SCHOOL OF ENVIRONMENT, SOCIETY & SUSTAINABILITY

REQUIREMENTS FOR THE MASTER'S OF SCIENCE IN GIS (PROFESSIONAL) DEGREE

All Masters of Science in Geographic Information Science (MSGIS) students are expected to have acceptable courses or proficiencies in subject matter presented in GEOG 1180 (Introduction to Geo-Programming), GEOG 3020 (Geographical Analysis) or an upper division basic statistics course, GEOG 3100 (Introduction to GIS and Cartography), and GEOG 4140 Advanced Methods in GIS. Courses or proficiencies used to fulfill these requirements do not count toward graduate credit and should originally be fulfilled as a part of the undergraduate program.

A MSGIS Degree will require a minimum of **31** credit hours of courses, including six required core courses (20 credit hours) and four elective courses (12 credit hours), plus a final oral exam taken at the completion of the last semester of study. A grade point average of 3.0 or higher in course work is required. No graded work below a "B-" is acceptable toward the degree.

Students may not register for Individual Projects, Directed Readings, Research Practicum, Thesis Research, Technical Report Research, Internships, Faculty Consultation, or similar courses to fulfill degree requirements. MSGIS students are required to complete 24 credit hours in residency in the School of Environment, Society & Sustainability at the University of Utah. All students must be registered for at least one course per Fall/Spring semester. The program usually requires approximately two years of full time study, however all work must be completed within four consecutive calendar years. For further degree requirement details and information, you must refer to the MSGIS Graduate Student Handbook
https://ess.utah.edu/_resources/documents/msgis-handbook.pdf

All MSGIS students are required to assemble a portfolio as courses are completed which includes examples of work demonstrating mastery of the selected skills. Students will present this portfolio project and answer questions from the Supervisory Committee during the final oral exam at the end of the program.

PROGRAM OF STUDY CHECKLIST

COURSE NUMBER/TITLE	Credit Hrs.	Sem/Yr Taken	Grade
GEOG 6000 – Advanced Geographical Data Analysis *(Fall)*	4		
GEOG 6150 – Geospatial Big Data *(Fall)*	4		
GEOG 6160 – Spatial Modeling and Geocomputation *(Spring)*	4		
GEOG 6161 – Capstone in GIS *(Spring of last year)*	3		
GEOG 6165 – Data Visualization	3		
GEOG 6680 – Introduction to R *(Summer)*	2		
TOTAL	**20**		
ELECTIVE COURSES (min. 12 credit hrs.)			
1.	3		
2.	3		
3.	3		
4.	3		
TOTAL	**12**		
Final project and oral defense date:			

***** Elective courses are selected by the student with the assistance of the student's Supervisory Committee/Faculty Advisor.

(over)

MSGIS Elective Coursework

A total of 12 credit hours of elective coursework are required to graduate. Program requirements may change depending on available course offerings.

COURSE NUMBER/TITLE	Credit Hrs.
GEOG 5170 – Geospatial Field Methods	3
GEOG 6110 – Environmental Analysis Through Remote Sensing	3
GEOG 6130 – Advanced Active Remote Sensing	3
GEOG 5210 – Global Climate Change	3
GEOG 5340 – Geography of Disasters & Emergency Management	3

Table 1. MSGIS Skills List.

Skill	Description
GIS Analysis	Perform core vector and raster GIS analyses including overlay, interpolation, map algebra, terrain modeling, network analysis, and multi-criteria analysis.
Spatial Data and Algorithms	Understand methods for acquiring, evaluating, creating, manipulating, editing, and converting data and metadata in preparation for spatial analysis. Be familiar with how operations are carried out and when they are applicable.
GIS Workflow	Understand the importance of workflow in GIS and how to develop a workflow to perform GIS operations and spatial analysis.
Model Building	Be able to interpret existing geoprocessing models, create new models, add tools and data to a model, and string tools together to form an analysis workflow. Be able to choose appropriate models for modeling static and dynamic geographic processes. Be able to document a model so that others can understand its purpose and how it works.
Cartography and Graphic Design	Be able to design maps for different purposes, mediums, and audiences, and demonstrate cartographic design principles including color and symbology theory.
Spatial Analysis	Design, implement, and report on the analysis of spatial data. Describe and test hypotheses regarding distributions of spatial datasets.
Data Models and Structures	Be able to explore the data models within a database, and understand its structure.
Database Design	Given specific requirements for data, be able to design appropriate data models. Be familiar with database design tools.
Structured Query Language (SQL)	Be familiar with SQL and be able to write queries involving spatial objects and relationships.
Project Design	Be familiar with how to develop a project plan, which includes defining and confirming the project goals and objectives, identifying tasks and how goals will be achieved, quantifying the necessary resources (e.g. staff, software, and hardware), preparing reports, and determining budgets and timelines for completion.
Communication Skills	Be able to effectively communicate technical aspects of your work to both technical and layperson audiences.
Basic Programming or Scripting	Be familiar with a programming or scripting language, and be able to build workflows or custom solutions for solving spatial analysis problems.

Portions of this skills list were adapted from “The essential skills to succeed in a GIS career” by Michalis Avraam, http://michalisavraam.org/2009/11/the-essential-skills-to-succeed-in-a-gis-career/