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THE MASTER'S DEGREE PROGRAMS

The organization of the Master's Programs reflects a twofold conviction of the Department. First, graduate education in geography should provide every student in the program, regardless of his or her special interests, with a thorough professional preparation in the area of geography. Second, in addition to striving to provide students with a solid foundation in the field, the graduate program seeks to provide the student with the opportunity to receive specialized training in one of several subfields of geography.

The Department has long prided itself on the emphasis it places on good teaching in classroom and seminar settings, and on the effective guidance of research projects. In addition, we encourage informal contact between faculty and students.

DEPARTMENTAL AND STUDENT OBLIGATIONS: MASTER'S LEVEL

The Department has certain obligations to all graduate students, and conversely the students have certain obligations to the Department and to themselves. The most important of these is to maintain an environment in which there is mutual trust, self-respect and integrity, and to strive to attain excellence in scholarship.

The Department will provide for the student:

1. An environment in which scholarly attainment and conduct of meritorious scientific research can be achieved.
2. Responsiveness to valid academic needs and desires.
3. Support and encouragement of creative original study and research.
4. A periodic evaluation of their program and a willingness to make changes when warranted.

The student has the following responsibilities and goals:

1. To demonstrate a clear aptitude for the various aspects of scientific research: knowledge of the literature, formulation of hypotheses, experimental tests of hypotheses, analysis of data and the ability to clearly present those data in both oral and written form.
2. To strive for superior performance in academic coursework.
3. To participate in the teaching program of the Department as a practical means of training in the presentation of lectures and laboratory work. Graduate teaching assistants are expected to fulfill effectively their assigned responsibilities. Where applicable, faculty will provide each student with a confidential rating of his/her instructional performance.
4. To participate in Departmental seminars and colloquia. We expect that all students will attend these types of presentations and related events, since they provide intellectual challenge and are often the source of interesting ideas or new insights. Our expectation concerning student attendance is based on the belief that scientists should take advantage of every opportunity to learn.

The applicant is also encouraged to submit other information that may be pertinent to the admission decision, such as publications or other written products, to the department's Graduate Secretary. Applications that are complete **by February 1** will be given full consideration for funding in the fall of the academic year. Aid is available, however, for students who choose a January admission

Master's degrees offered

The Department offers two distinct Master's degrees: a M.A. research degree in Geography, and a technical, less research-intensive, M.S. degree in Geographic Information Science (GISci).

The Masters of Arts degree is intended to be a traditional, research degree, for students who desire broad training and research within the field of geography. A broad background within geography is assumed, however if M.A. students do not have adequate geographic training (as interpreted by the faculty at the time of admission), they can acquire such training by taking coursework while in residence. The Masters of Science degree consists primarily of coursework, and is directed toward people who are interested in furthering their skills in, and learning more about the theory of, the more technical areas of the field: GISci, remote sensing, spatial statistics manipulation and analysis of spatial data and cartography. Coursework and training across the field is neither assumed nor required. Application of these skills during the degree program is encouraged.

ACADEMIC ADVISING AND COMMITTEE STRUCTURE FOR MASTER'S STUDENTS

The Department of Geography is committed to the policy that graduate students have a right to the best advice regarding program planning, research, selection of courses and faculty, and general degree requirements, with the understanding that students are responsible for consulting their advisors before making program decisions.

Masters of Arts Degree

Incoming Master's students are advised by the Graduate Supervisor until an advisor is selected by the student. This arrangement is meant to provide the students with early, pertinent advice without obligating them to accept any given faculty member as their major professor(s). The professor with whom the student works most closely is the **major professor** or **advisor**. The student must select an advisor no later than the middle point of the second semester following entry into the program. The thesis advisor must be a member of the regular Geography faculty with a Ph.D.

The Master's Advisory Committee consists of at least two persons: the advisor, who chairs the committee, and the person(s) who will be second (or third) reader(s) of the thesis. The composition of the committee must be approved by the Chairperson of the Department and reported to the Graduate Supervisor and Department's Graduate Secretary. Any Ph.D. regular faculty (under the rules of tenure) appointed in the Geography Department can serve as a major advisor for MA and MS geography students. At least half of the student's committee members must have GEO as their tenure home. Other Ph.D faculty with an appointment in the Geography Department may be approved to chair committees on a case by case basis. Persons who are Specialists and Administrative Professionals may be included on the Committee but do not count toward the minimum of two (or more) members required. They are, in essence, "extras." The Advisory Committee must be formed no later than the end of the second semester following entry into the program.

By the end of the second semester following admission to the graduate program, the student, in consultation with the Master's Advisory Committee, shall formulate an appropriate program of study. The program must be approved by the Chairperson of the Department and reported to the Graduate Supervisor. A completed *Master's Program of Study* form must be submitted to the Graduate Secretary.

Changes in the student's committee, or changes in the program, must be approved by the Department Chairperson. A *Master's Program Changes* form must be completed and submitted to the Graduate Secretary. Master's students changing from an advisor who has already been officially designated and approved must first convene a meeting of the current and prospective advisors and the Graduate Supervisor to discuss the matter. The student shall be responsible for finding a meeting time and place that is convenient for the above persons. The Department Chairperson shall be notified of this meeting, by the student, at least 5 days in advance.

Masters of Science Degree

The Graduate Supervisor will advise the MS students for their first academic year. Sometime during their first year in residence, the students must choose an advisor from among the GEO faculty and work with that person on degree-related matters such as selection of courses, presentation at a professional meeting and final exit details and scheduling. Any GEO faculty member may serve as advisor to MS degree candidates.

REQUIREMENTS FOR THE MASTERS OF ARTS DEGREE

The minimum number of credits required beyond the Bachelor's for a Master of Arts (M.A.) degree is 30, with at least 20 credits in Geography. At least 16 credits must be taken at the 800 and 900 levels, permitting the student to take as many as 14 credits from a wide variety of offerings given at the undergraduate 400 level in Geography and cognate disciplines. Courses below the 400 level may not be counted toward the 30 credit requirement for the M.A. degree but may be used to fulfill tool course requirements (see below).

Master's students may count **no more than four credits** of coursework in "Independent Study" or "Research Problems" toward their degree, unless these credits were from classes taught as a regular course. Independent study courses include, but are not limited to GEO 490, 492, 495, 890, and 892.

General Requirements

All students seeking the M.A. degree in Geography must:

1. Have completed introductory courses in (1) physical, (2) cultural/human, (3) economic/urban, and (4) regional geography, (5) quantitative methods, and (6) a "tool" course (e.g., cartography, GIS, remote sensing, quantitative methods). If these courses were not taken prior to admission to the Master's Program, they must be taken while in the degree program at MSU.
2. Complete **GEO 886** (Research design in geography).
3. Complete **two** of the following broadly-taught, **Geography seminars**:
   Seminar in physical geography (**GEO 871**)
   Seminar in human geography (**GEO 872**)
   Seminar in human/environment geography (**GEO 873**)
   Seminar in geographic information science (**GEO 874**)
4. Complete one advanced- (400- or 800-) level course in **two** of seven tool areas. The courses must be approved by the Advisory Committee. Tool courses used to fulfill this requirement must be taken while enrolled as a graduate student at MSU.

The tool areas and recommended courses for satisfying this requirement are:

Tool Area	Recommended Courses
Cartography	GEO 423, 426, 823
GIS	GEO 425, 428, 825
Remote Sensing	GEO 324, 424, 827
Foreign Language	Second year equivalency, e.g., FRN 202 or 400, GRM 202 or 400.
Quantitative Methods	MTH 132, 133, 234, 235, 314, 414 STT 421, 422, 441, 442, 461 GEO 464, 825, 865
Programming	CPS 131, 230, 320

Students whose native language is not English may, with the approval of the Advisory Committee, use English as a tool language. GEO 463 may not be used to fulfill the tool course requirement.

Tool courses taken to satisfy deficiencies (see #1 above) may **not** also be used to fulfill tool course requirement for the MA program.

5. Present a research paper or poster, approved by the Advisor, at a professional meeting. This requirement must be met prior to the awarding of the degree.

6. Complete a minimum of 16 credits at the 800 or 900 level.

7. Complete a thesis. The student's Advisory Committee will supervise the research and writing of the thesis. Thesis credits (GEO 899) shall not be less than 4 or more than 8, and are included in the 16 credits required in #7 above. An abstract of the thesis not exceeding 150 words must also be prepared as specified in the *Graduate School Guide to the Preparation of Master's Theses and Doctoral Dissertations*. Contact the University Committee Involving Human Subjects (UCRIHS) before beginning any research that involves Human Subjects. **If you are dealing with Human Subjects in any way you must gain approval from this committee before starting your research.**

8. Pass the final examination. After completion of departmental requirements 1-6 above, the candidate will be given a final oral examination. The student must be registered for at least one credit during the term in which the examination is taken. The examining committee shall consist, at a minimum, of the student's Advisory Committee. If the Advisory Committee consists of fewer than three people, one other member of the faculty will be selected by the Department Chairperson or the Associate Chairperson to serve as an additional member of the examining committee. The candidate will provide each member of the examining committee with a curriculum vita and a cleanly typed and illustrated copy of the finished thesis at least two weeks prior to the exam. The Graduate Secretary must be notified at least 2 weeks prior to the final examination so that required paperwork can be completed. The final examination will cover the student's declared primary area of study (e.g., physical, cartography/remote sensing/GIS, urban/economic, regional development), related theory and methodology, and the thesis research. Successful completion of the examination and approval of the thesis will be determined by a majority vote of the examination committee. Passing the student only on portions of the examination is not permitted. A student who fails the examination may repeat it no sooner than three months from the time of failure and not more than once.

REQUIREMENTS FOR THE MASTERS OF SCIENCE DEGREE

The Master of Science degree is a Plan B (non-thesis) degree that emphasizes applications of analytical techniques in the field of geography, particularly Geographic Information Sciences (GISci).. Students are, however, trained in several advanced technologies such as remote sensing, geographic information systems, cartography, and spatial analysis. The degree is aimed toward professionals who want to acquire expertise in research techniques, but who may not necessarily wish to eventually pursue a PhD. This program is appropriate for persons with interest, but not necessarily strong training, in the geographical sciences. **Most Ph.D. programs require a research Master's degree as an entrance requirement; persons eventually getting a Ph.D. should get an MA in Geography, not this non-thesis, MS degree.** Persons interested in eventually pursuing a Ph.D. should apply to the MA program, which includes a thesis.

The student must complete a total of 30 credits distributed as follows. At least 16 credits must be taken at the 800 and 900 levels, permitting the student to take as many as 14 credits from a wide variety of offerings given at the undergraduate 400 level in Geography and cognate disciplines. Courses below the 400 level may not be counted toward the 30 credit requirement for the M.S. degree.

Master's students may count **no more than four credits** of coursework in "Independent Study" or "Research Problems" toward their degree, unless these credits were from classes taught as a regular course. Independent study courses include, but are not limited to GEO 490, 492, 495, 890, and 892.

General Requirements

All students seeking the M.S. degree in GISci must:

1. Complete all of the following courses:
   Geographic Information Systems (or its equivalent, if taken elsewhere) (**GEO 425**)
   Issues in Geographic Information Science **(GEO 801**)
   Digital Image Processing and Analysis (**GEO 827**)
   Seminar in Geographic Information Science (**GEO 874**)
2. Complete one 400-level (or higher) course in cartography.
3. Complete one 400-level (or higher) course in quantitative or qualitative methods.

All other (elective) courses must be approved by the student's guidance committee.

4. Present a research paper or poster, approved by the Advisor, at a professional meeting. This requirement must be met prior to the awarding of the degree.
5. Complete a minimum of 16 credits at the 800 or 900 level.
6. Pass the final exit examination. After completion of departmental requirements 1-5 above, the candidate will be given a final oral examination. The student must be registered for at least one credit during the term in which the examination is taken. The examining committee shall consist, at a minimum, of the student's Advisor and at least one other faculty member. The candidate will provide each member of the examining committee with a curriculum vita at least two weeks prior to the exam. The Graduate Secretary must be notified at least 2 weeks prior to the final examination so that required paperwork can be completed. The final examination will cover the student's declared primary area of study within the field of GISci, as well as related theory and methodology. Successful completion of the examination will be determined by a vote of the examination committee. A student who fails the examination may repeat it no sooner than three months from the time of failure and not more than once.

By the end of the second semester following admission to the graduate program, the student, in consultation with their Advisor shall formulate an appropriate program of study. The program must be approved by the Chairperson of the Department and reported to the Graduate Supervisor. A

completed *Master'sof Science Program of Study(MS-GIS)* form must be submitted to the Graduate Secretary.

Exit Examination

During their last semester in residence, as their coursework is being completed, all MS students must work with their advisor to schedule their exit examination. After a date and time have been agreed upon, the student must inform the Graduate Secretary. The exit exam may be taken before the student has made their presentation at a professional meeting but cannot be taken before the end of the semester in which their coursework is being completed. All MS exit exams must be scheduled during final exam week of the spring or fall semester. It is the responsibility of the student to insure that the time they choose for their exam is acceptable to their advisor and second committee member. MSU students are expected to bring copies of their resume or vita to the exam. The exit examination is administered by oral questioning from the student's graduate committee, and generally takes less than two hours to complete. The advisory committee will evaluate the student's performance immediately after the session and will inform the student of pass/failure. The exam may be retaken once. Note that the University requires that a student be enrolled in the semester in which the exam is taken.

Any Ph.D. regular faculty (under the rules of tenure) appointed in the Geography Department can serve as a major advisor for MS geography students. At least half of the student's committee members must have GEO as their tenure home. Other Ph.D faculty with an appointment in the Geography Department may be approved to chair committees on a case by case basis

Funding for MS students

MS students, like all other students at MSU, are eligible for funding from various sources. They can be RAs (Research Assistants), TAs (Teaching Assistants) or work on or off campus on an hourly basis. It is important to note that the Department of Geography does not make long-term (>one semester) TA funding commitments to MS students. Instead, TA and RA assignments made by the Department to MS students on an *ad hoc*, semester by semester basis. RA commitments, which are arranged between the professor with the research grant and the student, are made at the discretion of the professor holding the funding.

FINANCIAL AID AND ASSISTANTSHIPS

The Department allocates financial aid in the form of Graduate Assistantships, and Graduate Office Fellowships. Graduate Assistantships (GAs) can either be a Teaching Assistantship (TA) or a Research Assistantship (RA). Each carry with them some obligations regarding teaching or research. Half-time GAs require up to 20 hours per week of work, while quarter-time GAs are for 10 hours per week. Each carries with it a stipend and up to nine credits of tuition waiver. Graduate Office Fellowships (GOFs) are given as unrestricted "gifts" and carry with them no obligation for repayment. Most GOFs exceed $500.

Please see the brochure entitled "Graduate Assistantships at Michigan State University" for more information on University policies concerning assistantships.

Assistantships and Fellowships are made to achieve the following goals: (1) recruitment of new students, (2) assisting continuing students to complete their degrees, (3) supporting departmental teaching and research, and (4) providing training in teaching and research. The funding priorities are as follows: (1) students already receiving financial assistance who meet the criteria specified above and to whom we have already made a long-term (either two or three years) commitment of aid, (2) students newly entering the Geography graduate program, and (3) currently enrolled students not receiving financial assistance and whose aid obligation (two years for Master's and three years for PhD students) has expired.

From the new student applicant pool, the criteria we often use to determine who shall be funded include but are not limited to the following:

1. the student's academic record (GPA, coursework, experience, academic history, etc.),
2. GRE scores (both the total score and the balance between the three sub-scores),
3. strength of the student's letters of recommendation, and
4. the student's statement of purpose.

We also consider the "fit" of the student to the department's academic strengths and needs, and try to determine which students have the best potential to finish their degrees. RA and TA awards are made in late February by the Geography Awards Committee. This committee reviews all admitted students to date and ranks them according to the criteria outlined above. Awards are then given out to the top students, based on available resources. Usually 3-6 new Graduate Assistantships are awarded each year, with the beginning date set for fall. Occasionally, we will fund students who enter the program in January, if we have the resources, and the student is exceptional. GOFs are awarded competitively to new and continuing students. These decisions are made by the Chairperson, in consultation with the Graduate Supervisor.

Work taken on outside the university, by half-time GAs, is strongly discouraged. Before beginning outside employment the assistant should discuss with the Graduate Supervisor the outside employment, how the assistantship obligations will be fulfilled, and if the employment will slow the student's progress toward the degree.

DETAILS OF GRADUATE ASSISTANT APPOINTMENTS

There are three classes of graduate assistantships: Level 1- Master's Level, Level 2 - Master's Level and Level 2-Doctoral Level (Senior). In any one semester, the stipend per assistantship unit is the same for all assistantships in a class. Actual stipend rates are set by MSU in the summer and become effective on August 15.

New incoming Master's students begin at Level 1. After completing two assistantship semesters at Level 1, the student is automatically transferred to Level 2-Master's for the duration of the appointment. In order to be eligible for a Level 2-Doctoral Level (Senior) assistantship appointment, a student must possess a Master's degree or the equivalent, and at least two year's experience as a graduate assistant (or equivalent experience as an instructor.)

The pay period begins in mid-August and GAs usually receive a paycheck on the 15th of each month, beginning in September. If the 15th falls on a Saturday or Sunday, checks arrive the Friday before. You may arrange to have your paycheck directly deposited to the bank of your choice you may contact the Payroll Office at 350 Administration Building. Graduate assistantship stipends are not subject to Social Security (FICA) taxes. Stipends are subject to income taxes with few exceptions. The taxability of stipends is subject to review by the Internal Revenue Service. Please call the Payroll office for more information, at 355-5010. A waiver of the out-of-state tuition rate is granted to out-of-state students during the semester of appointment, and for full academic year appointees, for the summer session that precedes or follows an appointment for an entire academic year. A nine-credit tuition waiver is granted each semester while holding an appointment. For summer session appointments, the waiver is four credits.

Important Note: If you have an assistantship you are REQUIRED to enroll for a minimum of 6 credits at the Master's level and 3 credits at the Ph.D. level during Fall/Spring semester and 3 credits Summer semester. There is ONE exception, during your last semester at MSU. Contact the Graduate Secretary <u>before</u> your last semester for details.

Michigan State University and the Council of Graduate Students have worked together to offer graduate assistants health insurance coverage. "Student only" coverage is automatically provided at no cost to graduate assistants. Michigan State University will provide a full twelve months of coverage if your appointment is at least nine months. If you wish to enroll your legal spouse and/or dependent children, please contact the MSU Benefits office. Questions regarding enrollment, premium payment and coverage should be directed to the Chickering Group at 1-800-859-8452. Questions or issues that cannot be resolved with the Chickering Group may be directed to the MSU Benefits office at 1407 South Harrison Road, Room 140 Nisbet Building at 517-353-4434, ext. 170 or 144.

UNIVERSITY EXPECTATIONS FOR TAs

As a Michigan State University teaching assistant you play a vital role in the educational mission of MSU. Disciplinary knowledge and instructional skills are key requisites for being a successful teacher, but teaching assistants are also expected to conform to ethical and professional standards described in the MSU Code of Teaching Responsibility. Treat your students with respect, deal with conflict fairly and promote a classroom atmosphere that encourages free and meaningful exchange of ideas. Familiarize yourself with the MSU Code of Teaching Responsibility as you strive to achieve educational excellence, for both yourself and your students.

UNIVERSITY EXPECTATIONS FOR RAs

As a Michigan State University research assistant you play a vital role in the research and outreach missions of MSU. Disciplinary knowledge and research/laboratory skills are key requisites for conducting research, but research assistants are also expected to conform to ethical and professional standards described in the MSU Faculty Handbook Section IV: Research and Creative Endeavors. This section includes information on working with animal and human subjects, radiation, chemical, and biological safety, and adherence to federal guidelines on data generation, management and control. Sections of the Academic Freedom Report for MSU Students and the Graduate Student Rights and Responsibilities document also contain valuable information as you strive to achieve research excellence.

ACADEMIC STANDARDS

Masters students are required to meet and maintain certain academic standards while enrolled in the Geography graduate program. These are:

1. **No more than** two courses with grades of 2.5 or lower, and
2. **No more than** eight credits with grades of 2.5 or lower.

This policy holds for all courses the student has taken as a graduate student at MSU. The only courses that are exempt from this rule are courses below the 400 level that are not on the student's program of study. Students who fail to meet **any one** of the above standards will be notified by the Graduate Secretary immediately upon the receipt of the semester grade report. Simultaneous notice will be given, by the Graduate Secretary, to the Department Chairperson, Graduate Supervisor, and the student's advisor. This information shall be taken as evidence of failure to meet departmental standards, and the student will be asked to withdraw immediately from the program.

A cumulative GPA of 3.0 or better is required for graduation from Michigan State University.

The student may petition to be reinstated to the graduate program by taking the following steps, in the order stated below. The student may **not** enroll in additional courses while a petition is pending.

1. The student shall meet with the Graduate Supervisor to discuss reinstatement, and

2. The student shall then meet with the Graduate Supervisor, Associate Chairperson, and Geography Department Chairperson to discuss reinstatement.

The student's advisor shall be notified of the meeting and invited to attend. The latter group will make a recommendation to the Department Chairperson regarding reinstatement. The final decision rests with the Department Chairperson.

Additional requirements for an advanced degree are also set by the Graduate School and the College of Social Science. All Geography graduate students should become thoroughly familiar with these requirements through the following university publications:

*Academic Programs (*for both undergraduate and graduate programs*),* available in Room 64 Administration Building and MSU Bookstore. *Graduate Studnt Rights and Responsibilities*, available in Room 118 Linton Hall.

The Graduate School Guide to the Preparation of Master's Theses and Doctoral Dissertations, available in Room 118 Linton Hall.

CALENDAR OF PROGRESS TOWARD THE MASTER'S DEGREES

Middle of second semester.....	Advisor chosen
End of second semester	**MA:**
.....	Master's Advisory Committee chosen Master's of Arts Program of Study on file with graduate secretary **MS-GIS:** Master's of Science Program of Study (MS-GIS) on file with graduate secretary

Failure to meet one or more of the above deadlines may be taken as evidence of lack of satisfactory progress toward the Master's degree.

TIME LIMITS

The University requires that the Master's program be completed no later than six calendar years from the date of initial enrollment. Extensions are sometimes granted.

THE PH.D. DEGREE PROGRAM

OBJECTIVES OF THE PH.D. PROGRAM

The Ph.D. program at Michigan State University is designed to develop the student's ability to conduct original research. As such, the program fosters:

- understanding of scientific inquiry;
- knowledge of the structure of the Geographic discipline, its history, issues, methods and trends;
- depth of knowledge in an area of specialization, including an understanding of important research questions;
- proficiency in appropriate analytical and technical skills;
- skills in communicating the results of research.

The program is individualized to allow the student, working with their Guidance Committee, to shape a program of study that is broad in scope yet consistent with specific student interests.

DEPARTMENTAL AND STUDENT OBLIGATIONS: PH.D. LEVEL

The Department has certain obligations to all graduate students, and conversely the students have certain obligations to the Department and to themselves. The most important of these are to maintain an environment in which there is mutual trust, self-respect and integrity, and to strive to attain excellence in scholarship.

The Department will provide for the student:

1. An environment in which scholarly attainment and conduct of meritorious scientific research can be achieved.
2. Responsiveness to valid academic needs and desires.
3. Support and encouragement of creative original study and research.
4. A periodic evaluation of their program and a willingness to make changes when warranted.

The student has the following responsibilities and goals:

1. To demonstrate a clear aptitude for the various aspects of scientific research: knowledge of the literature, formulation of hypotheses, experimental tests of hypotheses, analysis of data and the ability to clearly present those data in both oral and written form.
2. To produce, during his/her period of training, research work which is worthy of publication. Publication is a responsibility to share information with the scientific community. Publications are highly desirable outlets for our students.

They enhance the visibility of our department, help to insure that students will be placed in first-rate jobs, and involve all of our members in the same central research process.

3. To strive for superior performance in academic courses.
4. To participate in the teaching program of the Department as a practical means of training in the presentation of lectures and laboratory work. Graduate teaching assistants are expected to fulfill effectively their assigned responsibilities. Where applicable, faculty will provide each student with a confidential rating of his/her instructional performance.
5. To participate in Departmental seminars and colloquia. We expect that all students will attend these types of presentations and related events, since they provide intellectual challenge and are often the source of interesting ideas or new insights. Our expectation concerning student attendance is based on the belief that scientists should take advantage of every opportunity to learn.

The applicant is also encouraged to submit other information that may be pertinent to the admission decision, such as awards, publications or other written products, to the Department's Graduate Secretary. Applications that are complete **by February 1** will be given full consideration for funding in the fall of the academic year. Aid is available, however, for students who choose a January admission.

ACADEMIC ADVISING AND COMMITTEE STRUCTURE FOR DOCTORAL STUDENTS

The Department of Geography is committed to the policy that graduate students have a right to the best advice regarding program planning, research, selection of courses and faculty, and general degree requirements, with the understanding that students are responsible for consulting their advisors before making program decisions.

Incoming Ph.D. students are assigned to the Graduate Supervisor until an advisor is selected by the student. The student's advisory shall be selected no later than the middle of the second semester following entry into the program. The advisor shall be any member of the Geography regular faculty[1] whose tenure home is in Geography.

The doctoral program Guidance Committee consists of at least four regular Michigan State University faculty. The professor with whom the student works most closely is known as the major professor or advisor. Generally, the major professor is the chairperson of the student's Guidance Committee and the dissertation advisor. The additional members of the Guidance Committee are chosen by the student in consultation with the major professor. Any Ph.D. regular faculty (under the rules of tenure) appointed in the Geography Department can serve as a major advisor for Ph.D. geography students. At least half of the student's committee members must have GEO as their tenure home. Other Ph.D faculty with an appointment in the Geography Department may be approved to chair committees on a case by case basis. The composition of the committee must be approved by the Chairperson of the Department and reported to the Graduate

[1] From the MSU Faculty Handbook: The "regular faculty" of Michigan State University shall consist of all persons appointed under the rules of tenure and holding the rank of professor, associate professor, assistant professor, or instructor, and persons appointed as librarians. In addition, the principal administrative officer of each major educational and research unit of the University shall be a member of the "regular faculty".

Secretary and the Dean of the College of Social Science. Persons eligible to serve as Guidance Committee members include all regular Michigan State University faculty and, in some cases, emeritus faculty. Persons who are Specialists and Administrative Professionals may be included on the Committee but do not count toward the minimum of four (or more) members required. They are, in essence, "extras." Changes in the constitution of the committee must be approved by the Department Chairperson and the Associate Chairperson, and a *Doctoral Program Changes* form must be submitted to the Graduate Secretary. The Guidance Committee should be formed no later than the end of the second semester following entry into the program.

Ph.D. students changing from an advisor who has already been designated and approved must first convene a meeting of the current and prospective advisors and the Graduate Supervisor to discuss the matter. The student shall be responsible for finding a meeting time and place that is convenient for all the above persons. The Department Chairperson shall be notified of this meeting, by the student, at least 5 days in advance.

REQUIREMENTS FOR THE Ph.D. DEGREE

General Requirements

Ph.D. applicants whose Master's degree is in a field other than Geography must have completed courses in (1) physical, (2) cultural/human, (3) economic/urban, and (4) regional Geography, as well as (5) quantitative methods, and (6) a "tool" course (e.g., cartography, GIS, remote sensing). If these courses have not been taken previously, they must be taken while in the degree program at MSU. In addition students seeking the Ph.D in Geography must:

Complete at least 56 credits in the courses and areas listed below. Courses below the 400 level may not be counted toward the 56 credit requirement for the Ph.D. degree, but may be used to fulfill tool course requirements (see below). Ph.D. students may count **no more than six credits** of coursework, regardless of the department, in independent study or research problems toward their degree. Geography courses covered under this requirement include but are not limited to GEO 490, 492, 495, 890, and 892.

1. Complete **GEO 886** (Research Design in Geography) and
   GEO 986 (Theory and Methods in Geography) — 6 cr.
2. Complete **three** of the four, following broadly-taught, **Geography seminars**:
   Seminar in Physical Geography (**GEO 871**)
   Seminar in Human Geography (**GEO 872**)
   Seminar in Human/Environment Geography (**GEO 873**)
   Seminar in Geographic Information Science (**GEO 874**) — 9 cr.
3. One tool course (800-level or higher) — 3-4 cr.
4. Electives — min. 15 cr.
5. Dissertation credits (GEO 999) — 24 cr.

   56 cr.

6. Pass the comprehensive examination, (see below).
7. Present and defend a written dissertation proposal before the Department (see below).
8. Complete a dissertation (see below).
9. Present a research paper or poster, approved by the advisor, at a professional meeting. This requirement must be met prior to the awarding of the degree.
10. Submit an authored or co-authored manuscript, approved by the advisor, for publication in a book or refereed journal. This requirement must be met prior to the awarding of the degree.
11. Pass an oral examination in defense of the dissertation.

Course Waivers

Student requesting course waivers must compile suitable documentation concerning the course proposed as a substitute for the course to be waived. Suitable documentation should include but is not limited to: course syllabi, examinations, term papers, bibliographies, textbooks, reading lists,

and lecture notes. A lack of suitable documentation may be grounds for refusal to grant the waiver.

Students then shall obtain written permission from their committee members that indicate the disposition of these persons on the waiver request. In addition, students must obtain written permission from the instructor of the course to be waived, which should state the disposition of the instructor on the request for a waiver.

After completing the preceding steps, students shall submit all materials to the Department Chairperson for action. The Chairperson may consult with the Associate Chairperson before granting or refusing the course waiver request.

Tool Course

Acceptance of foreign language as a tool requires the student to pass a competency examination. Approval of the language courses and the level of proficiency is determined by the student's Guidance Committee; the Committee may confer with a faculty member in the department offering the courses for guidance on the issue of language competency. Generally, the tool course must advance the level of competency, via coursework, while in the MSU Ph.D. program. Research techniques used to satisfy the tool requirement must be in the fields of cartography, GIS, remote sensing, computer science, statistics, mathematics, or social or physical science research methods. Coursework in combinations of these areas is permitted. Tool courses taken to satisfy deficiencies (see above) may **not** also be used to fulfill the tool course requirement for the Ph.D. program.

Comprehensive Examination

Students are eligible to undertake the comprehensive examination, not before their fourth semester and no later than the fifth semester. This examination will cover the student's field of specialization as defined in the student's Guidance Committee Report, together with related theory and methodology. It will include both a written portion and an oral portion. Performance on the examinations must provide evidence of the student's mastery of subject matter, knowledge of related geographic literature, and an understanding of research theory and methodology.

Written portion: The primary responsibility for preparing the written exam rests with the student's Guidance Committee; however, all faculty will be notified of the examination and each may submit possible questions for the Guidance Committee's consideration. The exam will last a maximum of twelve hours. The exam may be spread over no more than two consecutive days.

The student's Guidance Committee shall decide whether the student has passed or failed the written portion of the comprehensive examinations; and officially pass this information to the student and the Graduate Secretary within ten working days from the date when the examination answers are given to the committee, decisions to pass the student on portions of the examination are not permitted. Prior to grading the student's answers to the written examination, the Guidance Committee will agree as to which members will read and evaluate which answers. The advisor will then inform the student of the Guidance Committee's decision in this regard. The student will be considered as having "passed" the written Comprehensive Examination provided that **no more than one** member of the Guidance Committee votes to fail. If the student fails the written exam, it may be repeated but not sooner than three months from the time of failure and not more than once. After the examination, a copy of the questions and the student's responses to them will be placed in the student's departmental file.

It is the responsibility of the student to insure that legible copies of his/her responses to the exam questions are made available to all members of the Guidance Committee.

Oral portion: Upon successful completion of the written portion of the comprehensive examinations, the student's Guidance Committee will conduct the oral exam. The "orals", like the "writtens," will focus on the student's area(s) of specialization, together with related theory, methodology, literature, and research. Notice of the oral examination will be given to Geography

faculty and graduate students at least one week in advance. All Geography faculty may attend, and they may participate by notification to the student and Guidance Committee 48 hours in advance of the exam. Geography graduate students may attend with permission of the student being examined. The Guidance Committee will meet immediately after the oral exam to determine whether the student has passed or failed this portion of the examination. The student will be considered as having "passed" the oral Comprehensive Examination provided that no more than one member of the Guidance Committee votes to fail. Under special circumstances, if the Guidance Committee is unable to render a pass/fail decision, it has the option to adjourn and reconvene the exam at a later date. If the student fails, the normal waiting period before the exam can be retaken is one semester. However the student may, in consultation with the advisor and the Guidance Committee, request that the exam be rescheduled as soon as one month following the failed previous exam. The oral exam may be taken not more than twice (not counting reconvened exams). Oral exam questioning periods shall last no longer than four hours.

Dissertation Proposal

The student must prepare a written dissertation proposal in consultation with the Guidance Committee. The content of the proposal will be orally presented and defended before the Guidance Committee and other interested faculty and graduate students by the end of the student's fifth semester. The primary purpose of the proposal presentation and defense is to facilitate high-quality dissertation research by providing a forum for student-faculty interaction on this critical part of the student's Ph.D. work. The session gives the student access to evaluation of the research by the committee, other faculty, and students. At least two weeks before the presentation, copies of the written proposal must be made available to each member of the committee and to the Graduate Secretary for distribution. It is the responsibility of the student to insure that copies of the proposal are made available by the deadline.

A time for the proposal defense should be selected that will allow for a minimum of scheduling conflicts. The room selected should be large enough to seat the bulk of the GEO faculty and graduate students. Scheduling proposal defenses over spring break or during finals week is discouraged. Two hours will be allowed for the presentation and subsequent questioning. An initial uninterrupted presentation of the proposed research should be 20-30 minutes in length. All faculty and students, including those who do not wish to remain for the full question period, are encouraged to attend this initial presentation. The question session that follows will be moderated by the major professor, and normally all Guidance Committee members will actively participate. However, all persons attending may ask questions and offer comments. Following the session, the student's Guidance Committee will meet to determine whether the proposal must be revised and presented again. A student may present and defend a proposal only twice.

When approved by the student's committee, the proposal becomes a written understanding that sets forth the committee's expectations and the student's obligations. A dissertation that deviates significantly from the approved proposal may be found unsatisfactory. Students can contact the University Committee on Research Involving Human Subjects (UCRIHS) before beginning any research that involves Human Subjects. **If you are dealing with Human Subjects in any way you must gain approval from this committee before starting your research**.

The Dissertation

The dissertation must be written documentation of research that makes an original contribution to knowledge. The research is performed under the guidance of the major professor and the Guidance Committee and must be acceptable to them. The student, however, is responsible for the quality and design of the research, including any field work, statistical analysis, and graphics. The dissertation must be organized, typed, duplicated, and bound according to regulations prescribed in the *Formating Guide for Masters Theses and Doctoral Dissertations*. An abstract not exceeding 600 words must be included.

Not later than six weeks before the end of the last semester and at least three weeks before the final oral examination, the student is required to submit the dissertation and abstract to the major

professor, members of the Guidance Committee, Graduate Secretary, and the Dean of the College of Social Science. The Graduate Secretary must be notified at least 3 weeks prior to the final oral examination so that required paperwork can be completed. The student should, however, check the appropriate MSU *Schedule of Courses* and *Academic Handbook* for exact deadlines. The dissertation must be in completed form, typed with complete illustrative material and acceptable to the major professor. At this stage, it should be bound only by spiral, or other loose types, of binding.

The final oral examination in defense of the dissertation will be conducted and evaluated by the Guidance Committee, which may be supplemented with a Dean's Representative appointed by the Dean of the College of Social Science. Other interested faculty and students may attend and participate but not vote. According to University guidelines, both the dissertation and the student's performance on the oral defense must be approved by a positive vote of at least 75% of the voting examiners, and with not more than one dissenting vote among the MSU regular faculty members of the Guidance Committee. At least two weeks advance notice of the examination (and availability of the completed dissertation) will be given to all faculty.

Before being questioned by members of the committee, the candidate will present an uninterrupted, professional oral summary of the dissertation that shall be **no more than 30 minutes in length**. An oral examination period shall follow. Three hours will be allocated for the entire dissertation defense. Following its conclusion, the Examination Committee will decide whether the candidate has defended the dissertation satisfactorily. The student will be considered as having "passed" the Dissertation Defense provided that **no more than one** member of the Examination Committee (Guidance Committee plus, where provided, the Dean's representative) votes to fail. If the student fails the defense, it may be repeated, but no sooner than three months from the time of failure, and not more than once.

After the Guidance Committee has reviewed and approved the dissertation and the student has passed the oral defense, the student should incorporate into the dissertation recommended changes and corrections before having it permanently bound. One copy of the abstract must be bound with the dissertation. One bound copy of the dissertation and abstract be provided to the Department for its possession. Not later than two weeks before commencement the student must submit to the Office of the Graduate School one unbound copy of the dissertation and abstract. The student should, however, check the appropriate MSU *Schedule of Courses* and *Academic Handbook* for exact deadlines for submission of the dissertation. Students should also consult the *Graduate School Guide to the Preparation of Master's Theses and Doctoral Dissertations* for further information on preparing and submitting the dissertation.

FINANCIAL AID AND ASSISTANTSHIPS

The Department allocates financial aid in the form of Graduate Assistantships, and Graduate Office Fellowships. Graduate Assistantships (GAs) can either be a Teaching Assistantship (TA) or a Research Assistantship (RA). Each carry with them some obligations regarding teaching or research. Half-time GAs require up to 20 hours per week of work, while quarter-time GAs are for 10 hours per week. Each carries with it a stipend and nine credits of tuition waiver. Graduate Office Fellowships (GOFs) are given as unrestricted "gifts" and carry with them no obligation for repayment. Most GOFs exceed $500.

Please see the brochure entitled "Graduate Assistantships at Michigan State University" for more information on University policies concerning assistantships.

Assistantships and Fellowships are made to achieve the following goals: (1) recruitment of new students, (2) assisting continuing students to complete their degrees, (3) supporting departmental teaching and research, and (4) providing training in teaching and research. The funding priorities

are as follows: (1) students already receiving financial assistance who meet the criteria specified above and to whom we have already made a long-term (either two or three years) commitment of aid, (2) students newly entering the Geography graduate program, and (3) currently enrolled students not receiving financial assistance and whose aid obligation (two years for Master's and three years for PhD students) has expired.

From the new student applicant pool, the criteria we often use to determine who shall be funded include but are not limited to the following:

1. the student's academic record (GPA, coursework, experience, academic history, etc.),
2. GRE scores (both the total score and the balance between the three sub-scores),
3. strength of the student's letters of recommendation, and
4. the student's statement of purpose.

We also consider the "fit" of the student to the department's academic strengths and needs, and try to determine which students have the best potential to finish their degrees. RA and TA awards are made in late February by the chairperson, in consultation with the Awards Committee. This committee reviews all admitted students to date and ranks them according to the criteria outlined above. Awards are then given out to the top students, based on available resources. Usually 3-8 new Graduate Assistantships are awarded each year, with the beginning date set for fall. Occasionally, we will fund students who enter the program in January, if we have the resources, and the student is exceptional. GOFs are awarded competitively to new &and continuing students. These decisions are made by the Chairperson, in consultation with the Graduate Supervisor.

Work taken on outside the university, by half-time GAs, is strongly discouraged. Before beginning outside employment the assistant should discuss with the Graduate Supervisor the outside employment, how the assistantship obligations will be fulfilled, and if the employment will slow the student's progress toward the degree.

DETAILS OF GRADUATE ASSISTANT APPOINTMENTS

There are three classes of graduate assistantships: Level 1- Master's Level, Level 2 - Master's Level and Level 2-Doctoral Level (Senior). In any one semester, the stipend per assistantship unit is the same for all assistantships in a class. Actual stipend rates are set by MSU in the summer and become effective on August 15.

New incoming Master's students begin at Level 1. After completing two assistantship semesters at Level 1, the student is automatically transferred to Level 2-Master's for the duration of the appointment. In order to be eligible for a Level 2-Doctoral Level (Senior) assistantship appointment, a student must possess a Master's degree or the equivalent, and at least two year's experience as a graduate assistant (or equivalent experience as an instructor.)

The pay period begins in mid-August and GAs usually receive a paycheck on the 15th of each month, beginning in September. If the 15th falls on a Saturday or Sunday, checks arrive the Friday before. You may arrange to have your paycheck directly deposited to the bank of your choice you may contact the Payroll Office at 350 Administration Building. Graduate assistantship stipends are not subject to Social Security (FICA) taxes. Stipends are subject to income taxes with few exceptions. The taxability of stipends is subject to review by the Internal Revenue Service. Please call the Payroll office for more information, at 355-5010. A waiver of the out-of-

state tuition rate is granted to out-of-state students during the semester of appointment, and for full academic year appointees, for the summer session that precedes or follows an appointment for an entire academic year. A nine-credit tuition waiver is granted each semester while holding an appointment. For summer session appointments, the waiver is four credits.

Important Note: If you have an assistantship you are REQUIRED to enroll for a minimum of 6 credits at the Master's level and 3 credits at the Ph.D. level during Fall/Spring semester and 3 credits Summer semester. There is ONE exception, during your last semester at MSU. Contact the Graduate Secretary before your last semester for details.

Michigan State University and the Council of Graduate Students have worked together to offer graduate assistants health insurance coverage. "Student only" coverage is automatically provided at no cost to graduate assistants. Michigan State University will provide a full twelve months of coverage if your appointment is at least nine months. If you wish to enroll your legal spouse and/or dependent children, please contact the MSU Benefits office. Questions regarding enrollment, premium payment and coverage should be directed to the Chickering Group at 1-800-859-8452. Questions or issues that cannot be resolved with the Chickering Group may be directed to the MSU Benefits office at 1407 South Harrison Road, Room 140 Nisbet Building at 517-353-4434, ext. 144 or 170.

UNIVERSITY EXPECTATIONS FOR TAs

As a Michigan State University teaching assistant you play a vital role in the educational mission of MSU. Disciplinary knowledge and instructional skills are key requisites for being a successful teacher, but teaching assistants are also expected to conform to ethical and professional standards described in the MSU Code of Teaching Responsibility. Treat your students with respect, deal with conflict fairly and promote a classroom atmosphere that encourages free and meaningful exchange of ideas. Familiarize yourself with the MSU Code of Teaching Responsibility as you strive to achieve educational excellence, for both yourself and your students.

UNIVERSITY EXPECTATIONS FOR RAs

As a Michigan State University research assistant you play a vital role in the research and outreach missions of MSU. Disciplinary knowledge and research/laboratory skills are key requisites for conducting research, but research assistants are also expected to conform to ethical and professional standards described in the MSU Faculty Handbook Section IV: Research and Creative Endeavors. This section includes information on working with animal and human subjects, radiation, chemical, and biological safety, and adherence to federal guidelines on data generation, management and control. Sections of the Academic Freedom Report for MSU Students and the Graduate Student Rights and Responsibilities document also contain valuable information as you strive to achieve research excellence.

ACADEMIC STANDARDS

Ph.D. students are required to meet and maintain certain academic standards while enrolled in the Geography graduate program. These are:

1. **No more than** two courses with grades of 2.5 or lower, and
2. **No more than eight credits** with grades of 2.5 or lower.

This policy holds for all courses the student has taken at MSU, regardless of whether they are on the program of study. The only courses that are exempt from this rule are courses below the 400 level that are not on the student's program of study. Students who fail to meet **any one** of the above standards will be notified by the Graduate Secretary immediately upon the receipt of the

semester grade report. Simultaneous notice will be given, by the Graduate Secretary, to the Department Chairperson, Graduate Supervisor, and the student's advisor. This information shall be taken as evidence of failure to meet departmental standards, and the student will be asked to withdraw immediately from the program.

A cumulative GPA of 3.0 or better is required for graduation from Michigan State University.

The student may petition to be reinstated to the graduate program by taking the following steps, in the order stated below. The student may not enroll in additional courses while a petition is pending.

1. The student shall meet with the Graduate Supervisor to discuss reinstatement, AND
2. The student shall then meet with the Graduate Supervisor, Associate Chairperson, and Geography Department Chairperson to discuss reinstatement.

The student's advisor shall be notified of the meeting and invited to attend. The latter group will make a recommendation to the Department Chairperson regarding reinstatement. The final decision rests with the Department Chairperson.

Additional requirements for an advanced degree are also set by the Graduate School and the College of Social Science. All Geography graduate students should become thoroughly familiar with these requirements through the following university publications:

Academic Programs (for both undergraduate and graduate programs), available in Room 64 Administration Building and the MSU Bookstore. The cost is $3.00.

Graduate Student Rights and Responsibilities, available in Room 118 Linton Hall

Graduate School Guide to the Preparation of Master's Theses and Doctoral Dissertations, available in Room 118 Linton Hall

CALENDAR OF PROGRESS TOWARD THE PH.D. DEGREE

Middle of second semester.....	Advisor chosen
End of second semester	Guidance Committee chosen Guidance Committee Program Report on file
End of fifth semester.....	Comprehensive Examination completed Dissertation Proposal defended

TIME LIMITS

The University requires that the PhD comprehensive examination must be taken within five years of initial enrollment, and all requirements completed within eight years, as a doctoral student. If the degree is not completed within eight years, the comprehensive examination must be passed again.

A P P E N D I C E S

APPENDIX I. Geography Faculty: Their Research interests and courses

Jeffrey A. Andresen, Ph.D., Purdue University, 1987
Research Interests: Applied climatology and agricultural meteorology. The influence of weather and climate on agriculture, especially within Michigan and the Great Lakes Region. Climatological trends and potential impacts in the region, water use for agricultural irrigation, impacts associated with potential future changes in climate, weather and risk management in agricultural production systems, winter hardiness and mortality of crops and insects, and the measurement and use of weather data for determination of plant disease risk.
Courses:

GEO 203	Introduction to Meteorology
GEO 206	Physical Geography
GEO 402	Agricultural Climatology
GEO 871	Seminar in Physical Geography

Alan F. Arbogast, Ph.D., Kansas, 1995
Research Interests: Late-Quaternary geomorphology and landscape evolution, focusing on colian (sand dune) landscapes in coastal and interior locations. Holocene environmental change. Geoarchaeology. Field methods. Regional interests include the Great Lakes region, especially Michigan, and the Great Plains.
Courses:

GEO 206	Physical Geography
GEO 306	Environmental Geomorphology
ISS 310	People and Environment
GEO 407	Regional Geomorphology of the United States
GEO 871	Seminar in Physical Geography
GEO 880	Seminar in Advanced Physical Geography

David J. Campbell, Ph.D., Clark, 1977
Research Interests: Environment and development, strategies for coping with recurrent food shortage, human-environment interaction. My research has to date been conducted entirely in Africa. I direct the Environment and Development Project in the Center for Advanced Study of International Development (CASID).
Courses:

GEO 338	Geography of Africa
GEO 445	Environment and Development Policy
GEO 850	Seminar in Regional Geography

Michael Chubb, Ph.D., (Emeritus Professor) Michigan State, 1967

Joe T. Darden, Ph.D., Pittsburgh, 1972
Research Interests: Urban social geography, residential patterns of population groups in metropolitan areas, comparative spatial patterns and neighborhood socioeconomic inequality of racial minority groups.
Courses:

GEO 413	Urban Geography
GEO 418	The Ghetto

William R. Enslin, M.A., Eastern Michigan, 1968
Research Interests: Computer systems analysis and design of geographic information systems, environmental data bases, and video/image processing software, application of GIS and remote sensing technology to land and water resource programs in the State of Michigan.

Richard E. Groop, Ph.D., Kansas, 1976
Research Interests: Cartography and computer mapping, in particular, innovative computer map symbols for thematic maps. Socio-economic geography, specifically US internal migration, income distribution, and retirement. Applications of geographic information systems to socio-economic geography.
Courses:

GEO 221	Introduction to Geographic Information
GEO 874	Seminar in Geographic Information Science
ISS 310	People and Environment

Jay R. Harman, Ph.D., Illinois, 1968
Research Interests: Environmental ethics, applied physical geography (climatology and plant geography) with emphasis on the Midwestern United States
Courses:

GEO 203	Introduction to Meteorology
GEO 330	Geography of the United States and Canada
GEO 401	Plant Geography
GEO 432	Environmental Ethics in Geography
GEO 886	Research Design in Geography
GEO 986	Theory and Methods in Geography

John Melton Hunter (Emeritus Professor), Ph.D., Reading, U.K., 1954
Research Interests: Geography of Africa and world medical geography. Disease ecology.

David P. Lusch, Ph.D., Michigan State, 1982
Research Interests: **1**) Applications of remote sensing and/or geographic information systems to problem-solving in agriculture, natural resources, and human health; **2**) Meso-scale hydrogeology for aquifer vulnerability assessments and community ground-water protection planning; **3**) Mapping Land Use / Land Cover and its change; **4**) Spatial analysis of landform - soil - vegetation relationships; **5**) Glacial geomorphology of Michigan; **6**) Ecoregion mapping and management especially the nexus of landscape ecology, cultural ecology, and political ecology.
Courses:

GEO 324	Remote Sensing of the Environment
GEO 424	Advanced Remote Sensing
GEO 494	Remote Sensing Field Techniques

Gary A. Manson, Ph.D., (Emeritus Professor) Washington, 1970
Research Interests: Economic and demographic changes at the local area level both within Michigan and throughout the United States. While this research has a theoretical basis, it is largely empirical in nature.

Assefa Mehretu, Ph.D., Johns Hopkins, 1969
Research Interests: African development, more specifically to use theoretical economic geography to analyze both macro and microregional structures and processes of development, macro and microgeographic problematics of regional integration for development, factors in social and spatial marginality/equity/equality in development benefits, structural hegemony and uneven development, and theoretical and empirical issues in macro and microgeographic structures of uneven development in developed countries and Michigan.
Courses:

GEO 113	Introduction to Economic Geography
GEO 415	Location Theory and Land Use Analysis
ISS 215	Social Differentiation and Inequality
ISS 315	Global Diversity and Interdependence

Joseph P. Messina, Ph.D., North Carolina, 2001
Research Interests: My research program focuses broadly upon LandUse and LandCover Change (LULCC), medical geography, and the techniques and theoretical methods that allow one to explore the spatio-temporal dynamics of change including, but not limited to, Geographic Information Systems and Remote Sensing, Complexity Theory, and Dynamic Spatial Simulation Models.
Courses:

GEO 425	Geographic Information Systems
GEO 435	Geography of Health and Disease
GEO 825	Geoprocessing
ISS 310	People and Environment

Judy M. Olson, Ph.D., Wisconsin, 1970
Research Interests: Cartography, geographic information science, psychology of maps, map design, map use, navigational map skills, mapping for people with color vision deficiencies.
Courses:

GEO 221	Introduction to Geographic Information
GEO 801	Issues in Geographic Information Science
GEO 826	Seminar in Cartography and Geoprocessing
GEO 874	Seminar in Geographic Information Science
GEO 426	Thematic Cartography
GEO 485	Senior Seminar in Geography Education

Bruce William Pigozzi, Ph.D., Indiana, 1979
Research Interests: Regional economic impact analysis, spatial models of economic, urban and transportation systems, formulation and assessment of regional economic development, employment and other policies. Quantitative design in both theoretical and applied research contexts.
Courses:

GEO 113	Introduction to Economic Geography
GEO 413	Urban Geography
GEO 414	Geography of Transportation
GEO 463	Introduction to Quantitative Methods in Geography and Planning
GEO 865	Advanced Quantitative Methods in Geography
GEO 860	Regional Science Methods
GEO 813	Seminar in Urban and Economic Geography
GEO 815	Seminar in Location Theory and Transportation Geography

Jiaguo Qi, Ph.D., Arizona, 1993
Research Interests: Remote sensing and GIS applications in agricultural and environmental monitoring, assessment and management. Theoretical development and operational remote sensing technologies to extract biophysical parameters at variable spatial and temporal scales, including vegetation density, health status, fractional cover, leaf area index, and soil moisture. Remote information extraction and dissemination for natural and managed ecosystem assessment, including rangelands, forests, wetlands, and agricultural lands.
Courses:

GEO 324	Remote Sensing of Environment
GEO 824	Monitoring Biosphere from Space
GEO 827	Digital Image Processing and Analysis

Randall J. Schaetzl, Ph.D., Illinois, 1987
Research Interests: Spatial interactions and process linkages between soils and (i) geomorphology, (ii) climate (especially water), and/or (iii) biota. Soil geomorphology. Process geomorphology. Plant geography. Indicators of soil development. Quantification of pedogensis. Great Lakes region, especially Michigan.
Courses:

GEO 206	Physical Geography
GEO 306	Environmental Geomorphology
GEO 333	Geography of Michigan and the Great Lakes region
GEO 408	Soil Geomorphology Field Study
GEO 871	Seminar in Physical Geography
GEO 880	Seminar in Advanced Physical Geography
ISS 310	People and Environment

Ashton M. Shortridge, Ph.D., Santa Barbara, 2000
Research Interests: Geographic Information Systems, Spatial analysis, Analytical cartography, Digital terrain modeling & analysis, Uncertainty modeling and GIS, Error propagation and simulation.
Courses:

ISS 310	People and Environment
GEO 425	Geographic Information Systems
GEO 428	Digital Terrain Analysis
GEO 466	Spatial Data Analysis
GEO 492	Spatial Statistics
GEO 801	Issues in Geographical Information Science

David L. Skole, Ph.D., New Hampshire, 1992
Research Interests: global change research, land use and cover change, sustainability science, complex environmental systems, international development, remote sensing and geospatial information technologies, and geographic information for sustainable development.
Courses:

GEO 892	Advanced Research in Geography
ISS 310	People and Environment

Lawrence M. Sommers (Emeritus Professor), Ph.D., Northwestern, 1950
Research Interests: Energy, marginal area land use, geography of Scandinavia (particularly Norway), spatial analysis of Michigan, regional economic development in Europe.

Robert N. Thomas (Emeritus Professor), Ph.D., Pennsylvania State, 1968

Igor Vojnovic, Ph.D., University of Toronto, 1997
Research Interests: Urban Geography, Urban Form and Land Use Change, Urban and Metropolitan Governance, Urban-environmental Policy and Planning, Urban Design.
Courses:

GEO 113	Introduction to Economic Geography
GEO 413	Urban Geography
GEO 480	Senior Seminar
ISS 310	People and Environment

Robert Walker, Ph.D., Penn, 1984
Research Interests: Land Use Dynamics, deforestation, population and the environment/behavioral modeling, environmental impact assessment/GIS/remote sensing applications.
Courses:

GEO 113	Economic Geography
GEO 463	Introduction to Quantitative Methods for Geographers and Planners
GEO 872	Seminar in Human Geography
ISS 310	People and the Environment

Ellen White, M.S., V.P.I.&S.U., 1983
Research interests: cartographic design and production for traditional printing and internet distribution.

Jack F. Williams, Ph.D., Hawaii, 1973
Research Interests: China/Taiwan, Japan and East Asia, economic development, particularly urban and regional development, environmental issues. I tend toward applied topics and empirical research.
Courses:

GEO 204	World Regional Geography
GEO 337	Geography of East Asia
ISS 320	World Urban Systems
ISS 330B	Asia: Social Science perspectives

Julie A. Winkler, Ph.D., Minnesota, 1982
Research Interests: Synoptic climatology, climatology of convection and heavy precipitation in the eastern and central United States, application of synoptic climatological methodologies to agricultural questions, climate change and agriculture.
Courses:

GEO 206	Physical Geography
GEO 203	Introduction to Meteorology
GEO 405	Weather Analysis and Forecasting
GEO 409	Global Climate Change and Variability
GEO 865	Advanced Quantitative Methods in Geography
GEO 871	Seminar in Physical Geography
GEO 880	Seminar in Advanced Physical Geography (when I have enough climate students)
GEO 886	Research Design in Geography

Antoinette WinklerPrins, Ph.D., Wisconsin, 1999
Research Interests: People-environment geography especially in Brazilian Amazonia, cultural and political ecology, indigenous/local environmental knowledge (especially soils), smallholder agriculture in less developed countries, anthropogenic landscapes, gardens and urban agriculture, tropical soils and fluvial geomorphology as they relate to land-use.
Courses:

GEO 151	Cultural Geography
GEO 204V	World Regional Geography (virtual, summer only)
GEO 335	Geography of Latin America
GEO 454	The Geography of Environment and Development
GEO 850	Seminar on Regional Geography (Latin America)
GEO 873	Seminar in Human-Environment Geography

Robert I. Wittick, Ph.D., Iowa, 1972
Research Interests: Computer techniques in geography, particularly located-allocation models and Geographic information systems. Because of my administrative appointment, my research activities are currently inactive.
Courses:

GEO 414	Geography of Transportation

Catherine Yansa, Ph.D. University of Wisconsin at Madison, 2002
Research Interests: paleoecology, pollen and plant macrofossil analysis, plant geography, people-environment interactions, physical geography of North America
Courses:

GEO 206	Physical Geography
GEO 330	Geography of the United States and Canada
GEO 401	Plant Geography
GEO 871	Seminar in Physical Geography
GEO 490	Reconstructing Paleoenvironments (offered Spring 2004)
ISS 310	People and Environment

APPENDIX II. Courses In Geography At Michigan State University

GEO 113 Introduction to Economic Geography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Description: Spatial distribution of resources, population, enterprise, trade, consumption, and production. Interaction of those distributions at local to global scales.

GEO 151 Cultural Geography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Description: Systematic approach to the spatial distribution of cultural features, processes, and relationships.

GEO 203 Introduction to Meteorology
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Description: Fundamentals of meteorology. Energy balance, adiabatic processes, horizontal motion, cyclogenesis, and severe weather.

GEO 204 World Regional Geography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Description: In a time of increasing globalization of economic, political and technological processes, different societies on different continents are responding in various ways. This course explores the conditions that contribute to diversity in different world regions-including economic, social, political and environmental processes.

GEO 206 Physical Geography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Description: Geographic and functional interrelationships within the physical environment: Earth-sun relationships, weather, climate, soils, vegetation and landforms (terrain characteristics).

GEO 206L Physical Geography Laboratory
Credits: 1 Lab Hours: 2
1(0-2)
Prerequisite: (GEO 206 or concurrently)
Description: Geographic aspects of weather, climate, soil, vegetation, and terrain. Interpretation and application of maps and remotely sensed imagery.

GEO 221 Introduction to Geographic Information
Credits: 3 Lecture/Recitation/Discussion Hours: 2 Lab Hours: 2
3(2-2)
Description: Principles and methods of spatial data collection, handling, analysis, and display. Introduction to remote sensing, geographic information systems, and cartography.
Alias: GEO 223, GEO 225

GEO 259 Geography of Recreation and Tourism
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Description: Cultural, physical, and biotic factors affecting the distribution of recreation and tourism resources and participation. U.S. and international examples and case studies.

GEO 306 Environmental Geomorphology
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: (CSS 210 or GEO 203 or GEO 206 or GEO 330 or GEO 333 or GEO 259 or GLG 201 or GLG 304 or ISP 201 or ISP 203 or ISS 310 or RD 201) and completion of Tier I writing requirement.
Description: Relationships of running water, weathering, gravity, ice, waves, wind, and biota (including humans) to terrain and soils. Evolution of landscapes. Classical and modern interpretations.
Interdepartmental With: Geological Sciences
Administered By: Geography

GEO 314 Methods for Investigation of Urban Systems
Credits: 4 Lecture/Recitation/Discussion Hours: 3 Lab Hours: 2
4(3-2)
Prerequisite: (STT 201 and CSE 101)
Recommended Background: (UP 201)
Description: Models, approaches, and techniques for urban and regional problem analysis, research, program evaluation, and project management. Application of related computer software.
Interdepartmental With: Urban Planning
Administered By: Urban Planning

GEO 324 Remote Sensing of the Environment
Credits: 4 Lecture/Recitation/Discussion Hours: 2 Lab Hours: 4
4(2-4)
Description: Features and interpretation methods of remotely-sensed imagery, especially black-and-white and color infrared airphotos. Basic features of radar, thermal, and multispectral imagery. Interpretation for agriculture, archaeology, fisheries, forestry, geography, landscape architecture, planning, and wildlife management.
Alias: GEO 224

GEO 330 Geography of the United States and Canada
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Description: Regional analysis. Evolution and status of environmental, demographic, economic, and sociocultural patterns and processes.
Alias: GEO 230

GEO 333 Geography of Michigan and the Great Lakes Region
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Description: Michigan's physical, historical, and economic geography. Interrelationships between the physical environment (rocks, landforms, soils, climate, vegetation, hydrology) and historical and contemporary land uses. Demographic and agricultural patterns. Human history and settlement patterns contemporary recreational opportunities.
Alias: GEO 233

GEO 335 Geography of Latin America
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: Completion of Tier I writing requirement.
Restrictions: Not open to freshmen.
Description: Physical and human geography of Latin America. Current development issues, especially people-environment interaction in urban and rural areas. Topics include migration, urbanization, and industrialization.

GEO 336 Geography of Europe
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: Completion of Tier I writing requirement.
Restrictions: Not open to freshmen.
Description: Major regions and nations, including their physical resources, peoples, political structures, and economies.

GEO 337 Geography of East Asia
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: Completion of Tier I writing requirement.
Restrictions: Not open to freshmen.
Description: Spatial patterns and processes of physical and human geography in China, Japan, Korea, and Taiwan. Emphasis on development problems, especially since 1950.

GEO 338 Geography of Africa
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: Completion of Tier I writing requirement.
Restrictions: Not open to freshmen.
Description: Physical and human geography of Africa. Current development issues, especially people-environment interaction in urban and rural areas. Topics include drought, agricultural patterns, hunger, rural development, migration, and urbanization.

GEO 370 Introduction to Zoogeography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: (ZOL 355)
Description: Patterns of geographical distribution of animals and the ecological and historical processes leading to these patterns.
Interdepartmental With: Zoology , Fisheries and Wildlife
Administered By: Zoology

GEO 401 Geography of Plants of North America
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Restrictions: Not open to freshmen or sophomores.
Description: Geography of Plants in North America with emphasis on the East. Related ecological principles, soils, and post-cretaceous geologic history. Some field instruction.

GEO 402 Agricultural Climatology
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: (MTH 104 or MTH 110 or MTH 116)
Restrictions: Not open to freshmen or sophomores.
Description: Relationships between climate and agriculture in resource assessment, water budget analysis, meteorological hazards, pests, crop-yield modeling, and impacts of global climate change.
Alias: AE 402
Interdepartmental With: Biosystems Engineering
Administered By: Geography

GEO 405 Weather Analysis and Forecasting
Credits: 4 Lecture/Recitation/Discussion Hours: 3 Lab Hours: 2
4(3-2)
Prerequisite: (GEO 203) and (MTH 110 or MTH 116)
Description: Dynamic and thermodynamic principles of atmospheric science applied to the development and evolution of extratropical cyclones. Laboratory sessions include analysis of current observations and satellite imagery.

GEO 407 Regional Geomorphology of the United States
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: (GEO 306 or GLG 201 or GLG 412 or ISP 203)
Description: Geomorphic characteristics of physiographic regions of the United States.

GEO 408 Soil Geomorphology Field Study
Credits: 4 Lecture/Recitation/Discussion Hours: 2 Lab Hours: 4
4(2-4)
Prerequisite: (CSS 210 or GEO 306 or GLG 201 or GLG 412 or ISP 203)
Restrictions: Not open to freshmen or sophomores.
Description: Common geographic relationships among soils, landforms, and vegetation in lower Michigan. Description, analysis, and genesis of soils and landscapes. Surficial processes. Field trips required.

GEO 409 Global Climate Change and Variability
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: (GEO 206)
Description: Analysis of climate change and variability at various time and space scales with emphasis on climate systems, paleoclimatology, global warming, climate models, and climate impact assessment.

GEO 412 Glacial and Quaternary Geology
Credits: 4 Lecture/Recitation/Discussion Hours: 3 Lab Hours: 2
4(3-2)
Recommended Background: (GLG 201 or GEO 306 or GEO 408)
Restrictions: Not open to freshmen or sophomores.
Description: Glacial and Quaternary geology with emphasis on North America and Europe. Laboratory focuses on glacial processes. One weekend field trip required.
Interdepartmental With: Geological Sciences
Administered By: Geological Sciences

GEO 413 Urban Geography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Restrictions: Not open to freshmen or sophomores.
Description: Theories and models of urban spatial form. Underlying structures and processes. Socio-spatial dimensions of modern urbanism. Differentiation and locational conflict in residential, commercial, and industrial space.
Interdepartmental With: Urban Planning
Administered By: Geography

GEO 414 Geography of Transportation
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: (GEO 113)
Restrictions: Not open to freshmen.
Description: Spatial principles of transportation. Theories of interaction, network structures, and location-allocation models. Role of transport and transport planning.
Interdepartmental With: Urban Planning
Administered By: Geography

GEO 415 Location Theory and Land Use Analysis
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: (GEO 113 or UP 201)
Recommended Background: One of the prerequisites or an introductory ECON course.
Restrictions: Not open to freshmen or sophomores.
Description: Classical and neoclassical, static and dynamic models of industrial location and spatial organization. Land rent theory. Central place theory. Multi-locational organization. Growth transmission.
Interdepartmental With: Urban Planning
Administered By: Geography

GEO 418 The Ghetto
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Restrictions: Not open to freshmen or sophomores.
Description: Analysis of the ghetto including its spatial organization and structure. Distribution of racial and ethnic populations. Emphasis on U.S. cities.
Interdepartmental With: Urban Planning
Administered By: Geography

GEO 419 Applications of Geographic Information Systems to Natural Resources Management
Interdepartmental With: Fisheries and Wildlife , Forestry , Park, Recreation and Tourism Resources , Resource Development , Biosystems Engineering
Administered By: Fisheries and Wildlife

GEO 423 Cartographic Design and Production
Credits: 4 Lecture/Recitation/Discussion Hours: 2 Lab Hours: 4
4(2-4)
Prerequisite: (GEO 221)
Description: Elements of map design including planning, layout, typography, color theory and selection, and user issues. Techniques of map production, for both printed and electronic display.

GEO 424 Advanced Remote Sensing
Credits: 4 Lecture/Recitation/Discussion Hours: 3 Lab Hours: 2
4(3-2)
Recommended Background: (GEO 324)
Description: Interaction of solar radiation with the atmosphere, lithosphere, hydrosphere, and biosphere. Introductory digital image processing. Earth-resources satellite sensors, data products, and applications. Radar and thermal remote sensing.

GEO 425 Geographic Information Systems
Credits: 4 Lecture/Recitation/Discussion Hours: 3 Lab Hours: 2
4(3-2)
Prerequisite: (GEO 221)
Description: Technical and theoretical issues in the design, evaluation, and implementation of geographic information systems for research and application.
Interdepartmental With: Urban Planning
Administered By: Geography

GEO 426 Thematic Cartography
Credits: 4 Lecture/Recitation/Discussion Hours: 3 Lab Hours: 2
4(3-2)
Prerequisite: (GEO 221)
Description: Principles, techniques, and decision making in thematic mapping. Use of computer-mapping and geographic information systems (GIS) software to produce individual thematic maps and map series. Electronic delivery of thematic maps.
Alias: GEO 326

GEO 428 Digital Terrain Analysis
Credits: 4 Lecture/Recitation/Discussion Hours: 3 Lab Hours: 2
4(3-2)
Prerequisite: (GEO 221)
Restrictions: Open only to juniors or seniors.
Description: Theoretical and technical issues of collection, management, analysis, and display of terrain data. Application of photogrammetry, geographic information systems, and cartography.

GEO 432 Environmental Ethics in Geography(W)
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: Completion of Tier I writing requirement.
Restrictions: Open only to juniors or seniors.
Description: Ethical dimensions and scientific bases of environmental and spatial controversies arising from landscape valuation, control, and alteration.

GEO 435 Geography of Health and Disease
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Restrictions: Not open to freshmen or sophomores.
Description: Spatio-environmental concepts and techniques applied to health problems. Disease transmission cycles, community nutrition, and health-care planning.

GEO 454 Spatial Aspects of Regional Development
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: (GEO 113 or GEO 151 or GEO 330 or GEO 333 or GEO 335 or GEO 336 or GEO 337 or GEO 338)
Description: Spatial patterns and processes associated with regional development in selected world areas.

GEO 459 Tourism in Regional Development
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Recommended Background: (GEO 259 or PRR 213)
Description: The role of tourism in regional development. Examples from Michigan, and the United States and other nations. Environmental considerations.

GEO 463 Introduction to Quantitative Methods for Geographers and Planners
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Recommended Background: Completion of University mathematics requirement.
Restrictions: Open only to majors in Geography, Urban Planning, and Landscape Architecture.
Description: Quantitative techniques in the analysis and classification of spatial data.
Interdepartmental With: Urban Planning
Administered By: Geography

GEO 466 Spatial Data Analysis
Credits: 4 Lecture/Recitation/Discussion Hours: 3 Lab Hours: 2
4(3-2)
Prerequisite: (GEO 463 or STT 200 or STT 201 or STT 231 or STT 315 or STT 351)
Recommended Background: Basic computer skills, basic mathematics, basic statistics, geographic information science.
Description: Theory and techniques for statistical analysis of point patterns, spatially continuous data, and data in spatial zones.
Interdepartmental With: Statistics and Probability
Administered By: Geography

GEO 478 Urban Transportation Planning
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Restrictions: Open only to juniors or seniors in Urban and Regional Planning or Geography or approval of department.
Description: Principles of decision-making in urban transportation planning. Demand and supply analysis, social and environmental impacts, implementation programs. Use of computer models.
Interdepartmental With: Urban Planning
Administered By: Urban Planning

GEO 480 Senior Seminar (W)
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: Completion of Tier I writing requirement.
Restrictions: Open only to seniors in Geography.
Description: History, philosophy, and methodology of the geographic discipline as it has evolved within academic and social contexts.

GEO 485 Senior Seminar in Geography Education
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: (GEO 113 or GEO 151) and (GEO 204 and GEO 206 and GEO 221 and GEO 330 or concurrently and GEO 333 or concurrently)
Restrictions: Open only to Geography minors.
Description: Geography educational standards will guide the development of knowledge and technical expertise of future K-12 teachers. Emphasis will be on continued learning of geography, integration of physical and human concepts, the role of representation (maps, etc.), and the use of current events, local observations, and technology to integrate geography into the K-12 curriculum.

GEO 490 Independent Study
Variable from 1 to 4
Reenrollment
Information: A student may earn a maximum of 12 credits in all enrollments for this course.
Restrictions: Approval of department.
Description: Supervised individual study in an area supplementary to regular courses.

GEO 492 Geographic Research Problems
Credits: Variable from 1 to 4
Reenrollment
Information: A student may earn a maximum of 12 credits in all enrollments for this course.
Restrictions: Not open to freshmen or sophomores. Approval of department.
Description: Supervised original research on selected aspects of geography.

GEO 494 Remote Sensing Field Techniques
Credits: 2 Lab Hours: 4
2(0-4)
Prerequisite: (GEO 424)
Description: Collection and processing of field data to coordinate with remotely sensed imagery. Data correction and analysis. The use of global positioning systems (GPS) receivers and of sensors for determining chlorophyll levels and other biophysical properties. Hands-on experiences; considerable time outdoors. Field trips required.

GEO 495 Field Study
Variable from 1 to 4
Reenrollment
Information: A student may earn a maximum of 8 credits in all enrollments for this course.
Description: Supervised field study in geography.

GEO 498 Internship in Geography
Credits: Variable from 1 to 4
Reenrollment
Information: A student may earn a maximum of 8 credits in all enrollments for this course.
Description: Individual experience in geography in an approved organization.

GEO 801 Issues in Geographical Information Science
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Prerequisite: (GEO 221)
Description: Manipulation and display of geographic data. Interpreting and using geographic information in social and scientific contexts. Ethical issues associated with geographical information science.

GEO 813 Seminar in Urban and Economic Geography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Reenrollment
Information: A student may earn a maximum of 9 credits in all enrollments for this course.
Recommended Background: Two of GEO 413, GEO 414, GEO 415, GEO 416, GEO 417, GEO 418.
Description: Review of research on selected topics in urban and economic geography.

GEO 814 Applied Research Methods for Planning and Development
Credits: 3 Lecture/Recitation/Discussion Hours: 2 Lab Hours: 2
3(2-2)
Recommended Background: (UP 813)
Restrictions: Open only to graduate students in Urban and Regional Planning, Public Administration, and Geography.
Description: Techniques in urban and regional planning analysis. Forecasting models. Methods of urban project evaluation.
Interdepartmental With: Urban Planning
Administered By: Urban Planning

GEO 819 Spatial Epidemiology and Medical Geography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Recommended Background: (EPI 810)
Restrictions: Open only to master's students in the Epidemiology major or approval of department.
Description: Concepts, techniques, and utilization of spatio-epidemiologic analyses for human health.
Alias: HM 819
Interdepartmental With: Epidemiology
Administered By: Epidemiology

GEO 824 Monitoring the Biosphere from Space
Credits: 4 Lecture/Recitation/Discussion Hours: 4
4(4-0)
Prerequisite: (GEO 424)
Description: Remote sensing in support of global and other environmental change research. Observing patterns in satellite imagery and linking them with human processes. Monitoring Earth from space at variable spatial and temporal scales. Advanced digital image processing, information extraction, interpretation, and applications.

GEO 825 Geoprocessing
Credits: 4 Lecture/Recitation/Discussion Hours: 4
4(4-0)
Description: Integration of digital remote sensing data, geographic information systems, spatial analysis, and expert systems in solving research problems. Class research project.

GEO 826 Seminar in Cartography and Geoprocessing
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Reenrollment Information: A student may earn a maximum of 9 credits in all enrollments for this course.
Description: Review of research in cartography, geographic information systems, and remote sensing.

GEO 827 Digital Image Processing and Analysis
Credits: 4 Lecture/Recitation/Discussion Hours: 2 Lab Hours: 4
4(2-4)
Prerequisite: (GEO 424)
Description: Use of computer to classify and enhance satellite images and to extract information from them. Combining images from different sources. Accuracy assessment of resulting information.

GEO 832 Environmental and Natural Resource Law
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Recommended Background: (RD 430)
Description: Origin and development of environmental law. Theories of power, jurisdication, sovereignty, property interests, pollution, and other bases for legal controls of natural resources. Common law and constitutional limitations on governmental power.
Interdepartmental With: Resource Development , Agricultural Economics , Crop and Soil Sciences , Forestry
Administered By: Resource Development

GEO 835 Biogeography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Recommended Background: Courses in evolution and ecology at undergraduate level.
Description: Geographical distributions of plants and animals; biogeographic realms. Ecological and evolutionary mechanisms determining distributional patterns. Application of biogeography to conservation problems.
Interdepartmental With: Fisheries and Wildlife , Zoology , Plant Biology
Administered By: Fisheries and Wildlife

GEO 850 Seminar in Regional Geography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Reenrollment Information: A student may earn a maximum of 9 credits in all enrollments for this course.
Description: Review of research on contemporary geographic issues in different world regions.

GEO 854 Economics of Planning and Development
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Recommended Background: (UP 801)
Description: The physical urban environment and local economic development.
Interdepartmental With: Urban Planning
Administered By: Urban Planning

GEO 865 Advanced Quantitative Methods in Geography
Credits: 4 Lecture/Recitation/Discussion Hours: 4
4(4-0)
Recommended Background: (GEO 465)
Description: Statistical and mathematical approaches. Multiple regression, principal components and factor analysis, discriminant analysis. Related taxonomic methods.

GEO 867 Methods and Modeling in Regional Science
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Recommended Background: (EC 820 and GEO 865) and (GEO 415 or RD 461)
Description: Techniques for regional research: economic base analysis, input-output analysis, mathematical programming, and econometric and simulation analysis.
Interdepartmental With: Resource Development , Urban Planning
Administered By: Geography

GEO 871 Seminar in Physical Geography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Recommended Background: at least one course in physical geography
Description: Research on topics in physical geography.

GEO 872 Seminar in Human Geography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Recommended Background: at least one course in human geography
Description: Research on topics in human geography.

GEO 873 Seminar in Human-Environment Geography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Recommended Background: at least one course in human geography and one course in physical geography.
Description: Research on topics in human-environment geography.

GEO 874 Seminar in Geographic Information Science
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Recommended Background: at least one course in geographic information science, cartography or remote sensing
Description: Geographic information science (GIS) applications to social and environmental problems. Theory and related issues.

GEO 880 Seminar in Advanced Physical Geography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Reenrollment
Information: A student may earn a maximum of 9 credits in all enrollments for this course.
Description: Advanced study of soils, geomorphology, climatology and/or plant geography.
Alias: GEO 809

GEO 886 Research Design in Geography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Description: Research and writing in geography. Identification of geographic problems and their relative importance. Structuring and stating hypotheses. Data acquisition and tests for validity.

GEO 890 Advanced Readings in Geography
Variable from 1 to 8
Reenrollment
Information: A student may earn a maximum of 12 credits in all enrollments for this course.
Restrictions: Approval of department.
Description: Advanced independent readings.

GEO 892 Advanced Research in Geography
Credits: Variable from 1 to 4
Reenrollment
Information: A student may earn a maximum of 12 credits in all enrollments for this course.
Description: Advanced independent research.

GEO 899 Master's Thesis Research
Variable from 1 to 12
Reenrollment
Information: A student may earn a maximum of 99 credits in all enrollments for this course.
Restrictions: Open only to graduate students in Geography.
Description: Master's thesis research.

GEO 986 Theory and Methods in Geography
Credits: 3 Lecture/Recitation/Discussion Hours: 3
3(3-0)
Restrictions: Open only to Ph.D. students in Geography.
Description: Historical development of the discipline within social and intellectual contexts. Current methodological and philosophical approaches to geographic research.

GEO 999 Doctoral Dissertation Research
Credits: Variable from 1 to 24
Reenrollment
Information: A student may earn a maximum of 99 credits in all enrollments for this course.
Description: Doctoral dissertation research.

APPENDIX III. Non-Geography Courses Taken By MSU geography graduate students since 1992

A strength of graduate study at Michigan State is the diverse course offerings across our large campus. Our students are always encouraged to take courses from other Departments. Since Fall 1992, we have been keeping track of all non-seminar courses, outside of Geography, taken by our graduate students.

Unit Offering Course	Course Number	Course Title
African Languages	AFR 450B	Advanced African Language
Agricultural Economics	AEC 841	Analysis of Food Sys Org
	AEC 845	Commodity Market Analysis
	AEC 861	Agriculture in Economic Development
	AEC 891C	Data Collection and Analysis in Developing Countries
Agricultural Technology & System Management	ATM 836	Microclimate and Its Management
Anthropology	ANP 414	Anthropology of South Asia
	ANP 431	Gender, Environment and Development
	ANP 867	Social Impact
Botany	BOT 441	Plant Ecology
Computer Science	CSE 320	Computer Organization and Assembly Language Programming
	CSE 410	Operating Systems
Crop and Soil Science	CSS 210	Fundamentals of Soil and Landscape Science
	CSS 470	Soil Resources
	CSS 825	Clay Mineralogy and Soil Genesis
	CSS 840	Soil Physics
Economics	EC 420	Introduction of Econometric Methods
	EC 820	Econometrics I
Entomology	ENT 460	Medical and Veterinary Entomology
Fisheries & Wildlife	FW 443	Restoration Ecology
	FW 444	Conservation Biology
	FW 852	Systems Modeling and Simulation
	FW 419	Application of GIS Natural Resources
	FW 414	Aquatic Ecosystem Management
	FW 824	Analysis of Wildlife Populations
	FW 835	Biogeography
	FW 893	Landscape Ecology
Forestry	FOR 404	Forest and Agricultural Ecology
French	FRN 102	Elementary French II
	FRN 320	Grammar and Composition
Geological Sciences	GLG 411	Hydrogeology
	GLF 412	Glacial and Quaternary Geology
Human Medicine	HM 810	Epidemiology Theory and Methods
	HM 817	Epidemiology of Infectious Disease

	HM 817	Epidemiology of Infectious Disease
Human Nutrition and Foods	HNF 375	Community Nutrition
	HNF 406	Sociocultural Aspects of Food
	HNF 843	Community Nutritional Assessment
Natural Science	NSC 840	Writing for the Sciences
Park and Recreation Resources	PRR 475	Evaluation in Parks and Recreation
	PRR 840	Recreation and Tourism Economics
	PRR 841	Parks and Recreation Administration and Policy
	PRR 874	Leisure, Travel and Tourism
Philosophy	PHL 440	Central Issues in Ethics
Resource Development	RD 430	Natural Resource Law
	RD 460	Resource and Environmental Economics
	RD 452	Watershed Concepts
	RD 824	Watershed Management
	RD 832	Environmental Law
	RD 870	Community Resource Development
	RD 878	Administration of International Development
Sociology	SOC 452	Environment and Society
	SOC 452L	Internship Environment and Society
Statistics	STT 421	Statistics I
Urban and Regional Planning	URP 428	Principles of Regional Planning
	URP 801	Policies and Issues in Planning and Development
	URP 814	Applied Research Methods for Planning and Development

APPENDIX IV. AFTER YOU ARE HERE: MISCELLANEOUS

A. **Payroll forms:**. Graduate students being funded by the department need to access ePayroll. You can set up direct deposit of your assistantship check and your tax withholding (Federal W-4 and State of Michigan W-4). For access to ePayroll, you are required to log on with your MSUNet ID and password. You can link to the ePayroll system through the following web sites:

Web address: www.epayroll.msu.edu
STUINFO – (under "Online Student Services" with a heading of Payroll Forms).

You will need to give a copy of your Social Security card to the graduate secretary. If you have lost your card – you can apply for another card at their local office is: Social Security Office, 5210 Perry Robinson Ct., Lansing MI 48911, Phone: 800-772-1213 or 517 393-3876

B. **I.D.** Student ID's can be obtained in Room 50 Administration Bldg.

C. **Mail**. Please check mail boxes each day for personal mail, departmental notices, etc. The mailboxes are located in room 315B Natural Science.

D. **Telephone**. Personal long distance telephone calls are NOT to be placed on departmental phones (phones in graduate student offices are secured from long distance calls).

E. **Copy Machine**. Graduate students are allowed 1000 free photocopies per semester. A copy machine access code will be assigned to you. The geography receptionist can assist if you forget your code.

F. **Office Staff**. The office staff is here to assist you from 8:00 a.m. to 12:00 noon, and from 1:00 p.m. to 5:00 p.m.

G. **Student Evaluation Forms**. The University has a standard Student Evaluation form. However, the Department of Geography elects to use its own Student Evaluation Forms. These forms are available in the main Geography office (315 Nat. Sci.), in the copy/storage room. TAs are required to hand out these forms to each of their classes each semester. The forms must be filled out by the students, collected by someone other than the TA, and returned to the Department office.

H. **Parking on campus.** If you own a motor vehicle and want to use it on campus, you must register it with the University Vehicle Office. The Vehicle Office is located in the Public Safety Building, 87 S. Red Cedar Road. To register a vehicle you need the vehicle registration, proof of insurance, and a copy of your signed appointment form which is given to you by the Graduate Secretary.

I. **Laboratory Safety** (for physical geographers)**.** All graduate student work in the Geomorphology Laboratory, outside of regularly scheduled classes, must have prior approval by a faculty member. No approval can be given unless the student has viewed the "Right to Know" video. Students must certify that they have seen this film before being allowed to work in any laboratory. All lab personnel generating any hazardous waste must come to a Hazardous Waste Refresher Training Session once each year, given by the Office of Radiation, Chemical and Biological Safety on campus. Students must attend these sessions to maintain authorization to handle hazardous materials. Federal law mandates this training, and we must assure that all of the workers handling hazardous materials attend each year.

J. **Email accounts.** All students can obtain electronic mail accounts on the MSU pilot email system at no cost. Once you have obtained your account, please inform the Graduate Secretary of your email address so that it can be added to the various

Departmental mailing lists. If you also obtain an account on the Sun workstations, you will also be able to send and receive mail with that account.

K. Bikes. The University maintains bicycle racks throughout the campus. Bikes should be locked to these racks when parked. Bikes are not permitted in campus buildings. Improperly parked bikes are subject to impoundment by the Department of Public Safety. Bicycle registration through the MSU Department of Public Safety or the cities of East Lansing or Lansing is required. A 4-year MSU bike or moped registration may be purchased for $2.00 from the Department of Public Safety.

L. Frequently Used Numbers and Important Contacts on Campus

Dean's Office, College of Social Science - 203 Berkey Hall 353-9202
Admissions and Scholarships - 250 Admin. Bldg 355-8332
Registrar's Office - 150 Admin. Bldg 355-3300
Telephone Enrollment 432-3000 or 800-678-1715
Billing Statements - 142 Admin. Bldg 355-3343
PAN Numbers, - Office of the Registrar 150 Admin. Bldg 355-3300
Payroll (direct deposit) - 350 Admin. Bldg 355-5010
Degree & Certification - 160 Admin. Bldg 353-3880
Transcripts - 50 Admin. Bldg 355-5150
Graduate School - 118 Linton Hall 355-0300

STUDENT SERVICES

Graduate Record Examination sign-up - 207 Student Services 355-8385
Financial Aid/Student Loan - 259 Student Services 353-5940
ASMSU/COGS Legal Services - 329 Student Services 353-3716
Council of Graduate Students (COGS) 353-9189
Office of Financial Aid - 252 Student Services 353-5940
Div. of Student Affairs & Services - 101 Student Services 355-8303
Career Services & Placement Center - 113 Student Services 355-9510
Counseling Center - 207 Student Services 355-8270
Department of Married Student Housing - 1205 S. Harrison Rd 355-9550
Employee Assistance Program - 205 Olds Hall 355-4506
Urban Affairs Assistant Dean - 130 W. Owen 353-9506

GRADUATE FELLOWSHIPS AND GRADUATE ASSISTANTSHIPS

The following web addresses give information about Academic Achievement Graduate Assistantships (AAGA); University Distinguished Fellowships (UDF); University Enrichment Fellowships (UEF); and Education Opportunity Fellowships

Info on UDF and UEF: http://grad.msu.edu/ufellows.htm

Info on AAGA: http://grad.msu.edu/all/aaga.htm

Info on EOF: http://grad.msu.edu/all/eof.htm

If you have questions please contact Suzy Pavick at geop@msu.edu or 517 353-1803

COMPUTER CENTER

Computing Resource Center 355-4500 (ext. 122)
Computer Store - 305 Computer Center 355-4500 (ext 204)
Scoring Office – 114 Computer Center 355-1819

INTERNATIONAL CENTER

English Language Center - 1 International Center 353-0800
Director, Office for International Students & Scholars- 103 International Ctr 353-1720
Office of Study Abroad - 109 International Center 353-8920
International Studies & Programs, Deans Office - 209 International Center 355-2350

LIBRARY

Information Desk 353-8700
Library Hours 355-8981
Map Library 3rd floor Main Library 432-6277

STUDENT HEALTH SERVICES

Olin Health Center Information Desk 355-4510
Olin Health Center Appointments 353-4660
Olin Pharmacy 103 Olin Health Center 353-9165
Student Insurance Questions-Benefits Administration, 140 Nisbet Bldg 353-4434, ext. 144 or 170

APPENDIX IV. CAMPUS-WIDE RESOURCES AND SERVICES FOR GRADUATE STUDENTS

The University provides a wide array of services to students to assist them in adjusting to the stresses that go with a rigorous academic life.

1. **Student Services**

Michigan State University provides extensive student personnel services to assist students and enhance the educational experience. Michigan State University recognizes that the total development of the individual-personal, social, and physical, as well as intellectual is of equal importance.

The Vice President for Student Affairs and Services has general administrative responsibility for all student personnel matters. The multiple services and responsibilities are carried out through the offices of Coordinated Minority Student Programs, Counseling, Financial Aids, Intramural Sports, Recreative Services, Placement Services (including Student Employment and the Career Information Center), Student Life, and University Housing Programs. The Student Life area includes Campus Life Orientation, Health and Alcohol Education, Judicial Affairs, Off-Campus Housing and Commuter Programs, Service Learning, Student Activities, Student and Leadership Development, and Student Withdrawals and Records.

2. **Michigan State University Library**

It is strongly suggested that you take advantage of the library tours in order to more thoroughly familiarize yourself with all the available resources. There are also many branch libraries on campus.

3. **Computer Center**

User Services, telephone numbers:

353-1800 Computing Information Center
353-1800 Mainframe/Host Access Support Services
353-4599 Microcomputer Support Services/Store

User Services offers consulting help on canned statistical programs and “helps students help themselves”. It refers students elsewhere if User Services cannot offer enough assistance. User Services will help students short of doing the job for them. There is no charge for the consulting service. Graduate student consultants from the Department of Statistics and Probability are available on an appointment basis for about ten hours a week. They consult about design problems, appropriate statistical design, etc. There is no charge for this service. A number of short courses are offered through User Services, including a basic introduction to the computer, and discussion of collection and coding of data, offered at the beginning of the term.

4. **Programming Services** 355-4684

This is a professional group that charges professional fees for computer work. They can offer some statistical help although they are limited in this area. They can do just about any computer programming work. All students are given an estimate of charges which they must approve before the job is performed.

5. **Office for International Students and Scholars**

The Office for International Students and Scholars (OISS) serves international students and international faculty. OISS is a resource center for information and consultation on matters related to international students and faculty/scholars. The staff is prepared to help in any of the various areas of concern, including academic problems, immigration questions, social health,

employment or financial matters. The office also organizes seminars and workshops on topics of interest to the broad university community. These have included immigration regulations, cross-cultural communication, pre-departure programs for graduating students and various training programs. They also publish a very informative handbook called Welcome to Our Community, that answers questions you may have about living and going to school in our community. A copy of this handbook can be picked up in the OISS. The OISS is located in room 103 in the International Center and can be contacted by phone at 353-1720, email: oiex@pilot.msu.edu

6. **Learning Resources Center,** 209 Bessey Hall 355-2363

This is a self-paced, individualized learning center that offers free assistance to students who want to improve their study skills. Its goal is to help you develop the strategies and techniques you need to be successful student. Workshops on specific study skills are offered throughout the year.

7. **The Writing Center,** 300 Bessey Hall 432-3610

This center offers writing consultation to graduate as well as undergraduate students. One on one consultations are best for small papers or projects like Vitas, abstracts and cover letters, while peer response writing groups offer help developing drafts of larger projects like research and conference papers, and even theses and dissertations. The center also has a library with books on resumes, Vitas and cover letters, and examples of all of the above. Call 432-3610 to make an appointment, or email grammar@pilot.msu.edu for grammatical questions. You can also see their web site at (http://www.writing.msu.edu) for more information.

8. **Career Development & Placement Services,** 113 Student Services 355-9510

The Career Development and Placement Services office assists students in career advising and seeking employment upon graduation. Their office is located in 113 Student Services Building. Their staff does workshops, classes and individual advising on topics such as how to interview successfully and steps to creating a well-written resume. You may also interview for internships or full-time employment through the Career Placement office.

The Career Information Center, located in room 6 Student Services Bldg (353-6474) provides up-to-date information on career possibilities, self-evaluation tools, and resource material on career choice, planning and strategy.

9. **Programs for Handicapper Students,** 101 Bessey Hall 353-9642

Staff specialists available to respond to mobility, visual, hearing, alternative learner, and other handicapper populations to enable their involvement in University activities. Other resources are available to students with special needs.

10. **Counseling Center Main Office**

207 Student Services Building 355-8270
344 Olin Health Center (for off campus students) 355-2310
Multi-Ethnic Counseling 207 Student Services Building 355-8270

Students should feel free to contact the Counseling Center for personal concerns and crises. Professional counseling and psychological services are offered to assist with personal, as well as career concerns. All services are confidential. Initial consultations are free of charge; all services are free to students carrying 7 or more credits. In addition to professional counseling a self-management laboratory, and workshops are offered.

11. **Olin Health Center** 355-7573

The Student Health Service is located in Olin Health Center. In the event of an emergency, no matter what time of day, go directly to Sparrow Hospital, St. Lawrence or Michigan Capital Medical Center if possible. Otherwise go to the nearest emergency center.

12. **Women's Resource Center** 353-1635

The WRC coordinates contacts relating to concerns of women and advocates women's issues by developing and implementing programs targeted for women faculty staff and students. They sponsor many workshops on campus.

13. **Intramural Sports Facilities** 355-5250

Students have access to equipment and facilities in the intramural facilities located in the IM-West, IM-East, and IM-Circle. Students must present a current MSU student ID and a picture ID in order to be admitted to these facilities and borrow the equipment. Use of most of the facilities is free to currently enrolled students, although there are a few exceptions, such as a small charge for the use of the weight room in the IM-East.

14. **MSU Student Food Bank** 353-2898

COGS and ASMSU jointly established a Student Food Bank to address the problems of students and their families with financial hardship. The SFB is located at Olin Health Center, and hours are 5:30- to 7:30 p.m. on Thursday evenings. Students may visit bi-monthly. For more information, or to volunteer, stop by the office (320 Student Services).

15. **Council of Graduate Students (COGS)**

COGS is the official graduate student organization at Michigan State University. Officers and departmental representatives (one representative per department for the entire University) are voting members. The primary objective is improvement of the academic, social, and economic position of graduate students at MSU. The organization has official delegates to the Graduate Council, the Academic Council and standing committees thereof, and several all-university and presidential committees. Through membership in these and other bodies, COGS participates in decisions on such matters as tuition and fees, the grading system, traffic regulations, academic and extracurricular programs of the university, graduate assistant stipends, improvements in on and off campus student living conditions, academic freedom and responsibilities, student representation in university government, and the selection of principal administrative officers. Meetings are open to all graduate students. For further information, contact the department for the name of your representative.

16. **Graduate Employees Union (GEU)**

The Graduate Employees Union (GEU) would like to welcome you to MSU. GEU is the legal collective bargaining unit for all graduate employees designated as teaching assistants at MSU. This means the University is obligated to bargain a contract with us concerning our pay, benefits (including health insurance and tuition waivers), and working conditions. GEU also represents any TA (regardless of membership status) in grievances regarding their employment. With our current contract you are guaranteed: yearly wage increases, protection from overwork, a grievance procedure that addresses a variety of issues arising in the work place, University contributions for family health coverage, and many other benefits and protections. We hope you will want to become a member of GEU. The collective effort of your colleagues has brought us this far and with your help we can continue making our lives and our families' lives better. The benefits of joining are immediate: you become eligible for a union-sponsored vision care program, you are able to vote in all GEU elections, and you have the right to hold executive office, sit on the

Steering Committee or Stewards Council - in short you have the right to participate in decisions that affect our work and lives.