind the technology that incorporates cartography, geodesy, photogrammetry, remote sensing, GPS, and other geospatial sciences with the technology

We have not lived in a time when our world resources have been pushed to their limits due to explosive population growth more than the present. Business, industry, and government require a skilled and competent workforce to manage the challenges associated with a growing world population. The GIS curriculum at BSC addresses these critical workforce needs.

The Associate in Applied Science degree in Geographic Information Systems has been designed to provide a core set of skills and competencies along with a broad knowledge of the discipline. The certificate program emphasizes GIS applications and computer technology. The certificate of completion program offers proficiency in GIS as a supplement to another course of study.

Individuals who have earned a degree or certificate in GIS are in high demand. GIS proficiency is one of the top 10 skills employers look for in job applicants. Graduates with GIS skills are in demand to fill 75,000 jobs nationwide with the number of professionals using GIS growing 15 percent annually.

Career Possibilities: energy production/distribution, agriculture, science, transportation, engineering, wildlife/natural resources, law enforcement, emergency management, government, social services, archeology, planning, marketing, service and retail business.

GIS TECHNICIAN ASSOCIATE IN APPLIED SCIENCE DEGREE

FRESHMAN YEAR

FALL SEMESTER	CREDITS
College Composition (ENGL 110)	3
Intro. to Computers (CSCI 101).....	3
College Algebra (MATH 103)	4
Fundamentals of Geographic Information Systems (GIS 105).....	3
GIS in Science, Agriculture and Business (GIS 206)	3
Total credits.....	16

SPRING SEMESTER CREDITS

Intro. to Professional Writing (ENGL 125)	3
Microcomputer Database (CIS 104)	3
Physical Geography (GEOG 121)	3
Physical Geography Lab (GEOG 121L).....	1
Computer Aided Design I (CAD 211)	3
GIS Applications (GIS 107).....	3
Total credits.....	16

SOPHOMORE YEAR

FALL SEMESTER	CREDITS
Database Theory with SQL (CIS 204)	3
Advanced GIS Applications (GIS 201).....	3
GPS, Photogrammetry and Remote Sensing (GIS 215)	3
State and Local Government (POLS 116)	3
Elements of Economics (ECON 105)	3
Total credits.....	15

SPRING SEMESTER CREDITS

Elementary Statistics (MATH 210).....	3
Beginning Visual Basic (CSCI 122)	3
GIS Project Development and Management (GIS 225)	3
Cartographic Design and Analysis (GIS 235).....	3
Principles of Management (BADM 202).....	3
Total credits.....	15
Associate in Applied Science Degree total credits	62

GIS TECHNICIAN CERTIFICATE PROGRAM

FALL SEMESTER	CREDITS
Fundamentals of Geographic Information Systems (GIS 105).....	3
GIS Applications (GIS 107).....	3
Computer Aided Design I (CAD 211)	3
GIS in Science, Agriculture, and Business (GIS 206)	3
GPS, Photogrammetry and Remote Sensing (GIS 215)	3
Total credits.....	15

SPRING SEMESTER	CREDITS
Advanced GIS Applications (GIS 201).....	3
Cartographic Design and Analysis (GIS 235).....	3
GIS Project Development and Management (GIS 225)	3
State and Local Government (POLS 116)	3
Microcomputer Database (CIS 104)	3
Physical Geography (GEOG 121)	3
Physical Geography Lab (GEOG 121L).....	1
Total credits.....	19
Certificate total credits	34

GIS TECHNICIAN CERTIFICATE OF COMPLETION

FALL SEMESTER	CREDITS
Fundamentals of Geographic Information Systems (GIS 105).....	3
GIS Applications (GIS 107).....	3
Total credits.....	6

SPRING SEMESTER	CREDITS
Physical Geography (GEOG 121)	3
Physical Geography Lab (GEOG 121L).....	1
Advanced GIS Applications (GIS 201).....	3
Total credits.....	7
Certificate of Completion total credits	13

GEOGRAPHIC INFORMATION SYSTEMS (GIS)

GIS 105 Fundamentals of Geographic Information Systems F&S 3 credits
 The course provides an introduction to Geographic Information Systems, including how GIS is used for integrating and analyzing spatial data to visualize relationships, seek explanations, and develop solutions to problems. Emphasis is placed on the nature of geographic information, and the ways in which digital methods support geographic analysis. The course is divided between lecture and lab sessions. Introduction to Computers (CSCI 101) or a working knowledge of Microsoft Windows is required.

GIS 107 GIS Applications F&S 3 credits
 The course will provide hands-on opportunities to experience the hardware and software used in GIS. The course applies fundamental GIS concepts to creating, editing, and querying spatial data and spatial relationships. Students will manipulate data and make decisions from the presented information through various geoprocessing techniques. Prerequisite: GIS 105.

GIS 201 Advanced GIS Application F&S 3 credits
 An advanced hands-on application course designed to extend GIS knowledge and experience and to prepare students in becoming self-sufficient GIS technicians. The course follows a hands-on, problem-solving approach that integrates the interests and analytical needs of participating students. The course will be divided between lecture and lab sessions. Pre-requisites: GIS 105 and 107.

GIS 206 GIS in Science, Agriculture, and Business Fall 3 credits
 The course integrates the fields of business, agriculture, and science through GIS and Global Positioning Systems (GPS). The course will be divided between lecture, guest speakers who are experts in their fields, and lab sessions that apply fundamental concepts associated with how GIS can complement business, agricultural, and science applications.

GIS 215 GPS, Photogrammetry, and Remote Sensing Fall 3 credits
 The course integrates the disciplines of GPS, photogrammetry, and remote sensing. Hands-on opportunities to manipulate GPS, DOQs, DLGs, TIFFs and JPEG images to track environmental changes over time are presented through raster analysis. Students will work together to solve environmental problems through group projects. Electromagnetic radiation in relation to environmental remote sensing will also be covered.

GIS 225 GIS Project Development and Management Spring 3 credits
 GIS 225 focuses on developing GIS project skills. Students will gain experience in the definition, planning, execution, and completion of a geographic information systems project for one of several clients. Students will also exercise technical skills, develop the ability to work in a team environment, and develop negotiating and project management skills. Prerequisite: GIS 105.

GIS 235 Cartographic Design and Analysis**Spring****3 credits**

The course incorporates the historical foundations of cartographic design and analysis with the digital age (GIS). Topics covered include the rapid changes in cartographic design driven by industry, data classification, advanced map design, generalization, multivariate mapping, and advanced thematic cartography through hands-on applications and case studies. Prerequisite: GIS 105.

GIS 197-297 Cooperative Education / Internship**F&S SM****1-3 credits**

Repeatable up to 6 semester hours. Students get on-the-job experience under qualified supervision in GIS occupations. Work hours are arranged by the employer, advisor and student. Student progress is checked by oral and written reports by the employer. Student/advisor conferences are held to discuss progress and/or problems. All co-op experiences are graded on a satisfactory/unsatisfactory basis. Consent of department chairperson required.