

GEOGRAPHICAL INFORMATION SYSTEMS

This certificate focuses on the systematic study of map-making and the application of mathematical, computer, and other techniques to the analysis of large amounts of geographic data and the science of mapping geographic information. Includes instruction in cartographic theory and map projections, computer-assisted cartography, geographic information systems, map design and layout, photogrammetry, air photointerpretation, remote sensing, spatial analysis, geodesy, cartographic editing, and applications to specific industrial, commercial, research, and governmental mapping problems.

Examples: Geographical Information Systems (GIS), Spatial Analysis,

Graduation Requirements

The certificates require a cumulative GPA of 2.0 or higher. A minimum of 6 credits earned toward the certificate must be completed at SENMC.

- Geographical Information Systems - Certificate of Completion (<https://senmc-public.courseleaf.com/academic-programs/associate-degree-certificate-programs/geographical-information-systems/geographical-information-systems-cc/>)

DRFT 100 Introduction to Architecture, Engineering, & Construction 3 Credits (3)

Introduction to and exploration of careers in the fields of architecture, engineering, and construction. Specific fields to include: architecture, civil engineering, mechanical engineering, structural engineering, engineering technology, residential construction, commercial construction, geographical information systems (GIS), surveying, sustainable design, and green building.

Crosslist: ARCH 1310

View Course Outcomes

DRFT 101 Introduction to Drafting and Design Technologies 1 Credit (1)

Professional and student organizations associated with the Drafting and Design Technologies program, degree requirements, employment skills and work habits, and university and college policies and procedures will be explored. Students will be introduced to the current learning management system and career-readiness certification.

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DRFT 105 Technical Drawing for Industry 3 Credits (3)

Technical sketching, basic CAD, and interpretation of drawings with visualization, speed and accuracy highly emphasized. Areas of focus include various trades such as machine parts, welding, heating and cooling, and general building sketches/plan interpretation. (2+2P)

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DRFT 108 Drafting Concepts/Descriptive Geometry 2 Credits (2)

Basic manual drafting skills, sketching, terminology and visualization. Graphical solutions utilizing applied concepts of space, planar, linear and point analyses. Metric and S.I. units introduced. (1+2P)

View Course Outcomes

DRFT 109 Computer Drafting Fundamentals 3 Credits (3)

Introduction to principles and fundamentals of drafting using both manual drawing techniques and computer-aided drafting (CAD) applications. (2+2P)

Repeatable: up to 3 credits

Crosslist: E T 109 and C E 109

View Course Outcomes

DRFT 112 Drafting Concepts/Computer Drafting Fundamentals I 4 Credits (4)

Basic drafting skills, terminology, and visualization. Introduction to principles and fundamentals of computer-aided drafting. Prerequisites: OECS 207, OECS 125. (2+4P)

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DRFT 113 Drafting Concepts/Computer Drafting Fundamentals II 4 Credits (4)

Drafting for mechanical/industrial applications; machine part detailing, assemblies in orthographic, isometric, auxiliary, oblique, and sectional views. Two-dimensional AutoCAD with introduction to 3-D AutoCAD. (2+4P)

Prerequisite(s): DRFT 112

Learning Outcomes

1. Create and draw a logo and title block
2. Design living spaces
3. Design and draw a workable floor plan, fully dimensioned with schedules
4. Locate and draw the floor plan on a site plan
5. Draw interior and exterior elevations
6. Draw sections and details
7. Save and plot

View Course Outcomes

DRFT 114 Introduction to Solid Modeling 3 Credits (3)

2D mechanical drafting and 3D mechanical solid modeling utilizing the latest version of AutoCAD software. Industry dimensioning and annotation standards will be emphasized. 2D multi-view working drawings, 3D solid models, and basic 3D model assemblies will be introduced.

Prerequisite(s): DRFT 109 (2+2P)

Learning Outcomes

1. Upon successful completion of this course, the student will have an understanding of and the ability to use CAD techniques.

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DRFT 115 General Construction Safety 3 Credits (3)

Overview of general construction safety related to building, highway and road construction, and surveying field work for entry-level individuals. Students will also have the opportunity to earn a 10-hour construction industry OSHA card.

Repeatable: up to 3 credits

View Course Outcomes

DRFT 124 Introduction to Geometric Dimensioning and Tolerancing 3 Credits (3)

Introduction to geometric dimensioning and tolerancing (GD&T) for the mechanical CAD drafting, solid modeling, mechanical engineering technology, mechanical engineering, and manufacturing industries. Related industry standard finishes and fasteners will also be introduced and explored. (2+2P)

Prerequisite(s)/Corequisite(s): DRFT 114

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DRFT 130 General Building Codes 3 Credits (3)

Interpretation of the Building Code, local zoning codes, A.D.A. Standards and the Model Energy Code to study construction and design requirements and perform basic plan checking. (2+2P)

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DRFT 135 Electronics Drafting I 3 Credits (3)

Drafting as it relates to device symbols; wiring, cabling, harness diagrams and assembly drawings; integrated circuits and printed circuit boards; schematic, flow and logic diagrams; industrial controls and electric power fields. Drawings produced using various CAD software packages. Prerequisites: DRFT 108 and DRFT 109. (2+2P)

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DRFT 143 Civil Drafting Fundamentals 3 Credits (3)

Introduction to drafting in the field of Civil Engineering. Drawings, projects, and terminologies related to topographic, contour drawings, plan and profiles, and street/highway layout. (2+2P)

Prerequisite(s): DRFT 109

Crosslist: E T 143

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DRFT 151 Construction Principles and Print Reading 3 Credits (3)

Introduction to construction materials, methods, and basic cost estimating and print reading applicable in today's residential, commercial, and public works industry. Instruction by print reading and interpretation, field trips, and actual job-site visits and progress evaluation. (2+2P)

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DRFT 153 Survey Drafting Applications 3 Credits (3)

Introduction to drafting in the field of survey engineering. Drawings, projects and terminologies related to Point Data, topography, land/boundary surveys, legal descriptions and plat surveys. Using the current Autodesk software. (2+2P)

Prerequisite(s): DRFT 109

Crosslist: SUR 143

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DRFT 160 Construction Take-Offs and Estimating 3 Credits (3)

Computing and compiling materials and labor estimates from working drawings using various techniques common in general building construction and in accordance with standard specifications and estimating formats. Use of spreadsheets and estimating software introduced. (2+2P)

Prerequisite(s): DRFT 151

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DRFT 163 Civil Infrastructure Detailing 3 Credits (3)

Infrastructure detailing related to civil engineering projects including: ponding, roadway, sewer, and storm-water structures; concrete foundations; and related utility details. (2+2P)

Prerequisite(s): DRFT 109

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DRFT 164 Intermediate Mechanical Drafting/Solid Modeling 3 Credits (3)

Intermediate 3D mechanical parametric solid modeling and assembly creation utilizing the latest version of Autodesk Inventor software. The creation of 2D working drawings from 3D solid models will be emphasized. Geometric Dimensioning and Tolerancing (GD&T), basic material properties, and industry standard fastening and manufacturing methods will be introduced. (2+2P)

Prerequisite(s)/Corequisite(s): DRFT 114

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DRFT 165 Introduction to Building Information Modeling 3 Credits (3)

Introduction to Building Information Modeling (BIM) in the development of virtual 3D building models, construction documents, renderings and basic animations related to architectural, structural, and mechanical/electrical/plumbing building components. Utilizes the latest BIM technologies in the integration one, parametric BIM. (2+2P)

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DRFT 180 Residential Drafting 3 Credits (3)

Basic residential drafting including, floor plans, foundation plans, sections, roof plans, exterior and interior elevations, and site plans. Applicable residential building and zoning codes, construction methods and materials, adaptable residential design, and drawing and sheet layout for architectural drafting will be introduced. (2+2P)

Prerequisite(s): DRFT 109

Learning Outcomes

1. Create and draw a logo and title block
2. Design living spaces
3. Design and draw a workable floor plan, fully dimensioned with schedules
4. Locate and draw the floor plan on a site plan
5. Draw interior and exterior elevations
6. Draw sections and details
7. Save and plot

[View Course Outcomes](#)

DRFT 181 Commercial Drafting 3 Credits (3)

Drafting principles, plan coordination, and code analysis applicable in the development of working drawings for commercial, public, and industrial building projects. Students will utilize National Cad Standards, ADA Standards, and will be introduced to modern office practice. (2+2P)

Prerequisite(s): DRFT 109

Repeatable: up to 3 credits

Learning Outcomes

1. Upon successful completion of this course, the student will understand and the ability to use CAD techniques in construction.

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DRFT 190 Finding and Maintaining Employment 2 Credits (2)

Techniques in self-evaluations, resume writing, application completion, job interviewing, and job retention. Exposure to work ethics, employee attitudes, and employer expectations.

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DRFT 204 Geographic Information Systems Technology 3 Credits (3)

The use of digital information for which various digitized data creation methods are captured. Users will capture, store, analyze and manage spatially referenced data in a modeled mapping procedure. (2+2P)

Repeatable: up to 3 credits

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DRFT 214 Advanced Solid Modeling 3 Credits (3)

Advanced 3D mechanical parametric solid modeling and assembly creation utilizing the latest version of Solidworks software. The creation of 2D working drawings from 3D solid models and the creation of 3D models for machining/manufacturing will be emphasized. Geometric Dimensioning and Tolerancing (GD&T), material properties, and industry standard fastening and manufacturing methods will be further explored. (2+2P)

Prerequisite(s)/Corequisite(s): DRFT 114

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DRFT 222 Introduction to Geomatics 3 Credits (3)

Theory and practice of geomatics as applied to plane surveying in the areas of linear measurements, angle measurements, area determination, differential and trigonometric leveling, and topographic mapping. (2+3P)

Prerequisite(s): MATH 1250G or MATH 1430G

Crosslist: SUR 222

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DRFT 230 Building Systems Drafting 3 Credits (3)

Development of working drawings for electrical, plumbing, and HVAC systems, for residential and commercial building through the applications of both 2D Drafting and 3D Building Information Modeling (BIM) techniques. Basics of project setup, National CAD Standards, ADA Standards, modern office practice, code analysis, as well as Sustainability and LEED for new construction. (2+2P)

Prerequisite(s): DRFT 180 or DRFT 181

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DRFT 240 Structural Systems Drafting 3 Credits (3)

Study of foundations, wall systems, floor systems and roof systems in residential, commercial and industrial design/construction. Produce structural drawings including foundation plans, wall and building sections, floor and roof framing plans, shop drawings and details; schedules, materials lists and specifications. Use of various software. (2+2P)

Prerequisite(s)/Corequisite(s): DRFT 180 or DRFT 181

Repeatable: up to 3 credits

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DRFT 242 Roadway Development Drafting 3 Credits (3)

Advanced civil/survey technology and drafting related to roadway development. Emphasis is on relevant terminology, codes/standards, and the production of complex working drawings such as topographical/grading, drainage, master utilities, roadway P P/details/etc., according to agency standards. (2+2P)

Prerequisite(s): DRFT 143

Repeatable: up to 3 credits

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DRFT 243 Land Development Drafting 3 Credits (3)

Advanced civil/survey technology and drafting related to land development. Emphasis is on relevant terminology codes/standards, and the production of complex working drawings such as subdivision plats, local utility and drainage plans, construction details roadway P P, etc., according to local development/agency standards. (2+2P)

Prerequisite(s): DRFT 143 and DRFT 153

View Course Outcomes

DRFT 250 Principles of Detailing and Design 3 Credits (3)

Advanced practice in construction documentation in the development and coordination of working drawings & specifications. In particular, will utilize Architectural Graphic Standards, National CAD Standards, and ADA standards to develop detail drawings related to Architectural, Civil, Structural and Building Mechanical systems. Will also be introduced to basic principles, factors, and process of building design such as space planning, site analysis, and basic architectural programming. (2+2P)

Prerequisite(s)/Corequisite(s): DRFT 180 or DRFT 181

Repeatable: up to 3 credits

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DRFT 254 Spatial Data Processing 3 Credits (3)

Utilizes the tools and technologies of GIS, processing volumes of geodata identifying a numerical, coded or listed map. Involves the analysis of spatial data from various diverse applications and place in a descriptive mapping process. (2+2P)

Prerequisite(s): DRFT 204

Repeatable: up to 3 credits

View Course Outcomes

DRFT 255 Independent Study 1-3 Credits

Instructor-approved projects in drafting or related topics specific to the student's individual areas of interest and relevant to the drafting and graphics technology curriculum. Consent of instructor required.

Repeatable: for a maximum of 6 credits

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DRFT 258 Introduction to Infracworks 3 Credits (3)

Introduction to the utilization of Infracworks software for the conceptualization, optimization, and visualization of infrastructure projects in the context of the built and natural environment. (2+2P)

Prerequisite(s): DRFT 143

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DRFT 265 Advanced Building Information Modeling Applications 3 Credits (3)

Advanced applications of Building Information Modeling (BIM) including the creation of, and practice in collaborative work sets, data and design analyses, energy modeling and analysis, preliminary LEED analysis, construction take-offs & estimation, and construction animation, through use of various BIM and related software. (2+2P)

Prerequisite(s): DRFT 165

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DRFT 274 GIS Theory and Analysis 3 Credits (3)

Analyzes the hypothesis in which location and spatial data sufficiently quantities the appropriate statistical methodology. (2+2P)

Prerequisite(s): DRFT 254

Repeatable: up to 3 credits

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DRFT 276 Computer Rendering and Animation I 3 Credits (3)

Introduction to technical applications of computer generated renderings and animations for the architecture and engineering fields. 3D models, photo-realistic renderings, and basic animation movie files will be produced utilizing industry standard modeling and animation software. (2+2P)

View Course Outcomes

DRFT 288 Portfolio Development 3 Credits (3)

Production of a portfolio consisting of previously produced student work related to the student's individualized degree option. Process shall include the compilation and organization of working and presentation drawings, construction documents, BIM Models, and renderings/animations. Students will learn the basics of design layout and online portfolio documentation. Job search and resume preparation activities will also be required. Production of new material and content may also be required. This course is designed as a last semester course in the Drafting & Design curricula. (2+2P)

Repeatable: up to 3 credits

[View Course Outcomes](#)

DRFT 290 Special Topics 4 Credits (4)

Topics subtitled in the Schedule of Classes.

Repeatable: for a maximum of 12 credits

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DRFT 291 Cooperative Experience 6 Credits (6)

Supervised cooperative work program. Student is employed in an approved occupation and supervised and rated by the employer and instructor. Student meets with advisor weekly. Graded S/U.

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DRFT 295 Professional Development and Leadership DAGA 1 Credit (1)

Students gain experience in leadership, team building, performing community service, and membership and/or leadership in a student organization.

Repeatable: up to 6 credits

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GEOG 1110G Physical Geography 4 Credits (4)

This course introduces the physical elements of world geography through the study of climate and weather, vegetation, soils, plate tectonics, and the various types of landforms as well as the environmental cycles and the distributions of these components and their significance to humans. (3+3P)

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GEOG 1120G World Regional Geography 3 Credits (3)

Overview of the physical geography, natural resources, cultural landscapes, and current problems of the world's major regions. Students will also examine current events at a variety of geographic scales.

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GEOG 1130G Human Geography 3 Credits (3)

This course serves as an introduction to the study of human geography. Human geography examines the dynamic and often complex relationships that exist between people as members of particular cultural groups and the geographical spaces and places in which they exist over time and in the world today.

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GEOG 2130 Map Use and Analysis 3 Credits (3)

Exploration of the cartographic medium. Development of critical map analysis and interpretation skills, and map literacy. Comprised of traditional lecture, labs, and map use projects. (2+3P)

Learning Outcomes

1. Accurately measure bearings and distances on maps.
2. Read and interpret terrain and landform representation.
3. Utilize a magnetic compass for basic land navigation and basic map making.
4. Utilize a GPS instrument for basic land navigation.
5. Recognize and describe basic physical and cultural spatial patterns portrayed on maps.
6. Analyze and interpret the significance of spatial patterns portrayed on maps.
7. Perform elementary spatial statistical analysis on geographic data.
8. Appreciate and utilize the significance of place names and cultural patterns.
9. Critically examine maps for evidence of information misuse or propagandist motives. 1
10. Recognize and utilize appropriate map categories, symbols, projections, and coordinate systems to effectively and accurately portray, read, analyze, and interpret geographic data.

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GEOG 2996 Topics in Geography 1-3 Credits

Specific subjects to be announced in the Schedule of Classes.

Repeatable: for a maximum of 12 credits.

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