

M.A. in GEOGRAPHY without option (General Geography)
M.S. in GEOGRAPHY without option (General Geography)
M.S. in GEOGRAPHY with option in CARTOGRAPHY AND GIS
M.S. in GEOGRAPHY with option in COMMUNITY AND ENVIRONMENTAL PLANNING

OVERVIEW

The Department of Geography offers graduate study leading to the M.A. or M.S. degree. Students in General Geography may elect to pursue either degree (i.e., M.A. or M.S.). Students in either the Cartography & GIS Option (CGIS) or the Community and Environmental Planning Option (CEP) must complete the requirements of those options under the M.S. degree.

Degree Options and Tracks

For the **M.A or M.S. without option**, students are required to

- Successfully complete and defend a thesis or one or more papers of publishable quality before an examining committee.

The paper or papers of publishable quality must be intended for publication in a peer-reviewed journal.

Students pursuing the **M.S. CGIS or CEP Options** may choose either:

- a thesis track
- a professional paper track
- a non-thesis track.

The difference between a thesis and a professional paper is that while the thesis is directed toward advances in the discipline, the professional paper may be directed toward advances in the profession. Both the thesis and the professional paper must be completed and successfully defended before an examining committee.

The non-thesis track requires **additional course work**, the successful completion of a **comprehensive written examination**, and the **successful defense of a significant professional work** (report, portfolio, etc.) before an examining committee.

Degree Credit Minimum

A minimum of

- 30 credits plus a thesis (typically 3-6 cr.) are required for the M.A. or M.S. degree in General Geography.
- 34 credit hours are required for the CGIS Option with thesis or professional paper track.
- 33 to 34 credit hours are required for the CEP Option with the thesis or professional paper track.
- 39 credit hours are required for the M.S. CEP Option non-thesis track.
- 40 credit hours are required for the M.S. CGIS Option non-thesis track.

See specific requirements for the *options* for additional information on the thesis, professional paper, and professional degree tracks.

Background Credits (do not count toward the degree)

All students entering the M.S. program are expected to have a background in symbolic systems/quantitative methods and cartography.

Students in the M.A. or M.S. General Geography Options are expected to have appropriate background in the relevant areas of systematic geography.

Students in the CGIS Option are expected to have an understanding of computer methods.

- **Symbolic Systems**
 - **Quantitative** – All M.S. students, and those M.A. students engaging in quantitative methods in their research must complete the following Symbolic Systems/Quantitative Methods (3 credits) requirement: STAT 451 (MATH 444) or STAT 452 (MATH 445) or equivalent or a more advanced quantitative or statistics methods course (GPHY 482 {GEOG 484}, M 541 {MATH 541}, M 543 {MATH 543}, M 547 {MATH 547}, PSYX 520 {PSYCH 520}, PSYX 521 {PSYCH 521}, PSYX 522 {PSYCH 522}, SOCI 563 {SOC 563}, etc.)
 - **Language** – Those M.A. students engaging in regional studies and/or international research must complete up to the first semester of the second year of an appropriate foreign language.
- **Cartography** – All M.A. and M.S. students must have completed the equivalent of GPHY 381 (GEOG 387) - Principles of Digital Cartography and GPHY 382 (GEOG 389) the co-requisite 1-credit lab (4 credits total).
- **Systematic Geography** – All M.A. and M.S. without option: Systematic Geography (3-9 credits): In consultation with the advisor students select from upper-division courses in Regional Geography, Geography and Society, Physical Geography, or Human-Environment Interaction.
- **Computer Methods** – All M.S. students in CGIS must, in consultation with their advisor, select 3 credits from CS 207, CS 365, CS 435, or another appropriate course.
- **Planning Background** – All M.S. CEP students must have completed previous coursework in urban-rural studies, and/or physical geography. In consultation with their advisor, prior coursework will be reviewed for proficiency in the areas of urban and rural studies, and/or physical geography. Students showing deficiencies in any of these areas will be required to complete requisite coursework in addition to the graduate degree requirements.

Table 1. Geography M.A. and M.S. Background Req's (credits do not count toward degree)

	M.A. General Geography	M.S. General Geography	M.S. CGIS	M.S. CEP
Quantitative	3*	3	3	3
Foreign Language	3*			
Cartography	4	4	4	4
Systematic Geog.	3-9	3-9		
Computer Methods			3	
Urban/Rural &/or Physical Geog.				3-9
Total	10-16	10-16	10	10-16

***M.A. General Geography students must meet a symbolic systems requirement with either a quantitative course or the three semesters or the equivalent of a foreign language.**

Courses taken previously: The same courses taken previously or similar courses taken elsewhere will be evaluated by the advisor in order to determine whether or not they satisfy any of the requirements. Criteria for such evaluations include the course content, the date that the course was taken, and the grade received. Gphy 381/382 (Geog 387/389), Principles of Digital Cartography, is primarily concerned with the discipline of cartography. Previous GIS training will not be considered in substitution for this course.

Graduate School Requirements:

Of the minimum number of credits required, at least 20 semester credits (including those earned for the thesis or professional paper, will be in your major discipline, and at least 50% must be at the 500 or 600 level. Students must be continuously registered for a minimum of 3 credits per semester, including the final term during which they complete all degree requirements. Please see Graduate School Policies on *Credit Requirements* and *Continuous Registration*.

M.A. in GEOGRAPHY without option (General Geography)

Tracks: Students choosing to pursue a M.A. in Geography without option must complete and successfully defend a thesis (3-6 credits that do not count toward 30 credit minimum).

Required Core Courses (minimum 14 credits)

- Gphy 500-R2 Geography Graduate Colloquium (all students must register for colloquium each fall they are still in residence).
- Gphy 504-1 Introduction to Geographical Research
- Gphy 505-2 Research Design
- Gphy 520-3 Seminar in Geographical Thought

Methods-3 A methods/techniques course based on the student’s research interests, such as field methods (i.e., GPHY 385), quantitative methods (i.e., STAT 451 {MATH 444} or STAT 452 {MATH 445}, GPHY 482 {GEOG 484}, or SOCI 563 {SOC 563}), qualitative methods (i.e. SOCI 561 {SOC 561}, EVST 555, etc.), historical methods, survey methods (i.e. ECNS 486), GIS courses in Geography, advanced computer methods, etc.

The intent of the methods requirement is to provide students with a solid background in methodologies used for M.A. thesis research.

Seminar One seminar in Geography or closely allied field (minimum of 3 credits), in addition to Geog 520, is required of all M.A. General students – the seminar content should be relevant to the student’s research interests.

Table 2. Core Geography Courses for M.A. without option

Track/ Course	Gphy 500(2)	Gphy 504(1)	Gphy 505(2)	Gphy 520(3)	Methods(3+)	Add'l Seminar
Thesis	X	X	X	X	X	X

Electives (minimum 16 credits)

In consultation with the advisor, students in the Geography M.A. without option should select upper-division or graduate-level courses from the following:

Regional Geography Courses

Geographic Methods Courses

Systematic Geography Courses from the fields of
 Geography and Society
 Physical Geography
 Human-Environment Interaction

Other Courses from Allied Disciplines

M.S. in GEOGRAPHY without option (General Geography)

Tracks: Students choosing to pursue a M.S. in Geography without option must complete and successfully defend a thesis (3-6 credits that do not count toward 30 credit minimum).

Required Core Courses (14 credits)

- Gphy 500-R2 Geography Graduate Colloquium (all students must register for colloquium each fall they are still in residence).
- Gphy 504-1 Introduction to Geographical Research
- Gphy 505-2 Research Design
- Gphy 520-3 Seminar in Geographical Thought

Methods-3 A methods/techniques course based on the student’s research interests, such as field methods (i.e., GPHY 385), quantitative methods (i.e., STAT 451 {MATH 444} or STAT 452 {MATH 445}, GPHY 482 {GEOG 484}, or SOCI 563 {SOC 563}), GIS courses in Geography, advanced computer methods, etc.

The intent of the methods requirement is to provide students with a solid background in methodologies used for M.S. thesis research.

Seminar One seminar in Geography or closely allied field (minimum of 3 credits), in addition to Geog 520, is required of all M.S. General students – the seminar content should be relevant to the student’s research interests.

Table 3. Core Geography Courses for M.A. without option

Track/ Course	Gphy 500(2)	Gphy 504(1)	Gphy 505(2)	Gphy 520(3)	Methods(3+)	Add'l Seminar
Thesis	X	X	X	X	X	X

Electives (minimum 16 credits)

In consultation with the advisor, students in the Geography M.S. without option should select upper-division or graduate-level courses from the following:

Regional Geography Courses

Geographic Methods Courses

Systematic Geography Courses from the fields of
 Geography and Society
 Physical Geography
 Human-Environment Interaction

Other Courses from Allied Disciplines

M.S. in GEOGRAPHY with option in CARTOGRAPHY & GIS

Tracks: Those students choosing to pursue the option in CGIS may choose a thesis, professional paper, or non-thesis degree track (thesis and prof. paper tracks must include 3-6 credits of thesis hours that do not count toward 34 credit minimum - please see above OVERVIEW).

Required Core Courses (5-11 credits, depending on Track)

Those students selecting the thesis and professional paper tracks are required to complete the Geography core courses: Gphy 500-R2, Gphy 504 and Gphy 505, Gphy 520, plus a methods course. Those students selecting the non-thesis track are only required to complete Gphy 500-R2, and Gphy 520. Note: all students must register for colloquium each fall they are still in residence.

The methods course is based on the student’s research and/or professional interests, such as quantitative methods (i.e., STAT 451 {MATH 444} or STAT 452 {MATH 445}, GPHY 482 {GEOG 484}, or SOCI 563 {SOC 563}), qualitative methods (i.e. SOCI 561 {SOC 561}, EVST 555, etc.), historical methods, survey methods (i.e. ECNS 486), GIS courses in Geography, advanced computer methods, etc. The intent of the methods requirement is to provide students with a background in methodologies used for research and professional practice. Courses required for the option may not be used to meet this methods requirement. Electives, however, may be used.

Table 4. Core Geography Courses for M.S. with option in CGIS (5-11 credits depending on Track)

Track/Course	Gphy 500(2)	Gphy 504(1)	Gphy 505(2)	Gphy 520(3)	Methods(3+)
Thesis	X	X	X	X	X
Prof. Paper	X	X	X	X	X
Non Thesis	X			X	

Required Courses in the Cartography/GIS Option (23 credits)

- Gphy 486-3 Transport, Planning, and GIS (Geog 483-3)
- Gphy 489-1 Laboratory (with Gphy 486)
- Gphy 487-3 Remote Sensing and Raster GIS (Geog 487-3)
- Gphy 489-1 Laboratory (with Gphy 487)
- Gphy 488-3 Thematic Cartography and GIS (Geog 488-3)
- Gphy 489-1 Laboratory (with Gphy 488)
- Gphy 580-3 Seminar in GIS and Cartography (Geog 580-3)
- Gphy 587-3 Digital Image Analysis and Modeling (Geog 587-3)
- Gphy 589-1 Laboratory (with Gphy 587)
- Gphy 588-3 Vector GIS (Geog 588-3)
- Gphy 589-1 Laboratory (with Gphy 588)

Electives

- Gphy 467-3 Planning Decision Support Systems (Geog 467-3)
- Gphy 468-3 Community and Regional Analysis (Geog 468-3)
- Gphy 469-1 Laboratory (with Gphy 468)
- Gphy 482-3 Spatial Analysis and GIS (Geog 484-3)
- Gphy 485-3 Internet GIS (Geog 485-3)
- Gphy 489-1 Laboratory (with Gphy 485)
- Gphy 495-3 Digital Mapping & Design
- Gphy 598-3 Internship (Geog 598-3)
- For 551-4 Digital Image Processing

Other electives may be chosen in consultation with the advisor.

Courses taken previously and course substitutions: please see above OVERVIEW for courses previously taken. In general, professional training courses such as those offered by software companies may not be used to substitute for course requirements. Since GIS is so dependent on advances in technology, courses taken more than three years prior to beginning the program cannot generally be used to substitute for requirements (consult with advisor).

M.S. in GEOGRAPHY with option in COMMUNITY AND ENVIRONMENTAL PLANNING

Tracks: Those students choosing to pursue the option in CEP may choose a thesis, professional paper, or non-thesis degree track (thesis and prof. paper tracks must include 3-6 credits of thesis hours that do not count toward 33 credit minimum - please see above OVERVIEW).

Required Core Courses (5-11 credits, depending on option)

Those students selecting the thesis and professional paper tracks are required to complete the Geography core courses: Gphy 500-R2, Gphy 504 and Gphy 505, Gphy 520, plus a methods course. Those students selecting the non-thesis track are only required to complete Gphy 500-R2, and Gphy 520. Note: all students must register for colloquium each fall they are still in residence.

The methods course is based on the student’s research and/or professional interests, such as quantitative methods (i.e., STAT 451 {MATH 444} or STAT 452 {MATH 445}, GPHY 482 {GEOG 484}, or SOCI 563 {SOC 563}), qualitative methods (i.e. SOCI 561 {SOC 561}, EVST 555, etc.), historical methods, survey methods (i.e. ECNS 486), GIS courses in Geography, advanced computer methods, etc. The intent of the methods requirement is to provide students with a background in methodologies used for research and professional practice. Courses required for the option may not be used to meet this methods requirement. Electives, however, may be used.

Table 5. Core Geography Courses for M.S. with option in CEP (5-11 credits depending on Track)

Track/Course	Gphy 500(2)	Gphy 504(1)	Gphy 505(2)	Gphy 520(3)	Methods(3+)
Thesis	X	X	X	X	X
Prof. Paper	X	X	X	X	X
Non Thesis	X			X	

Required Courses in the option (minimum of 22-23 credits)

- Gphy 465-3 Planning Principles and Processes (Geog 465-3)
- Gphy 466-3 Environmental Planning (Geog 466-3)
- Gphy 468-3 Community and Regional Analysis (Geog 468-3)
- Gphy 469-1 Laboratory with Gphy 468
- Gphy 560-3 Seminar in Planning (Geog 560-3)
- Gphy 561-3 Land Use Law (Geog 561-3)
- Gphy 564-3 Planning Design (Geog 564-3)

Select at least one of the following courses (3-4 credits):

- Gphy 421-3 Towns and Rural Settlement (Geog 412-3S)
- Gphy 435-3 Environmental Hazards and Planning
- Gphy 467-3 Planning Decision Support Systems
- Gphy 486-3 Transport, Planning & GIS (Geog 483-3)
- Gphy 489-1 Laboratory with Gphy 486

Highly recommended:

- Gphy 598-R3 Internship (maximum 6 cr.)
- Gphy 562-2 Land Use Planning Clinic

Electives

Community Planning Group

- Gphy 442-3 Regionalism and the Rocky Mountain West (Geog 401-3)
- Gphy 423-3 Migration and Population Change (Geog 415-3)
- Gphy 443-3 Cultural and Global Competence (Geog 417-3)

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Anth 451-3	Cultural Resource Management
Comm 512-3	Seminar in Dispute Resolution
EVST 450-3	Food, Agriculture, and the Environment
EVST 477-3	Environmental Justice Issues and Solutions
For/ EVST 473-3	Collaboration in Natural Resources Decisions
For 475-3	Sociology of Environment and Development
Soci 350-3	The Community (Soc 340)
Soci 571-3	Seminar in Rural and Environmental Change (Soc 571-3)
Psci 344-3	State and Local Government (Psc364-3)
Psci 501-3	Public Administration (Psc 501-3)

Environmental Planning Group

Erth 303N-3	Meteorology (Geog 322N-3)
Gphy 317-3	Geomorphology (Geog 324-3)
Gphy 411N-3	Biogeography (Geog 426N-3)
Gphy 432-3	Human Role in Environmental Change (Geog 432-3)
Gphy 525-3	Adv. Physical Geography (Geog 525-3)
EVST 465-3	Restoration Ecology
EVST 540-3	Watershed Conservation Ecology
For 424-3	Community Forestry and Conservation
For 455-3	Riparian Ecology and Management
For 481-3	Forest Planning
For 485-3	Watershed Management

GIScience Group

Gphy 487-3	Remote Sensing and Raster GIS (Geog 487-3)
Gphy 489-1	Laboratory (with Gphy 487)
Gphy 488-3	Thematic Cartography and GIS (Geog 488-3)
Gphy 489-1	Laboratory (with Gphy 488)
Gphy 580-3	Seminar in GIS and Cartography (Geog 580-3)
Gphy 587-3	Image Analysis and Modeling (Geog 587-3)
Gphy 589-1	Laboratory (with Gphy 587)
Gphy 588-3	Vector GIS (Geog 588-3)
Gphy 589-1	Laboratory (with Gphy 588)
CRT 182-T-2	Computer Aided Design (COT Course)

Policy Group

EVST 502-3	Environmental Law for Non Lawyers
EVST 560-3	Environmental Impact Analysis
For 422-3	Natural Resources Policy and Administration
LAW 663/EVST 567-2	Water Law

Native American Communities

NAS 324H-3	Indians of Montana Since the Reservation Era
NAS 341S-3	Contemporary Issues of American Indians
NAS 400-3	Tribal Sovereignty

Others

Gphy 596-R3	Independent Study (Geog 596 - maximum 3 cr.)
Other electives in consultation with advisor	