department. The Graduate School application, GRE scores, transcripts (sent directly from the institution[s]), and TOEFL/IELTS score are sent to the Graduate School.

Centers—College centers directed by department faculty include the Institute on Community Integration (ICI), the Minnesota Postsecondary Education Research Institute (Minnesota-PERI) and the Center for Applied Research and Educational Improvement (CAREI). These centers provide research and graduate assistantship opportunities for department graduate students.

Courses—Please refer to Educational Policy and Administration (EdPA) in the course section of this catalog for courses pertaining to the program.

Use of 4xxx Courses—Inclusion of 4xxx courses on degree program forms is subject to adviser and director of graduate studies approval.

M.A. Plan B Degree Requirements

The master’s is available under four program tracks: educational administration, evaluation studies, higher education, and comparative and international development education. All M.A. programs require 12 or more credits in program core courses, 6 or more credits in a related field, 6 or more credits of research methodology courses, 2 to 4 credits for the Plan B paper, and an oral exam. Within the general framework for M.A. requirements, the degree program is developed by the student and his or her adviser and is subject to approval by the department’s director of graduate studies and the Graduate School. For specific requirements see the current Student Handbook under Student Resources on the department Web site address listed above.

Language Requirements—None.

Final Exam—The final exam is oral.

Ph.D. Degree Requirements

The Ph.D. is available in four program tracks: educational administration, evaluation studies, higher education, and comparative and international development education. All Ph.D. programs include 10 credits in department core courses, 18 or more credits in program core courses, 12 or more credits of research methodology courses, 12 or more course credits in a supporting program or minor, and 24 thesis credits. The minimum total of course credits varies by track (see Student Handbook on the Web site for details). Preliminary written and oral exams are required. Students must complete a dissertation. Within the general framework for Ph.D. requirements, the degree program is developed by the student and his or her adviser and is subject to approval by the department’s director of graduate studies and the Graduate School.

Language Requirements—None.

Final Exam—The final exam is oral.

Ed.D. Degree Requirements

The doctor of education (Ed.D.) is a professionally oriented degree program for those who will provide leadership in educational institutions. The program emphasizes breadth of preparation in educational policy and administration and in related fields. Through courses, seminars, and independent study, students learn to apply the products of disciplined inquiry to educational policy issues and practical situations in educational environments.

The Ed.D. is offered in two areas in educational policy and administration: educational administration (PK-12 schools) and higher education. Cohorts include those in the metropolitan area, out state Minnesota, and international schools. The Ed.D. degree is offered only in the context of cohort programs of 20-30 students each. All Ed.D. cohort programs include department core courses, program core courses, inquiry and research courses, supporting program or minor, and field research project credits. Within the overall 76 or more credit framework (some credits may be brought in from previous graduate work), specific course requirements are developed for each program area and cohort. See the department Web site address above for requirements in specific cohorts.

Preliminary written and oral exams are required. Students must complete a professional field project that contributes to the improvement of educational policy or practice.

Language Requirements—None.

Final Exam—The final exam is an oral defense.

Educational Psychology

Contact Information—Director of Graduate Studies Assistant, Department of Educational Psychology, University of Minnesota, 204 Burton Hall, 178 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-624-1698; fax 612-624-8241; epsy-adm@umn.edu; www.education.umn.edu/EPSyPsyc).

For specific track materials, contact the tracks as follows:

Counseling and Student Personnel Psychology, University of Minnesota, 204 Burton Hall, 178 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-624-8241;fax 612-624-8241; spp-adm@umn.edu)

Psychological Foundations of Education, University of Minnesota, 204 Burton Hall, 178 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-624-0042; fax 612-624-8241; psyf-adm@umn.edu)

Quantitative Methods in Education, University of Minnesota, 204 Burton Hall, 178 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-624-0042; fax 612-624-8241; psyf-adm@umn.edu)

School Psychology, University of Minnesota, 344 Elliott Hall, 75 E. River Road, Minneapolis, MN 55455 (612-624-4156; fax 612-624-0879; kbpsych@umn.edu)

Special Education, University of Minnesota, 206 Burton Hall, 178 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-624-0367; fax 612-624-8241; ped-adm@umn.edu)

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step.

Professor

William M. Bart, SM
Robert H. Bruininks, SM
Sandra L. Christenson, SM
Eli Coleman, Family Medicine and Community Health, ASM
Nicki R. Crick, ASM
Mark L. Davison, SM
Stanley L. Deno, SM
Byron Engeland, Child Development, ASM
Christine A. Espin, SM
Joan B. Garfield, SM
Sunny Sundal Hansen (emeritus), ASM
Michael R. Harwell, SM
Thomas J. Hummel, SM
Susan C. Hupp, SM
David R. Johnson, Educational Policy and Administration, AM2
David W. Johnson, SM
Roger T. Johnson, Curriculum and Instruction, AM2
Jean A. King, Educational Policy and Administration, AM2
Frances P. Lawrenz, SM
Rodney G. Loper, Psychiatry, AM2
Geoffrey M. Maruyama, SM
Scott R. McConnell, SM
Anthony Pellegrini, SM
Joe E. Reichle, Communication Disorders, AM2
John L. Romano, SM
S. Jay Samuels, SM
Thomas M. Skovholt, SM
Robert D. Tennyson, SM
Paulus W. van den Broek, SM
Patricia R. McCarthy Veach, SM
Richard A. Weinberg, Child Development, ASM
James E. Ysseldyke, SM

Associate Professor

Ernest C. Davenport, SM
Robert C. DelMas, General College, AM2
V. Lois Erickson, SM
Jeffrey D. Long, M2
Jennifer J. McComas, SM
Kristen McMaster, M2
Michael C. Rodriguez, M2
Susan Rose, SM
Frank J. Symons, M2
Kay Herting Wahl, M2

Assistant Professor

Pearl Barner, Psychology, AM
Lesley Craig-Unkefer, M2
Michael P. Golt, M2
David N. Rupp, M2
Kay A. Thomas, International Programs, AM2
Sherri L. Turner, M2

Lecturer

Brian H. Abery, AM2
Ann M. Casey, AM
Courses—Please refer to Educational Psychology (EPSy) in the course section of this catalog for courses pertaining to the program.

Use of 4xxx Courses—None of the five tracks allow 4xxx or 6xxx coursework to be counted toward Graduate School degree program requirements.

Educational Psychology—Counseling/Personnel

The counseling and student personnel psychology (CSPP) program subscribes to the scientist/practitioner model, which assumes that scholarly inquiry and counseling practice are interdependent and complementary. The program’s primary mission is to prepare counseling psychologists to bring a well-trained professional's attitude and interest to bear on the application of psychological and education knowledge. In addition to becoming skilled clinicians, students learn to be critical consumers and producers of both qualitative and quantitative research.

M.A. Degree Requirements

Students must complete at least 48 credits, including credits in EPSy core courses (statistics, measurement, learning, and social psychology), 30 credits in counseling theory and practice, and 6 credits in a related field or minor.

Language Requirements—None.

Final Exam—The final exam is written; students must also submit a portfolio.

Minor Requirements for Students Majoring in Other Fields—A master’s minor requires at least 6 credits of graduate-level EPSy courses.

Ph.D. Degree Requirements

Students must complete credits in EPSy core courses (statistics, measurement, learning, social psychology, foundations, and research methods); 51 credits in counseling theory and practice, practica, and internships; 12 credits in a supporting program or minor; and 24 thesis credits.

Language Requirements—None.

Minor Requirements for Students Majoring in Other Fields—A doctoral minor requires at least 15 credits of graduate-level EPSy courses: 9 credits in psychological foundations and 6 credits in applied areas, of which at least 9 credits must be in 8xxx courses.

Certificate of Specialist Requirements

Students must complete at least 60 credits, including 13 credits in EPSy core courses (statistics, measurement, learning, and social psychology), and 26 credits in counseling theory and practice.

Language Requirements—None.

Final Exam—The final exam is oral.

K-12 School Counseling (For those seeking licensure only)

This licensure program is designed for professionals who already hold a master’s degree in counseling or a related field and want to broaden their career development with a K-12 school counseling license. It aligns with the licensing requirements of the Minnesota Department of Education and state licensing board.

Educational Psychology—Psychological Foundations

Graduate study in psychological foundations of education prepares students for research and teaching positions in colleges and universities, schools, private industry, human service organizations, health science units, government agencies, and other research and development centers. The goal of psychological foundations of education is to apply and generate knowledge of psychological processes and metacognitive procedures involved in learning and teaching.

The program offers M.A. and Ph.D. degrees with emphases in social psychology, personality, human development in education, learning and cognition, human relations, and educational technology. Students typically choose one of these areas in addition to achieving broad competence in all aspects of the curriculum.

M.A. Degree Requirements

Students must complete at least 30 credits, including credits in EPSy core courses (statistics, measurement, learning, social psychology) and 6 credits in a related field or minor.

Language Requirements—None.

Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—A master’s minor requires at least 6 credits of graduate-level EPSy courses.

Ph.D. Degree Requirements

Students must complete credits in EPSy core courses (statistics, measurement, learning, social psychology, foundations, and research methods), EPSy electives, 12 credits in a supporting program or minor, and 24 thesis credits.

Language Requirements—None.

Minor Requirements for Students Majoring in Other Fields—A doctoral minor requires at least 15 credits of graduate level courses in EPSy: 9 credits in psychological foundations and 6 in applied areas, of which at least 9 credits must be in 8xxx courses.
Educational Psychology—
Quantitative Methods in Education (QME)
Graduate Study in QME prepares students for a wide variety of careers, including positions in test publishing firms, college and university teaching and research, research and evaluation centers, public school systems, state departments of instruction, and private industry. The goal of QME is to provide students with broad but rigorous methodological skills so that they may conduct research on methodologies, may help to train others in methodology, or will have the skills necessary to conduct research in related fields.

The program offers M.A. and Ph. D. degrees with emphases in measurement, evaluation, statistics, and statistics education. Students typically choose one of these areas in addition to achieving competence in all aspects of the curriculum.

M.A. Degree Requirements
Students must complete at least 30 credits, including credits in EPsy core courses (statistics, measurement, learning, social psychology) and 6 credits in a related field or minor.

Language Requirements—None.
Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—A master’s minor requires at least 6 credits of graduate-level EPsy courses.

Ph.D. Degree Requirements
Students must complete credits in EPsy core courses (statistics, measurement, learning, social psychology, foundations, and research methods). In consultation with their advisors, students develop a curriculum and select courses and practica placements that are appropriate for their interests, prior experience, and career directions.

Language Requirements—None.
Minor Requirements for Students Majoring in Other Fields—A doctoral minor requires at least 15 credits of graduate-level EPsy courses: 9 credits in psychological foundations and 6 credits in applied areas, of which at least 9 credits must be in 8xxx courses.

Educational Psychology—
School Psychology
School psychology is an interdepartmental program involving the Departments of Educational Psychology, Psychology, and the Institute of Child Development. It is fully accredited by the American Psychological Association, the Minnesota Board of Teaching, and the National Association of School Psychologists. Through coursework and practica/internships, students develop competencies in assessment, consultation, intervention and program development, research, and evaluation. Graduates are employed as psychologists in local schools, university clinics and hospitals, community mental health centers, and as trainers/researchers in universities. Since 1988, training has focused on the delivery of psychological services in schools and school communities to promote children’s and adolescent’s academic, social, and behavioral success.

The program integrates didactic and experiential components of training and applied research. Students develop specific competencies through a broad range of applied experiences, including field placements, practica assignments, and a full-year internship.

M.A. Degree Requirements
School psychology does not offer the M.A. as a terminal degree; rather the M.A. is required to obtain the Ed.S. or Ph.D. in educational psychology. The M.A. is offered under Plan A (thesis) and Plan B (paper) and requires at least 30 credits: credits in EPsy core courses (statistics, measurement, learning, and social psychology) and 6 credits in a related field or minor. Plan A students must also take 10 thesis credits; Plan B students take 2 research credits (EPsy 8994).

Language Requirements—None.
Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—An master’s minor requires at least 6 credits of graduate-level EPsy courses.

Ph.D. Degree Requirements
The Ph.D. program educates future school-based researchers with emphases in family/school partnerships, accountability systems, school dropouts, and school outcomes and interventions for children/adolescents at risk. Students must complete credits in EPsy core courses (statistics, measurement, learning, social psychology, foundations, and research methods). In consultation with their advisors, students develop a curriculum and select courses and practica placements that are appropriate for their interests, prior experience, and career directions.

Language Requirements—None.
Minor Requirements for Students Majoring in Other Fields—A doctoral minor requires at least 15 credits of graduate-level EPsy courses: 9 credits in psychological foundations and 6 credits in applied areas, of which at least 9 credits must be in 8xxx courses.

Certificate of Specialist Requirements
The specialist program is designed for students who want to become practitioners. It meets the Minnesota certification requirements for school psychologists.

Students must complete at least 60 credits, including credits in EPsy core courses (statistics, measurement, learning, social psychology, and research methods) and NASP requirements that are delineated in terms of 11 domains of training (e.g., Data-Based Decision-Making and Accountability, Consultation and Collaborations).

Language Requirements—None.
Final Exam—The final exam is written.

Educational Psychology—
Special Education
M.A., Ph.D., and certificate of specialist degrees are offered in special education in the following specializations: deaf/hard-of-hearing, emotional behavior disorders, early childhood special education, learning disabilities, autism, and developmental disabilities. Early involvement in research projects and the development of original research programs in such areas as instructional strategies, social and cognitive development, behavioral and psychological management, child development, and technology are encouraged. Special projects and training programs supplement academic studies.

The program focuses on the attainment of core competencies and related skills, since special education professionals share many common concerns and goals. A complementary emphasis is placed on problems unique to or extremely influential in the field, including social and cultural perceptions about disabilities, and federal, state, and local legislation regarding prevention and the care, treatment, education, training, and support of persons with disabilities.

M.A. Degree Requirements
Students may emphasize consulting, college teaching, or research in one or more of the specializations.

Students must complete at least 30 credits, including credits in EPsy core courses (statistics, measurement, learning, and social psychology), 6 credits in special education foundations, and 6 credits in a related field or minor. Plan A students must take 10 thesis credits.

Language Requirements—None.
Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—A master’s minor requires at least 6 credits of graduate-level EPsy courses.

Ph.D. Degree Requirements
The Ph.D. program trains graduates to address problems related to the full development of individuals with disabilities and their families. Intensive course-related learning and guided experiences prepare students to assume professional leadership. Further
competencies may be achieved in four areas of emphasis: research, professional preparation, administration/policy, and clinical practice/community service.

Students must complete credits in EPsy core courses (statistics, measurement, learning, social psychology, foundations, and research methods), 12 credits in special education (EPsy 8701 and 8702 and 6 additional credits which must be from EPsy 86xx or 87xx offerings), 12 credits in a supporting program or minor, and 24 thesis credits.

**Language Requirements**—None.

**Minor Requirements for Students Majoring in Other Fields**—A doctoral minor requires at least 15 credits of graduate-level EPsy courses: 9 credits in psychological foundations and 6 in applied areas, of which at least 9 credits must be in 8xxx courses.

**Certificate of Specialist Requirements** Students must complete at least 60 credits, including credits in EPsy core courses (statistics, measurement, learning, social psychology, and research methods) and 6 credits of special education foundations. The remaining coursework usually focuses on two or more special education areas, determined in consultation with the adviser.

**Language Requirements**—None.

**Final Exam**—The final exam is oral.

### Electrical Engineering

**Contact Information**—Director of Graduate Studies, Department of Electrical Engineering, University of Minnesota, 4-178 Electrical Engineering/Computer Science, 200 Union Street S.E., Minneapolis, MN 55455 (612-625-3564; fax 612-625-4583; graduate_studies@ece.umn.edu); www.ece.umn.edu. For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.

**Professor**
- Vernon D. Albertson, (emeritus), ASM
- Massoud Amini, SM
- Stephen A. Campbell, SM
- Vladimir Cherkassky, SM
- Philip I. Cohen, SM
- E. Dan Dahlberg, Physics, ASM
- David H. Du, Computer Science and Engineering, ASM
- Tryphon T. Georgiou, SM
- Georgios Giannakis, SM
- Anand Gopinath, SM
- Jack H. Judy (emeritus), ASM
- Mostafa Kaveh, SM
- John C. Kieffer, SM
- Richard A. Kiehl, SM
- Larry L. Kinney, SM
- K. S. P. Kumar (emeritus), ASM
- Vinod Kumar, Computer Science and Engineering, ASM
- James R. Leger, SM
- David J. Lilja, SM
- Zhi-Quan Luo, SM
- Christine Mazar, SM
- Ned Mohan, SM
- Jaekyun Moon, SM
- Marshall I. Nathan (emeritus), ASM
- Hal Ottesen, Rochester, ASM
- Nikolaos P. Papanikolopoulos, Computer Science and Engineering, ASM
- Keshab K. Parhi, SM
- Robert P. Patterson, Physical Medicine and Rehabilitation, ASM
- William T. Peria (emeritus), SM
- Dennis L. Polla, SM
- William P. Robbins, SM
- P. Paul Ruden, SM
- Sachin Sapatnekar, SM
- Guillermo Sapiro, SM
- Marian S. Stachowicz, Duluth, ASM
- Ahmed H. Tewfik, SM
- J. Thomas Vaughan, Radiology, Magnetic Resonance Research, ASM
- Randall H. Victoria, SM
- Jian-Ping Wang, SM
- Bruce F. Wollenberg, SM
- Paul R. Woodward, Astronomy, ASM
- Pen-Chung Yew, Computer Science and Engineering, ASM
- Ofer Zeitouni, Mathematics, ASM

**Associate Professor**
- Mohamed-Slim Aouini, SM
- Phonda Drayton, SM
- Emad Ebbini, SM
- Douglas W. Ernie, SM
- Bruce E. Hammer, Radiology, ASM
- Ramesh Harjani, SM
- Ted K. Higman, SM
- James E. Holte, SM
- Thomas S. Lee (emeritus), ASM
- Jaijeet Roychowdhury, SM
- Nicholas D. Sidiropoulos, SM
- Gerald E. Sobelman, SM
- Joseph J. Talghader, SM
- Richard M. Voyles, Computer Science and Engineering, ASM
- Zhi-Li Zhang, Computer Science and Engineering, ASM
- Babak Ziaie, SM

**Assistant Professor**
- Kiarash Bazargan, SM
- Heinrich O. Jacobs, SM
- Nihar Jindal, SM
- Mihailo Jovanovic, SM
- Chris Huyng-il Kim, SM
- Bethanie J. Stadler, SM

**Adjunct**
- Gregory T. Cibazaru, Microtechnology Laboratory, AM
- E. Dan Dahlberg, ASM
- Demez Gebre Egziabher, AM2
- Gabriel C. Ejebe, Carthage, AM
- Barry K. Gilbert, Mayo Clinic, ASM
- Bruce Eric Hammer, ASM
- Bin He, ASM
- Paul Jay Imbertson, AM2
- Matthew T. O’Keefe, Sistina, ASM
- Thomas Alfred Posbergh, AM2
- Robert A. Sainati, 3M, ASM
- Babak Ziaie, SM
- Frank G. Soitus, IBM, ASM

**Certificate of Specialist Requirements**

- 8 credits in psychological foundations and 6 in applied areas, of which at least 9 credits must be in 8xxx courses.

**Certificate of Specialist Requirements**

- 12 credits in special education foundations.

**Language Requirements**—None.

**Final Exam**—The final exam is oral.

**Graduate School**

Graduate study in Electrical Engineering is available at the University of Minnesota, Twin Cities campus. This program is designed to provide advanced education and research training to students who wish to pursue a career in electrical engineering or a related field.

**Admission Requirements**

Application for admission to the Electrical Engineering Graduate Program is available online at www.ece.umn.edu and is also available by contacting the director of graduate studies at graduate_studies@ece.umn.edu.

**Financial Assistance**

Financial assistance is available for graduate students through teaching and research assistantships, fellowships, and loans. Information on financial aid opportunities can be obtained from the department.

**Course Offerings**

Course offerings for the Electrical Engineering Graduate Program are listed in the University of Minnesota Graduate School catalog. The catalog is available online at www.cse.umn.edu.

**Contact Information**

Director of Graduate Studies
Department of Electrical Engineering
University of Minnesota
4-178 Electrical Engineering/Computer Science
200 Union Street S.E.
Minneapolis, MN 55455
(612-625-3564; fax 612-625-4583; graduate_studies@ece.umn.edu)
www.ece.umn.edu.

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**Professor**

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- J. Thomas Vaughan, Radiology, Magnetic Resonance Research, ASM
- Randall H. Victoria, SM
- Jian-Ping Wang, SM
- Bruce F. Wollenberg, SM
- Paul R. Woodward, Astronomy, ASM
- Pen-Chung Yew, Computer Science and Engineering, ASM
- Ofer Zeitouni, Mathematics, ASM

**Associate Professor**

- Mohamed-Slim Aouini, SM
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- Babak Ziaie, SM

**Assistant Professor**

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- Mihailo Jovanovic, SM
- Chris Huyng-il Kim, SM
- Bethanie J. Stadler, SM

**Adjunct**

- Gregory T. Cibazaru, Microtechnology Laboratory, AM
- E. Dan Dahlberg, ASM
- Demez Gebre Egziabher, AM2
- Gabriel C. Ejebe, Carthage, AM
- Barry K. Gilbert, Mayo Clinic, ASM
- Bruce Eric Hammer, ASM
- Bin He, ASM
- Paul Jay Imbertson, AM2
- Matthew T. O’Keefe, Sistina, ASM
- Thomas Alfred Posbergh, AM2
- Robert A. Sainati, 3M, ASM
- Babak Ziaie, SM
- Frank G. Soitus, IBM, ASM

**Certificate of Specialist Requirements**

- 8 credits in psychological foundations and 6 in applied areas, of which at least 9 credits must be in 8xxx courses.

**Certificate of Specialist Requirements**

- 12 credits in special education foundations.

**Language Requirements**—None.

**Final Exam**—The final exam is oral.

**Graduate School**

Graduate study in Electrical Engineering is available at the University of Minnesota, Twin Cities campus. This program is designed to provide advanced education and research training to students who wish to pursue a career in electrical engineering or a related field.

**Admission Requirements**

Application for admission to the Electrical Engineering Graduate Program is available online at www.ece.umn.edu and is also available by contacting the director of graduate studies at graduate_studies@ece.umn.edu.

**Financial Assistance**

Financial assistance is available for graduate students through teaching and research assistantships, fellowships, and loans. Information on financial aid opportunities can be obtained from the department.

**Course Offerings**

Course offerings for the Electrical Engineering Graduate Program are listed in the University of Minnesota Graduate School catalog. The catalog is available online at www.cse.umn.edu.
Courses—Please refer to Electrical Engineering (EE) in the course section of this catalog for courses pertaining to the program.

Use of 4xxx Courses—EE 4xxx courses acceptable for major field credit: EE 4301, 4541, 4701, 4721, and 4741. Non-EE 4xxx courses acceptable for supporting/related field credit: Math 4151, 4152, 4342, 4567, and 4606, and Stat 4101. All 4xxx physics courses are acceptable for graduate credit. No 4xxx computer science, mechanical engineering, or industrial engineering courses are acceptable for graduate credit.

M.E.E. Coursework Only Degree Requirements

The M.E.E. degree requires 30 credits, including at least 14 credits from EE courses at 5xxx and higher, at least 6 credits from courses numbered 4xxx and higher in a minor or related field, and 10 credits from EE or a supporting program. The program may contain up to 2 credits from seminars, special investigations, or directed studies (excluding colloquia and practical training).

Final Exam—No final exam is required.

Minor Requirements for Students Majoring in Other Fields—Credits for the master’s minor must be from classroom and laboratory courses graded A-F. In particular, colloquia, seminar, and special investigations credits do not count toward meeting the minor requirements.

M.S.E.E. Degree Requirements

Every M.S.E.E. degree program must include 30 credits including at least 14 credits from EE courses at 5xxx or higher (a few 4xxx EE courses can be used for the program) and at least 6 credits from courses outside EE at 4xxx or higher (normally from departments in the Institute of Technology or School of Statistics). These credits cannot come from seminars or special investigations registrations (excluding colloquia and practical training). A Plan A program (with thesis) cannot include more than 2 credits from projects, seminars, special investigations, or directed studies; in a Plan B program (without thesis), the limit is 2 credits. The Plan A program should include 10 thesis credits. Part-time students must choose Plan B; full-time students may choose either Plan A or Plan B.

Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—The 6 credits for the master’s minor must be from classroom and laboratory courses graded A-F. Colloquia, seminar, and special investigations credits do not count toward meeting the minor requirements.

Ph.D. Degree Requirements

The Ph.D. requires at least 40 course credits including at least 6 credits in 8xxx courses, at least 14 credits in EE courses, and at least 12 credits in the supporting program or minor, which cannot include EE courses. In addition, 24 thesis credits are required. The program may contain up to 2 credits from seminars or special investigations registrations (excluding colloquia and practical training), up to 8 credits of M.S. thesis registration, none of which can be used to meet the major requirements above. No credits can be included from colloquia or M.S. Plan B projects. At least 14 credits must be coursework taken at the University of Minnesota. The student’s degree program form listing all courses to be included toward the degree should be submitted no later than the end of the second year of the Ph.D. program. Each Ph.D. student must participate in one of the department research area seminars and make at least three oral paper presentations before the thesis proposal is approved.

Minor Requirements for Students Majoring in Other Fields—The 12 credits for the Ph.D. minor must be from classroom and laboratory courses graded A-F. Colloquia, seminar, and special investigations credits do not count toward meeting the minor requirements.

Elementary Education

See Education, Curriculum, and Instruction.

English

Contact Information—Director of Graduate Studies, Department of English, University of Minnesota, 204 Lind Hall, 207 Church Street S.E., Minneapolis, MN 55455; 612-625-3882; gradeng@umn.edu; http://english.cla.umn.edu/graduateprogramintro.html.

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step.

Regeps Professor

Thomas S. Clayton, SM
Patricia M. Hampl, SM

Professor

Kent R. Bales, SM
Timothy Brennan, Cultural Studies and Comparative Literature, SM
Michael D. Browne, SM
Andrew Elfenbein, SM
Genevieve J. Escure, SM
Peter E. Firchow, SM
Shirley N. Garner, SM
Jill Barnum Gidmark, AM2
Ray Gonzalez, SM
Edward M. Griffin, SM
David B. Haley, SM
Michael Hancher, SM
Gordon D. Hirsch, SM
Karen A. Hoyle, Children’s Literature Research Collections, AM2
Ellen Messer-Davidow, SM
Valerie J. Miner, SM
John W. Mowitt, Cultural Studies and Comparative Literature, SM
Marcia Pankake, Library Collection Development: Arts and Humanities, AM2
Paula Rabinowitz, SM
Donald J. Ross, Jr., SM
Madelon Sprengnether, SM
John A. Watkins, SM
Joel C. Weinsheimer, SM

Associate Professor

Thomas E. Augst, SM
Robert L. Brown, Jr., Cultural Studies and Comparative Literature, ASM
Patricia A. Crain, SM
Lois Cucullu, SM
Maria Damon, SM
Maria J. Fitzgerald, SM
Qadri Ismail, SM
Rebecca L. Krug, SM
Josephine D. Lee, SM
Daniel J. Philippin, Rhetoric, AM2
Janette Scandura, M2
Julie Schumacher, SM
Charles J. Sugenet, SM
John S. Wright, SM

Assistant Professor

Siobhan Craig, M2
Lianna H. Farber, M2
Brian B. Goldberg, M2
David B. Luke, M2
David R. Treuer, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—Over the past 20 years, the field of English studies has dramatically changed from a discipline concerned with studying the literary works produced by English speakers in Britain and the United States to encompass writings in English from around the globe. The concerns of literary scholars have broadened to include not only textual analyses but also cultural, social, political, and economic contexts. The field of literature itself now encompasses not only the traditional genres of poetry, prose (fiction and belles-lettres), and drama, but also extra-literary discourses: popular culture, film, television, legal documents, conduct books, and manifestoes. The Department of English has been in the forefront of interdisciplinary projects, thanks to the efforts of a faculty committed to research in American studies, medieval studies, feminist studies, film studies, and cultural studies. At the same time, the department maintains the core concerns of the discipline—the traditional study of the literatures and languages in English—as well as develops writers for the present and future through the master of fine arts in creative writing degree. The department is engaged in two simultaneous projects: to preserve the core curriculum and to reimagine its future shape.

The department offers two master’s degrees, the master of arts in English language and literature, and the master of fine arts in creative writing (see listing under Creative Writing).
The M.A. offers training in the areas of literary history, literary theory and interpretation, language, linguistics, rhetoric, and composition. Students in the M.A. can develop specific concentrations through consultation with the director of graduate studies.

Course requirements for the Ph.D. and M.A. programs are broadly defined, allowing the student to shape a personal program of study. The English program encourages and supports interdisciplinary work. The M.F.A. program requires coursework in English and writing and emphasizes intensive work on a creative project.

**Admission to the Program**—Students with a bachelor's degree may apply either to the master's program or the doctoral program. An M.A. degree, but not an M.F.A. degree, can be gained en route to the Ph.D. degree. M.A. candidates who wish to continue their studies must formally apply for admission to the Ph.D. program.

**Prerequisites for Admission**—A minimum of four courses in English, three of which must be at the upper division level, is required for degree programs and the graduate minor. The courses should be widely distributed.

**Special Application Requirements**—Three letters of recommendation; scores from the General Test of the GRE; a short essay explaining scholarly, professional, and personal goals and reason(s) for choosing the University of Minnesota; and a writing sample, such as a course paper, are required. Applications to the M.F.A. in creative writing are reviewed by the writing faculty; these applications should include a substantial portfolio of writing. Candidates for all degrees are admitted fall semester only; all materials must be received by December 20.

**Courses**—Please refer to English: Creative Writing (EngW), and English: Literature (EngL) in the course section of this catalog for courses pertaining to the program.

**Use of 4xxx Courses**—A limited number of 4xxx courses may be included as appropriate for field and area requirements. Inclusion of 4xxx courses on degree program forms is subject to adviser and director of graduate studies approval.

**M.A. Plan B Degree Requirements**

The minimum requirement for the M.A. is 30 credits. Coursework must include at least 24 credits in English and 6 credits in related fields outside of English or in a minor field. All M.A. students must complete the introductory sequence EngL 5001-02 on methods and theory of literary study and three Plan B papers.

**Language Requirements**—A reading knowledge of one classical or modern language, approved by the director of graduate studies, is required.

**Final Exam**—The final exam is oral.

**Minor Requirements for Students Majoring in Other Fields**—The master's minor consists of 9 credits in English. Course selection is determined in consultation with the director of graduate studies.

**Ph.D. Degree Requirements**

A minimum of 66 credits, including 24 thesis credits, is required. Course requirements for the Ph.D. program are broadly defined, allowing students to shape a personal program of study. The following courses are required: EngL 5001 and 5002, preferably during the first year of doctoral study.

(6 credits); four English courses distributed among broad areas (minimum of 12 credits); four additional English courses in a focused area of emphasis (minimum of 12 credits); 12 credits in a supporting program. Students are encouraged to enroll in additional courses as appropriate.

**Language Requirements**—A reading knowledge of two languages, classical or modern, approved by the director of graduate studies, is required. Students specializing in medieval or early modern literature and culture are advised to include Latin as one of their languages.

**Minor Requirements for Students Majoring in Other Fields**—The Ph.D. minor consists of 12 credits in English. Course selection is determined in consultation with the director of graduate studies.

**English as a Second Language**

**Contact Information**—Director of Graduate Studies, English as a Second Language, University of Minnesota, 215 Nolte Center, 315 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-624-3331; fax 612-624-4579; iles@umn.edu; www.iles.umn.edu/esl.html).

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step.

**Professor**

Andrew D. Cohen, M2
Elaine E. Tarone, M2

**Associate Professor**

Carol Klee, AM
Kathryn Kohnert, AM
Anne Lazaraton, M2

**Assistant Professor**

Michael E. Anderson, M2
Martha Bigelow, AM

**Other**

Jenise Rowekamp, AM

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The program in English as a second language (ESL) offers a course of study leading to an M.A. degree holders are qualified to teach ESL to adults at the college or university level. The program emphasizes research in language analysis, language acquisition, teaching methodology, materials development, and uses of technology in language teaching. Students are expected to do independent and creative work in one or two of these areas with the aim of developing a more complete understanding of the issues facing professionals in the field of ESL today.

**Prerequisites for Admission**—A bachelor's degree in the liberal arts or sciences with a strong academic record is required.

**Special Application Requirements**—Scores from the General (Apitude) Test of the GRE and three letters of reference, are required. Nonnative speakers of English must submit either TOEFL scores (preferred 250) and TSE scores (preferred 5), or IELTS scores (preferred 7). Students may begin the program fall semester or first summer session. Applications for both admission dates are due on March 1. To be considered for special fellowship opportunities, students must apply by January 15.

**Courses**—Please refer to Teaching English as a Second Language (TESL) in the course section of this catalog for courses pertaining to the program.

**Use of 4xxx Courses**—Inclusion of 4xxx courses on degree program forms is subject to adviser and director of graduate studies approval.

**M.A. Degree Requirements**

The M.A. program in ESL normally takes at least two years to complete. The Plan A option requires a thesis demonstrating original work in areas related to the field, familiarity with research methodology, and knowledge of the effective presentation of investigative study results. The Plan B option requires two qualifying papers, usually consisting of course papers which have been rewritten under the supervision of a faculty member.

Plan A and Plan B students must complete 28 credits in required coursework and 6 credits of elective coursework in related fields. Plan A students must complete an additional 10 thesis credits for a total of 44 credits and Plan B students must complete an additional 3 credits in elective coursework for a total of 37 credits. Elective and related field courses must be chosen with the help of an adviser to ensure the relevance of courses to students' goals.

**Language Requirements**—Proficiency, demonstrated by exam or coursework, in one language not native to the student is required upon completion of the program. Nonnative speakers of English who are admitted to the program are considered to have fulfilled the language requirement.

**Final Exam**—The final exam is oral.

**Minor Requirements for Students Majoring in Other Fields**—For a minor in ESL, students must take TESL 5721, 5401, and 5402, for a total of 11 credits.
Entomology

Contact Information—Director of Graduate Studies, Department of Entomology, University of Minnesota, 219A Hodson Hall, 1980 Folwell Ave., St. Paul, MN 55108 (612-624-3636; fax 612-625-5299; entodept@umn.edu; www.entomology.umn.edu).

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.aspx.

Degree Programs and Faculty

Special Application Requirements—Applicants must submit a complete set of official transcripts and a clearly written statement of career interests, goals, and objectives. Three letters of recommendation are required from persons well acquainted with the student’s academic record, and must be sent directly to the department. A 3.00 GPA (on a 4.00 scale) for undergraduate work, and 3.50 for prior graduate work are preferred for admission. GRE scores are required for admission. The preferred performance level on the GRE’s is about the 70th percentile in each of the Verbal and Quantitative exams; however, admissions decisions are not based solely on GRE scores. All credentials in the application packet are considered in reaching an individual admission decision for each applicant. For non-English speaking students, a minimum score on the TOEFL exam of 550 (or 213 on the computer-based exam) is preferred for admission. Students may apply at any time; however, submission of all application materials by January 15 is strongly encouraged to ensure priority consideration for fellowships awarded for the next academic year. Applications are reviewed individually when all materials are complete. Students are admitted each semester.

Courses—Please refer to Entomology (Ent) in the course section of this catalog for courses pertaining to the program.

Use of 4xxx Courses—Inclusion of 4xxx courses on degree program forms is subject to adviser and director of graduate studies approval.

M.S. Degree Requirements

Requirements for the M.S., supplemental to general Graduate School requirements, include a minimum of 14 course credits in entomology including a core curriculum of fundamental entomology courses and 1 credit of graduate seminar. Additional requirements include 6 credits from other programs and are determined in consultation with the adviser and other members of the student’s advisory committee.

Language Requirements—None.

Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—The doctoral minor requires a minimum of 12 credits in 4xxx, 5xxx, or 8xxx entomology courses.

Environmental Health

Contact Information—Student Services Center, School of Public Health, University of Minnesota, MMC 819, 420 Delaware Street S.E., Minneapolis, MN 55455 (612-626-3500 or 1-800-774-8636; fax 612-624-4496; sph-ssc@umn.edu; www.sph.umn.edu).

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.aspx.

Degree Programs and Faculty

Special Application Requirements—Applicants must submit a complete set of official transcripts and a clearly written statement of career interests, goals, and objectives. Three letters of recommendation are required from persons well acquainted with the student’s academic record, and must be sent directly to the department. A 3.00 GPA (on a 4.00 scale) for undergraduate work, and 3.50 for prior graduate work are preferred for admission. GRE scores are required for admission. The preferred performance level on the GRE’s is about the 70th percentile in each of the Verbal and Quantitative exams; however, admissions decisions are not based solely on GRE scores. All credentials in the application packet are considered in reaching an individual admission decision for each applicant. For non-English speaking students, a minimum score on the TOEFL exam of 550 (or 213 on the computer-based exam) is preferred for admission. Students may apply at any time; however, submission of all application materials by January 15 is strongly encouraged to ensure priority consideration for fellowships awarded for the next academic year. Applications are reviewed individually when all materials are complete. Students are admitted each semester.

Courses—Please refer to Environmental Health (Env) in the course section of this catalog for courses pertaining to the program.

Use of 4xxx Courses—Inclusion of 4xxx courses on degree program forms is subject to adviser and director of graduate studies approval.

M.S. Degree Requirements

Requirements for the M.S., supplemental to general Graduate School requirements, include a minimum of 14 course credits in entomology including a core curriculum of fundamental entomology courses and 1 credit of graduate seminar. Additional requirements include 6 credits from other programs and are determined in consultation with the adviser and other members of the student’s advisory committee.

Language Requirements—None.

Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—The doctoral minor requires a minimum of 12 credits in 4xxx, 5xxx, or 8xxx entomology courses.
Other
Jeffrey H. Mandel, AM2
Robert S. Skoglund, Clinical/Population Science, AM2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—Environmental health is the study of how exposures to external hazards, including chemical, physical, and biological agents, affect human health. Environmental health researchers and professionals seek to understand how to evaluate exposures that create risk to human health, how those exposures elicit biological responses that lead to disease and injury, and how policy is developed and used to prevent adverse health effects. This division offers academic programs at the master’s and doctoral levels, conducts research in diverse areas of environmental health, offers continuing education, and conducts outreach. The academic programs prepare students to be leaders in environmental health in academia, industry, consulting groups, and government agencies. The division’s training and research programs emphasize the importance of translating basic scientific knowledge into solutions for current societal problems and concerns.

Applicants must indicate an interest in one of the following specialties within the major: environmental chemistry, environmental health policy, infectious disease, environmental and occupational epidemiology, environmental toxicology, the general environmental health program, occupational health nursing, occupational injury epidemiology and control, or the industrial hygiene program. The industrial hygiene program is accredited by the Applied Science Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410-347-7700).

Prerequisites for Admission—Minimum requirements include a baccalaureate degree with coursework in the basic sciences. Each specialty requires slightly different preparation.

Special Application Requirements—GRE scores, a letter describing the applicant’s professional objectives, and three letters of recommendation are required.

Courses—Please refer to Public Health (PubH), particularly numbers 81xx, in the course section of this catalog for courses pertaining to the program. See http://onestop2.umn.edu/courses/tc/designators.jsp for 61xx-71xx courses.

Use of 4xxx Courses—Inclusion of 4xxx courses on degree program forms is subject to the approval of the adviser and the director of graduate studies. Students from other majors may include such courses subject to their own program’s approval.

M.S. Degree Requirements
The M.S. program prepares students for specialized careers in environmental and occupational health. M.S. students receive a solid technical background in their disciplines and by graduation are proficient in applied or basic research.

The minimum credits required for graduation depends on the chosen specialty area. Most specialty areas require a two-year program. M.S. students have the option of completing a Plan A with a thesis or a Plan B project.

Language Requirements—None.

Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—Students completing a minor in environmental health must complete 6 credits in environmental health, including PubH 6103, 6104, and 6105.

Ph.D. Degree Requirements
The Ph.D. focuses on research, supplemented with advanced coursework developed under the guidance of a faculty adviser and a Ph.D. committee. Students are required to register for 24 thesis credits. Students usually need a minimum of two to three years beyond the master’s degree to complete a doctorate.

Language Requirements—None.

Minor Requirements for Students Majoring in Other Fields—Students are required to take a minimum of 12 credits in environmental health, including PubH 6103, 6104, and 6105.

Epidemiology
Contact Information—Student Services Center, School of Public Health, University of Minnesota, MMC 819, 420 Delaware Street S.E., Minneapolis, MN 55455 (612-626-3500 or 1-800-774-8636; fax 612-626-6931; sphssc@umn.edu; www.sph.umn.edu).

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step.

Professor
Henry Blackburn, Jr. (emeritus), ASM
Richard S. Crow, M2

John R. Finnegan, Jr., SM
Aaron R. Folsom, SM
Jean L. Forster, M2
Aronne A. French, M2
Laël C. Gatewood, M2
Richard H. Grimm, Medicine, SM
John H. Himes, SM
Henry Hull, M2

David R. Jacobs, Jr., SM
Robert W. Jeffery, SM
Robert L. Kane, SM
Harry A. Lando, SM
Arthur S. Leon, SM
Alan R. Lifson, M2
Russell V. Lauepker, SM
Leslie L. Lytle, SM

A. Marshall McBean, M2
Joseph P. Neglia, M2
Dianne Neumark-Sztainer, M2
Cheryl L. Perry, SM
Julie A. Ross, SM
B. R. Rosser, M2
Eyal Shahar, SM
Michael T. Osterholm, SM
Leslie L. Robison, SM
Mary T. Story, SM

Adjunct Professor
Donna K. Arnett, SM
Alexander C. Wagenaar, SM

Associate Professor
Kristin E. Anderson, SM
Timothy R. Church, M2
Myron D. Gross, M2
James G. Gurney, M2
Lisa J. Harnack, M2
Craig W. Hedberg, M2
Wendy L. Hellerstedt, SM
Deborah J. Henrichs, M2
Rhonda J. Jones-Webb, M2
DeAnn Lazovich, M2
George Maldonado, M2
James S. Pankow, SM
Kathryn H. Schmitz, M2
Pamela J. Schreiner, SM
Traci L. Toomey, M2
Michelle van Ryn, M2
Beth A. Virnig, M2

Adjunct Associate Professor
Alan P. Bender, M2
Kelli A. Komro, SM
Ann C. Mertens, M2

Assistant Professor
Susan J. Duval, M2
Andrew P. Flood, M2
Michael B. Miller, M2
Kathy L. Moser, M2
J. Michael Oakes, M2
Mark A. Pereira, M2
Logan G. Spector, M2
Lyn M. Steffen, M2

Adjunct Assistant Professor
Sally A. Bushhouse, M2
Richard N. Danila, M2

Senior Research Fellow
Peter J. Hannan, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—The program provides students with the core methodological skills needed to address chronic or acute diseases, long-term or newly emerging health problems, and behavioral and biological aspects of health and disease. The doctoral program is for students interested in research and teaching careers in the health sciences. Courses are also available to students from other public health and health-related programs.
Students may select areas of concentration appropriate to their academic interests and career objectives, including the epidemiologic and public health aspects of cardiovascular disease; cancer; infectious diseases; alcohol, tobacco, and other substance abuse; maternal, child, and reproductive health; women’s health; nutrition; genetic epidemiology; behavioral interventions; and epidemiologic research methods. A detailed description of the course of study may be obtained online or by contacting the major coordinator at gradstudies@epi.umn.edu.

Prerequisites for Admission—For the doctoral program, applicants must have completed or be about to complete a master’s degree in a related field. Applicants should have prior coursework in life or behavioral sciences. Applicants who have not completed a master’s degree in epidemiology or a related field are asked to apply to the master’s of public health in epidemiology through the School of Public Health. Because positions in the doctoral program are limited, selection is competitive with respect to academic background and experience.

Special Application Requirements—The following materials are required by the department. The program’s strong emphasis on methodology, quantitative aptitude is very important. This can be demonstrated by a 70th percentile on the quantitative section of the GRE and satisfactory grades in college-level quantitative courses. At least three recommendations (form and separate letter) from faculty or work supervisors with knowledge of the applicant’s scholastic and professional capabilities and potential and a statement of goals and objectives (letter of intent) for seeking a career in epidemiology are also required.

In addition to the above materials, applicants for the Ph.D. program must submit a separate essay (statement of research interests) demonstrating evidence of their capability in or potential for original research in a specific epidemiologic area and, if possible, indicating interest in particular methodologies or study designs. Serious doctoral applicants are encouraged to contact the major coordinator at gradstudies@epi.umn.edu before applying. Students begin their studies in the fall semester. Applications must be completed by January 15 of the same year for the doctoral program.

For an online application, see the School of Public Health Web site at www.sph.umn.edu. For an online application, see the School of Public Health Web site at www.sph.umn.edu.

Courses—Please refer to the epidemiology Ph.D. program sheet available on the School of Public Health Web site for courses pertaining to the program at www.epi.umn.edu/academic/phd_epi.shtm.

Use of 4xxx Courses—Inclusion of any 4xxx courses on degree program forms of majors or minors is subject to adviser and director of graduate studies approval.

M.S. Degree Requirements
Students are not admitted directly into the master’s program; it is available only by special arrangement with the program. Students interested in a master’s degree in epidemiology should apply for the master’s of public health (M.P.H.) degree through the School of Public Health (SPH). For more information on the M.P.H. degree please go to the SPH Web site at www.sph.umn.edu.

Language Requirements—None.

Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—The master’s minor requires at least 8 credits.

Ph.D. Degree Requirements
Students may select one of two concentrations; both have an applied perspective that emphasizes study design, measurement, quantitative analysis, and data interpretation. Behavioral epidemiology focuses on origins and development of human behavior patterns and how they are influenced and formed by personality, family, culture and environment. Biological epidemiology focuses on the biological causes of diseases, especially determinants of cardiovascular disease, cancer, infectious diseases and genetic epidemiology.

The Ph.D. program includes a core curriculum of 67-72 credits. Students must pass written and oral preliminary exams, write and defend a dissertation, and prepare a first-authored manuscript for publication.

Coursework includes 16 credits in epidemiology and biostatistics core courses; 10 credits in advanced courses (epidemiological theory, teaching practicum, writing research grants, seminars on epidemiologic issues); 4-6 credits in Ph.D.-specific electives; 24 thesis credits; 6-8 credits (three courses) of epidemiologic-related interventions/methods taken from a menu of courses (e.g., cancer epidemiology, public health policy as a prevention strategy, smoking intervention); and 7-9 credits in advanced biologically or behaviorally related courses.

Language Requirements—None.

Minor Requirements for Students Majoring in Other Fields—The minor requires at least 8 credits. The minor requires 20 credits: 16 credits in epidemiology and biostatistics, and 4 credits in epidemiology elective courses. The director of graduate studies must approve the student’s selection of elective credits. Contact the major coordinator in epidemiology for information at gradstudies@epi.umn.edu.

Experimental Surgery

Contact Information and Faculty—See Surgery.

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—The general surgery program trains medical doctors for the practice of surgery and for academic positions. See the Medical School Catalog for professional degree requirements; see below for academic degree requirements. Trainees spend two to three years in laboratory research, either in a basic science or in surgery, after which they begin their senior residency and chief residency training. The Medical School’s laboratory departments offer many graduate courses closely related to surgery (see the graduate programs in biochemistry, molecular biology, and biophysics; cellular and integrative physiology; microbiology, immunology, and molecular pathology; and pharmacology). These fields also offer opportunities for research work. The Department of Surgery offers supervised work in its experimental research laboratories, as well as in its hospital and outpatient departments, in the areas of surgical diagnosis and operative surgery and in some surgical specialties (such as colon and rectal surgery, transplantation, thoracic and cardiovascular surgery, and pediatric surgery). The experimental surgery program provides an opportunity to gain practical research experience.

Prerequisites for Admission—Prospective students must be in the general surgery training program and have two to three clinical years of training completed.

Courses—For courses pertaining to the program, please refer to Surgery (Surg) in the course section of this catalog.

Use of 4xxx Courses—4xxx courses are not permitted toward degree requirements.

M.S. Exp. Surg. Plan A Degree Requirements
The M.S. Exp. Surg. is offered under Plan A only. At least 32 course credits (26 in the major and 6 in the minor or related fields) plus 10 thesis credits are required for a total of 42 credits.

Language Requirements—None.

Final Exam—The final exam is oral.
Degree Programs and Faculty

Family Policy

Minor Only

Contact Information—Graduate Minor in Family Policy, College of Human Ecology, University of Minnesota, 290 McNeal Hall, 1985 Buford Avenue, St. Paul, MN 55108 (612-625-3116; fax 612-625-4227; sosgradinfo@che.umn.edu). For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.

Professor
Jean W. Bauer, Family Social Science, M
Jeffrey L. Edleson, Social Work, M
Nancy Eustis, Public Affairs, M
David Hollister, Social Work, M
Jeylan T. Mortimer, Sociology, M
Samuel Myers, Public Affairs, M
B. Jan McCulloch, Family Social Science, M
Kathryn Rettig, Family Social Science, M
Becky Yust, Design, Housing, and Apparel, M

Associate Professor
Marilyn Bruin, Design, Housing, and Apparel, M
Jeffrey R. Crump, Design, Housing, and Apparel, M
Elizabeth (Liz) E. Davis, Applied Economics, M
Maria Hanratty, Public Affairs, M
Linda E. Jones, Social Work, M
Deborah Levison, Public Affairs, M
Joan Patterson, Epidemiology, M
Marlene Stum, Family Social Science, M
Ann Ziebarth, Design, Housing, and Apparel, M

Assistant Professor
Kathleen E. Hull, Sociology
Erin L. Kelly, Sociology
Elizabeth Lightfoot, Social Work, M

Program Director
Marcia (Marcie) Jeferys, Social Work, M

Curriculum—This minor is available to both master and doctoral students. The family policy minor provides a multidisciplinary academic foundation in the analysis of policies for their impact on families. Students completing the family policy minor will be knowledgeable about major public and private policies affecting families, and will understand how these policies came to be adopted, including social, economic, and political past and current influences. Participating students will develop a framework in which to analyze policies for their impact on families, and an understanding of the differential impact on diverse families.

Students may choose relevant courses from a variety of disciplines, including applied economics, family social science, housing, law, political science, public health, public policy, social work, and sociology. By integrating their knowledge across disciplines, students will develop a comprehensive understanding of how families are affected by public and private policies.

Prerequisites for Admission—Admission is contingent upon prior admission to a master or doctoral degree-granting program within the Graduate School. Any graduate student currently in good standing in the Graduate School may elect to complete the minor.

Special Application Requirements—Students formally apply to the minor by completing the Application for Family Policy Minor and submitting to the director of graduate studies, family policy minor, prior to beginning courses. The PDF form is available at sos.che.umn.edu/graduate.html. For information on relevant courses.

Use of 4xxx Courses—4xxx courses are not allowed in the minor.

Minor Only Requirements
The master’s minor is nine credits. FPol 8000—Family Policy Perspectives is required plus 6 credits from one of the departments or professional schools’ elective courses on the course list. The doctoral minor is twelve credits. FPol 8000—Family Policy Perspectives is required plus 9 additional credits from elective courses that make a coherent plan. The dissertation must include a family policy application.

Family Social Science

Contact Information—Department of Family Social Science, University of Minnesota, 290 McNeal Hall, 1985 Buford Avenue, St. Paul, MN 55108 (612-625-3116 or 612-625-1900; fax 612-625-4227; sosgradinfo@che.umn.edu). For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.

Professor
Jean W. Bauer, SM
Shirley L. Baughner, ASM
Pauline E. Boss, emeritus, ASM
Sharon M. Danes, SM
Daniel F. Detzner, ASM
William J. Doherty, SM
Ann W. Garwick, AM2
Harold D. Grotevant, SM
M. Janice Hogan, SM
James W. Maddock (emeritus), ASM
B. Jan McCulloch, M2
Kathryn D. Rettig, SM
Paul C. Rosenblatt, SM
Kathryn D. Rettig, SM
William L. Turner, SM

Associate Professor
Rose M. Brewer, AM2
Joan M. Patterson, ASM
Beatrice E. Robinson, AM2
Martha A. Raeter, SM
Catherine A. Solheim, AM2
Marlene S. Stum, SM
Elizabeth Wieling, SM
Virginia S. Zuiker, SM

Assistant Professor
Jodi B. Dworkin, M2
Blong Xiong, AM2

Senior Lecturer and Associate Teaching Professor
William J. Goodman, M2

Senior Lecturer and Assistant Teaching Professor
Wayne A. Caron, M2

Senior Fellow
Martha F. Erickson, AM2

Area Program Leader, Family Resource Management and Center for Personal and Family Financial Education Director
Patricia Olson, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—The program of study uses methods of social science to examine family systems and their interactions with various environments. The curriculum supports study in several broad theme areas: family economic well-being, families and mental health, family diversity, and relationships and development across the life span.

Prerequisites for Admission—The master’s program requires two family courses; at least one course in economics, political science, government, or public policy; one course in sociology, anthropology, or human geography; one psychology course; and one statistics course. The doctoral program requirements include all requirements for the master’s program plus three additional social or behavioral science courses and two additional statistics or research methods courses. It is important that students, especially those applying for the Ph.D. program, present evidence of interest in research and that they have experience working with families through paid employment or volunteer work. Occasionally, the graduate faculty admits a student who lacks one or more required courses with the understanding that the missing course(s) will be made up soon, ideally before entering the program.

The marriage and family therapy program is accredited by the American Association for Marriage and Family Therapy. Admission to the program is available only to doctoral students with a clinical master’s degree. Students cannot earn a clinical master’s degree in the Department of Family Social Science.

Students may apply for admission to the Ph.D. program after completing either a bachelor’s degree or a master’s degree. Students who enter the Ph.D. program with a bachelor’s degree are expected to fulfill the requirements for an M.A. degree in the process of working toward the Ph.D.
Special Application Requirements—Consult the Family Social Science Graduate Program Handbook or the director of graduate studies. The Graduate Program Handbook and all materials needed for the application process may be found at http://fsos.che.umn.edu/graduate/admissions_orientation.html.

Applicants for the doctoral program and Plan A master’s program are reviewed only once per year. The application deadline is December 15 for admission fall semester of the following year. Applications for the Plan B master’s program are considered once they are complete, and students may begin graduate study the semester after the application is approved.

Courses—Please refer to Family Social Science (FSoS) in the course section of this catalog for courses pertaining to the program.

Use of 4xxx Courses—Students from other majors may take courses with instructor approval and include them on their degree programs subject to their own program’s approval. Credit courses counted on graduate programs must be taught by a member of the graduate faculty and must include assignments that are at the graduate level.

M.A. Degree Requirements
The M.A. program is offered under Plan A and Plan B. Plan A requires at least 30 credits, including at least 20 course credits, of which 6 credits are outside the department in a related field, and 10 thesis credits. The Plan A master’s is recommended for students who intend to pursue a Ph.D. degree.

Plan B requires at least 30 credits, including at least 26 course credits, of which 6 credits are outside the department in a related field, and at least 4 credits for a Plan B project. It is for students who wish to further their education so that they may hold positions of responsibility serving families. Although the instruction is based on research, the Plan B degree is not intended to provide intensive research training. The Plan B program is understood to be a terminal degree and is not recommended for students who intend to pursue the Ph.D. degree. Consult the department for the most current information.

Language Requirements—None.

Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—Master’s students must complete at least 6 credits of 5xxx or 8xxx in family social science. All courses must be taken A-F and completed with a GPA of at least 3.00.

Ph.D. Degree Requirements
Courses in the Ph.D. degree program must contribute to an organized program of study and research. The program includes at least 72 credits beyond the master’s degree, including 48 course credits and 24 dissertation credits. Coursework includes at least 12 credits in a minor or supporting program; 24 credits in one of the two designated specializations of family science or marriage and family therapy; and 12 credits in core family content and advanced research methods. An optional teaching internship program is recommended for students who are planning for careers in higher education.

Language Requirements—None. Minor Requirements for Students Majoring in Other Fields—Doctoral minor requires at least 12 credits of 8xxx in family social science. All courses for the minor must be taken A-F and completed with a GPA of at least 3.00.

Feminist Studies

Contact Information—Department of Women’s Studies Graduate Program, University of Minnesota, 425 Ford Hall, 224 Church Street S.E., Minneapolis, MN 55455; (612-624-0332; fax 612-624-3573; bostgral@umn.edu; http://womensstudy.umn.edu).

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/student.

Regents Professor
Joanne Eicher, Design, Housing, and Apparel, AM2
Sara M. Evans, History, AM2

Professor
Karyn K. Campbell, Communication Studies, AM2
Anna Clark, History, AM2
Mary Dietz, Political Science, AM2
Lisa J. Disch, Political Science, AM2
Raymond Duvall, Political Science, AM2
Mary L. Fellows, Law School, AM2
Shirley N. Garner, English, AM2
Jane F. Gilgun, Social Work, AM2
Ruth-Ellen B. Joeres, German, Scandinavian, and Dutch, AM2
Indira Y. Junghare, Linguistics, ESL, and Slavic Languages and Literatures, AM2
Amy K. Kaminsky, Women’s Studies, SM
Mary Jo Kane, Kinesiology, AM2
Ruth Karras, History, AM2
Sally J. Kenney, Public Affairs, AM2
Sally G. Kohlstedt, Geology and Geophysics, AM2
Helga Leitner, Geography, AM2
Elaine Tyler May, American Studies, AM2
Mary J. Maynes, History, AM2
Richard W. McCormick, German, Scandinavian, and Dutch, AM2
Ellen Messer-Davidow, English, AM2
Riv-Ellen Prell, American Studies, AM2
Paula Rabinowitz, English, AM2
Gloria Goodwin Raheja, Anthropology, AM2
Naomi B. Scheman, Philosophy, SM
Edward Schiappa, Communication Studies, AM2
Amy L. Sheldon, Communication Studies, AM2
Billie J. Wahlstrom, Rhetoric, AM2
Ann B. Waltner, History, AM2

Associate Professor
Lisa Albrecht, Social Work, ASM
Walter Bockting, Medical School, AM2
Maria M. Brewer, French and Italian, AM2
Rose M. Brewer, African American and African Studies, ASM
Sarah Chambers, History, AM2
Catherine Choy, American Studies, AM2
Susan Craddock, Women’s Studies, SM
Maria Damon, English, AM2
Jigna Desai, Women’s Studies, AM2
Roderick Ferguson, American Studies, AM2
Susanna Ferlito, French and Italian, AM2
Amy Lee, General College, AM2
Josephine Lee, English, AM2
Richa Nagar, Women’s Studies, SM
Lisa A. Norling, History, AM2
Joanna O’Connell, Spanish and Portuguese Studies, AM2
Jennifer L. Pierce, American Studies, AM2
Gwendolyn Pough, Women’s Studies, AM2
Eileen B. Sivert, French and Italian, AM2
Gary Thomas, Cultural Studies and Comparative Literature, AM2
Karen E. Till, Geography, AM2
Eden Torres, Women’s Studies, M2
Mary Vavrus, Communication Studies, AM2
Barbara Y. Welke, History, AM2
Monika Zagar, German, Scandinavian, and Dutch, AM2
Jacquelyn N. Zita, Women’s Studies, SM

Assistant Professor
Kathleen Hull, Sociology, AM2
Karen Taussig, Anthropology, AM2

Other
Karen Brown-Thompson, AM2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—The M.A. is available only to students admitted to the Ph.D. program who wish to secure this credential for ABD employment purposes or who must exit the program. It is similar to the Ph.D. but with no dissertation.

The Ph.D. program is an interdisciplinary, multicultural, and international study of women and gender in which students develop competence in interdisciplinary and disciplinary feminist theories, research methods, and pedagogy. The program pays attention to all aspects of women’s diversity, nationally and globally. Students select a disciplinary focus from among feminist theory, literary studies, historical studies, social sciences and public policy, and gender in a global perspective. Students may, with the advice and consent of the director of graduate studies, design their own area of concentration.

Prerequisites for Admission—The graduate minor program is available only to students who have prior admission to a master’s or doctoral degree-granting program within the Graduate School.

Special Application Requirements—Applicants for the Ph.D. program must submit scores from the General (Aptitude) Test of the GRE, three letters of recommendation sent directly to the department, a writing sample,
Degree Programs and Faculty

Ph.D. students are writing the dissertation. Students are expected to register for 24 thesis credits while attending the biweekly series of faculty, student, and guest lecturer presentations. In addition, students are expected to register for 4 credits of WoSt 8996 (related to the concentration). Students are also expected to register for credits in the minor field or supporting program methods. The remaining coursework includes credits in required courses, including two enhancing a concentration. Students take 28 requirements, and courses constituting or required course requirements, and courses constituting or enhancing a concentration. Students take 28 credits in required courses, including two elective courses that satisfy core requirements in cultural diversity and two courses that satisfy core requirements in research tools and methods. The remaining coursework includes 12 credits in an area of concentration and 12 credits in the minor field or supporting program (related to the concentration). Students are also expected to register for 4 credits of WoSt 8996 colloquium and to participate in a weekly or biweekly series of faculty, student, and guest lecturer presentations. In addition, students are expected to register for 24 thesis credits while writing the dissertation.

Because some courses may fall into more than one category (e.g., courses in the concentration may also satisfy core course requirements), students are permitted to “double count” credits in the major program in consultation with the director of graduate studies. This means that a student can graduate with fewer than 55 credits when double counting is approved. Students entering the Ph.D. program with a master’s degree may transfer credits from that degree and apply them to the Ph.D. requirements in consultation with the director of graduate studies. All students, however, must take WoSt 8108 and 8109.

Language Requirements—None, but a second language is strongly encouraged.

Preliminary Exams—Ph.D. students are expected to take a three-paper preliminary written exam (which includes an oral exam on these papers) and a preliminary oral exam on their dissertation proposal.

Final Exam—The final Ph.D. exam on the dissertation is oral.

Minor Requirements for Students Majoring in Other Fields—The graduate minor focuses on skills and competencies in four areas: interdisciplinary knowledge of women and gender; feminist theories and methods; feminist research in a specific field; feminist practice through teaching or internships. To complete a Ph.D. minor, students must complete WoSt 8108 and 8109 and three graduate-level electives (9 credits), including at least one 5xxx or 8xxx course in women’s studies and at most one feminist studies-approved graduate course from a student’s home department. Students must apply for admission into the graduate minor program.

Fisheries

See Conservation Biology.

Food Science

Contact Information—Graduate Program in Food Science, Department of Food Science and Nutrition, University of Minnesota, 1334 Eckles Avenue, St. Paul, MN 55108 (612-624-1290; fax 612-625-5272; grad@umn.edu; http://fscn.che.umn.edu/grad_students/fs_grad_students.html; For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step)

Professor

Mrunal Bhattacharya, SM
Linda J. Brady, SM
Francis F. Busta (emeritus), ASM
Agnes S. Csallany, SM
R. Gary Fulcher, SM
Theodore P. Labuzza, SM
Larry L. McKay, SM
Gary A. Reineccius, SM
Rongsheng R. Ruan, SM
Joanne L. Slavin, AM2
David E. Smith, SM
Sita R. Tatini, SM
Zata M. Vickers, SM

Associate Professor

Francisco Díez-Gonzalez, SM
Joelien M. Feiturg, SM
Craig A. Hasell, AM2
Daniel J. O’Sullivan, SM
H. William Schafer, SM

Assistant Professor

Leonard F. Marquart, SM
Lloyd E. Metzger, SM

Adjunct Assistant Professor

Kayla M. Polzin, AM2
Mary K. Schmidt, AM

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—Food science applies scientific principles to the manufacture, distribution, marketing, and consumer aspects of food. Food scientists apply the basic principles and techniques of many disciplines, including chemistry, physics, microbiology, and nutrition, to food processing and preservation, new product development, and food marketing. Food scientists are concerned with the theoretical and practical aspects of the food chain, from the production of raw materials to the use of food products by consumers. Students may emphasize the chemistry, engineering, microbiology, nutrition, or technology of food products.

Prerequisites for Admission—Applicants with an undergraduate major in any physical or biological science usually have completed the necessary prerequisites. The minimum requirements are general chemistry with laboratory, organic chemistry with laboratory, physics with laboratory, biology with laboratory, and calculus. If preparation appears inadequate, certain additional courses may be required after admission.

Special Application Requirements—Submission of GRE scores is required. Submission of three letters of reference is also required whether or not the prospective student is applying for financial assistance.

Courses—Please refer to Food Science and Nutrition (FSCN) in the course section of this catalog for courses pertaining to the program.

Use of 4xxx Courses—Inclusion of 4xxx food science courses on degree program forms is permitted with adviser and director of graduate studies approval.

M.S. Degree Requirements

The M.S. offers both Plan A (with thesis) and Plan B (without thesis) options. Both options require at least 14 course credits in the major and 6 course credits in the minor or related field. Plan A also requires at least 10 thesis credits. Plan B also requires at least an additional 10 graduate credits in approved courses and a Plan B paper. The minor may be chosen from fields such as biochemistry,
chemistry, chemical engineering, microbiology, nutrition, and statistics.

Language Requirements—None.

Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—For a master’s minor, two of the following courses must be taken: FScN 4111, 4121, or 4331. The minor must be approved by the food science director of graduate studies.

Ph.D. Degree Requirements
The number of credits required will vary depending on preparation and the research undertaken. Most students take a total of about 60 credits. Of these, at least 12 credits must be in the minor or related fields and 24 credits must be doctoral thesis credits. The student and the adviser, with the approval of the graduate studies committee, determine coursework in the major.

Language Requirements—None.

Minor Requirements for Students Majoring in Other Fields—For a Ph.D. minor, students must take FScN 4111, 4121, 4331, and 3 additional FScN credits, for a total of 12 credits. The minor must be approved by the food science director of graduate studies.

Forestry
See Natural Resources Science and Management.

French and Italian

Contact Information—A department general information bulletin and a projection of graduate-level courses to be offered is available from the Department of French and Italian, University of Minnesota, 260 Folwell Hall, 9 Pleasant Street S.E., Minneapolis, MN 55455 (612-624-4308; fax 612-624-6021; frit@umn.edu or http://frit.umn.edu). For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step.

Professor
F. R. P. Akehurst, SM
Susan Noakes, SM, Italian, M
María Paganini, SM

Associate Professor
Daniel Brewer, SM
Mária M. Brewer, SM
Bruno Chaouat, M2
Juliette Cherbuliez, M2
Susanna Ferlito, SM, Italian, M
Betsy Kerr, SM
Judith Preckshot, SM
Peter H. Robinson, SM
Eileen B. Sivert, SM

Assistant Professor
Alan Smith, M2, Italian, M

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—The French program, which offers M.A. and Ph.D. degrees, covers all areas of French literature and culture from the Middle Ages to the present. Traditional areas of study and scholarship are inflected by the faculty’s interests, expertise, and research in areas that have shaped—and continue to shape—the discipline of French studies. The program, which fosters interdisciplinary research, has particular strengths in literary and cultural studies, critical theory, feminist studies, medieval studies, and francophone studies.

The Italian M.A. program adopts an interdisciplinary approach to the study of the literatures and cultures of Italy. The curriculum emphasizes the study of cultural identities in Italy through literary and historical discourses. The program has special strengths in Dante and Early Modern studies, and in the Romantic and Modern periods.

Prerequisites for Admission—A B.A. in French or Italian (or equivalent), with a literary emphasis, is required for the M.A. programs.
Applicants have generally completed at least 18 semester credits in French or Italian literature and culture. Prospective students whose undergraduate degree is in another field, but who have taken substantial coursework in French or Italian and are strongly motivated to pursue literary studies, are invited to contact the director of graduate studies in French or in Italian. For the Ph.D. program, an M.A. in French (or equivalent) is required.

Special Application Requirements—Applicants must submit scores from the General Test of the GRE, three letters of recommendation from persons familiar with their scholarship and research potential, a complete set of official transcripts, a sample of their academic writing, an audiotape of their spoken French or Italian, and a written statement of career interests and goals.
International student applicants should also submit scores for the TOEFL or equivalent English proficiency testing program. Students may apply at any time; however, submission of all application materials by January 15 is encouraged to ensure priority consideration for fellowships and teaching and research assistantships awarded for the next academic year. New teaching assistants and fellowship recipients are only admitted for fall semester; others may be admitted in mid-year.

Affiliated Research Centers—Students are encouraged to explore interdisciplinary approaches through outside coursework or participation in one of several academic centers with which the programs are affiliated. These centers include, in the College of Liberal Arts, the Center for Advanced Feminist Studies, the Center for Advanced Research in Language Acquisition, the Center for German and European Studies, the Center for Medieval Studies, the Humanities Institute, as well as the University’s Immigration History Research Center. Students specializing in francophone literatures and cultures may pursue these interests through the African American and African studies program or the Interdisciplinary Center for the Study of Global Change.

Courses—Please refer to French (Fren), French and Italian (FrIt), and Italian (Ital) in the course section of this catalog.

Use of 4xxx Courses—4xxx courses in French, Italian, or other programs may be used for graduate credit only in exceptional cases.
Students should consult the director of graduate studies and adviser before registering.

M.A. Degree Requirements
In French, students may pursue Plan A (with thesis) or Plan B (with paper). Plan A requires at least 24 credits, Plan B at least 33 credits. Both plans require at least 18 credits in the major and 6 credits in related fields or, in a minor, the number of credits required by the minor program (usually 6 credits). Plan A also requires at least 10 thesis credits. (Detailed information is available through the program office.)
In Italian, the M.A. is offered under Plan A (with thesis) or Plan B (with paper). Plan A requires at least 22 course credits and 10 thesis credits. Plan B requires at least 30 course credits. (Detailed information is available through the program office.)

Final Exam—The final exams in both French and Italian programs are written and oral.

Language Requirements—For the M.A. degree in French, students must demonstrate proficiency in one foreign language besides English and French. For the M.A. in Italian, by the time of their final exam, students must demonstrate proficiency in one ancient or modern language besides Italian and English; French, Spanish, or Latin is recommended.

Minor Requirements for Students Majoring in Other Fields—A master’s minor in French requires at least 9 credits; a minor in Italian requires at least 6 credits.

Ph.D. Degree Requirements
The Ph.D. requires at least 57 course credits and 24 thesis credits. Coursework involves at least 45 credits in the major and at least 12 credits (usually four courses) in related fields or, in a minor, the number of credits required by the major program (usually 12 credits). Detailed information is available through program office.

Language Requirements—For the Ph.D., students must demonstrate proficiency in one foreign language besides English and French, at a level higher than for the M.A. and suitable for use in research. Doctoral students specializing in the Middle Ages, Renaissance, or Early Modern period (roughly to 1666) must also demonstrate knowledge of Latin.
Minor Requirements for Students Majoring in Other Fields—A Ph.D. minor requires at least 12 credits

French Studies

Postbaccalaureate Certificate

Contact Information—French Studies Certificate, Department of French and Italian, 260 Folwell Hall, 9 Pleasant Street S.E., Minneapolis, MN 55455-6162-6430; fax 612-624-6021; frt@umn.edu

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.

Professor
F. R. P. Akhurst, M
Susan Noakes, M
Maria Paganini, M

Associate Professor
Daniel Brewer, M
Mária M. Brewer, M
Bruno Chaouat, M
Juliette Cherbuliez, M
Susanna Ferlito, M
Betsy Kerr, M
Judith Preckshot, M
Peter H. Robinson, M
Eileen B. Sivert, M

Assistant Professor
Alan Smith, M

Curriculum—This 15-credit graduate program is addressed primarily to secondary teachers of French but welcomes any prospective students wishing to enhance their knowledge of diverse areas of French and francophone studies, including linguistics, culture, literature, and film. Consisting of coursework only, the certificate provides the opportunity to explore in depth aspects of French and Francophone literature, culture, and language while also sharpening language skills. An additional benefit is the potential for professional advancement.

Prerequisites for Admission—Applicants must have a B.A. in French or equivalent (B.A./B.S. in another field but relevant professional experience or academic preparation in French language and culture) with a preferred GPA of 3.00. Applicants with considerable teaching experience or other relevant professional experience (publications, translations, work experience in France or a francophone country), who have a GPA below 3.00, are encouraged to make inquiries to the director of graduate studies.

Special Application Requirements—Applicants must submit the following materials: transcripts, a personal statement (in English) explaining how this certificate meets their personal or professional goals, a writing sample in French (500-1,000 word essay on applicant’s topic of choice), and two letters of recommendation from individuals who can comment knowledgeably on applicant’s interest and abilities in French studies. Applications must be received by April 15 for fall semester and by October 15 for spring semester.

Certificate Requirements—The certificate consists of five courses (15 credits) selected according to the following formula: one course (3 credits) in French linguistics, one course (3 credits) in French or francophone literature or culture, and three elective courses (9 credits) in French/francophone language, linguistics, literature, or culture. One of the three electives may be taken in a related area outside French studies, subject to approval by the student’s adviser. At least 60 percent of credits must be taken at the 5xxx and 8xxx levels and no more than two courses (6 credits) at the 4xxx level. No courses taken as part of an undergraduate program may be applied, but up to 40 percent of the work on the certificate program can be transfer credits, consistent with the Graduate School’s transfer policy. Program must be completed within four years of the date of admission.

Genetics

See Molecular, Cellular, Developmental Biology, and Genetics.

Geographic Information Science

Contact Information—Master of Geographic Information Science Program, Department of Geography, University of Minnesota, 414 Social Sciences Building, 267 19th Avenue South, Minneapolis, MN 55455-6162; 612-625-6080; fax 612-624-1044; mgis@umn.edu

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp.

Professor
John S. Adams, M2
Marvin E. Bauer, Forest Resources, M2
James Bell, Soil, Water, and Climate, M2
Dwight A. Brown, M2
Philip J. Gersmehl, M2
Robert B. McMaster, M2
Shashi Shekhar, Computer Science, M2
Richard H. Skaggs, M2

Associate Professor
Paul V. Bolstad, Forest Resources, M2
Francis Harvey, M2
Roderick H. Squires, M2

Assistant Professor
Martin Galanda, AM2
Steven Manson, M2

Senior Cartographer
Mark Lindberg, M2

Associate Program Director
Susanna McMaster, M2

Other
William J. Craig, M2
Teaching Specialist
Stephen Lime, AM2
Timothy Loesch, AM2
Robert Maki, AM2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—The master of geographic information science (MGIS), administered by the Department of Geography, provides graduate-level work in the theory, applications, and technology of geographic information science (GIS). Courses for the program are divided into three broad categories. Core courses provide the conceptual and theoretical underpinnings for a comprehensive, well-rounded knowledge of GIS, including an introductory seminar for entering students (GIS 8501). A set of technology courses focus on specific software and techniques of GIS. Elective courses provide additional breadth to the program by allowing students to take courses related to their area of interest.

Prerequisites for Admission—Admission to the program requires a bachelor’s degree with a preferred GPA of 3.00. Prospective students also should have completed a college-level mathematics course, statistics course, and computer programming course.

Special Application Requirements—Applicants must submit a MGIS program application form; transcripts; a clearly written statement of career interests, goals, and objectives; and three letters of recommendation from persons familiar with their academic and/or employment background. The GRE is not required. All materials must be submitted by January 30 for fall semester entrance and by September 1 for spring semester entrance.

Courses—Please refer to Geography (Geog) and Geographic Information Science (GIS) in the course descriptions for courses pertaining to the program. Also refer to Forest Resources (FR) and Environment and Natural Resources (ENR) in the course descriptions for additional courses.

Use of 4xxx Courses—No more than two 4xxx courses may be included in the program without consent of the adviser and director of graduate studies.

MGIS Plan B Degree Requirements

The degree is offered Plan B (without thesis) and requires 35 credits of coursework, three Plan B projects, and a final examination. All students must have at least 35 credits, with a minimum of 18 credits in core and technology classes (12 credits of core courses and 6 credits of technology courses). All students are required to take Geog 5561, Geog 5563, GIS 5571, GIS 5572, an approved 8xxx geography seminar, and GIS 8501. At least 6
Graduate Faculty Listings

Kurt F. Kipfmueller, M2
Vinay K. Gidwani, M2
Assistant Professor
Roderick H. Squires, SM
Katherine Klink, SM
George L. Henderson, SM
Francis J. Harvey, M2
Susan L. Craddock, Women's Studies, AM2
Richard H. Skaggs, SM
Eric S. Sheppard, SM
Earl P. Scott, SM
Abdi I. Samatar, SM
Helga Leitner, SM
Lawrence M. Knopp, Jr., Geography, Duluth, AM2
Philip J. Gersmehl, SM
Dwight A. Brown, SM
John S. Adams, SM
Professor
John S. Adams, SM
Dwight A. Brown, SM
Philip J. Gersmehl, SM
John Fraser Hart, SM
Lawrence M. Knopp, Jr., Geography, Duluth, AM2
Helga Leitner, SM
Ann R. Markusen, Public Affairs, AM2
Judith A. Martin, SM
Robert B. McMaster, SM
Abdi I. Samatar, SM
Earl P. Scott, SM
Eric S. Sheppard, SM
Richard H. Skaggs, SM
Associate Professor
Bruce P. Braun, SM
Sue L. Craddock, Women's Studies, AM2
Jeffrey R. Crump, Design, Housing, and Apparel, AM2
Francis J. Harvey, M2
George L. Henderson, SM
Katherine Klink, SM
Roger P. Miller, SM
Richa Nagar, Women's Studies, AM2
Roderick H. Squires, SM
Karen E. Till, M2
Connie H. Wel, SM
Assistant Professor
Vinay K. Gidwani, M2
Timothy J. Grifits, Soil, Water, and Climate, AM2
Kurt F. Kipfmueller, M2
Steven M. Manson, M2
Arun Saldanha, M2
Bryan N. Shuman, M2
Susy S. Ziegler, M2
Other
William J. Craig, Center for Urban and Regional Affairs, AM2
Pat Farrell, Geography, Duluth, AM
Scott Freundshuh, Geography, Duluth, AM
Mark B. Lindberg, Director, University of Minnesota Cartography Lab, M2
Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Language Requirements—None
Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—A master's minor is developed in consultation with a faculty adviser. Consult the MGIS director of graduate studies about selecting an adviser. The minor requires at least 9 credits (3 courses).

Geography

Contact Information—Department of Geography, University of Minnesota, 414 Social Sciences Building, 267 19th Avenue South, Minneapolis, MN 55455 (612-626-6080; fax 612-624-1044; willi046@umn.edu) (www.geog.umn.edu). For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp.

Professor
John S. Adams, SM
Dwight A. Brown, SM
Philip J. Gersmehl, SM
John Fraser Hart, SM
Lawrence M. Knopp, Jr., Geography, Duluth, AM2
Helga Leitner, SM
Ann R. Markusen, Public Affairs, AM2
Judith A. Martin, SM
Robert B. McMaster, SM
Abdi I. Samatar, SM
Earl P. Scott, SM
Eric S. Sheppard, SM
Richard H. Skaggs, SM

Associate Professor
Bruce P. Braun, SM
Sue L. Craddock, Women's Studies, AM2
Jeffrey R. Crump, Design, Housing, and Apparel, AM2
Francis J. Harvey, M2
George L. Henderson, SM
Katherine Klink, SM
Roger P. Miller, SM
Richa Nagar, Women's Studies, AM2
Roderick H. Squires, SM
Karen E. Till, M2
Connie H. Wel, SM

Assistant Professor
Vinay K. Gidwani, M2
Timothy J. Grifits, Soil, Water, and Climate, AM2
Kurt F. Kipfmueller, M2
Steven M. Manson, M2
Arun Saldanha, M2
Bryan N. Shuman, M2
Susy S. Ziegler, M2

Other
William J. Craig, Center for Urban and Regional Affairs, AM2
Pat Farrell, Geography, Duluth, AM
Scott Freundshuh, Geography, Duluth, AM
Mark B. Lindberg, Director, University of Minnesota Cartography Lab, M2
Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—The discipline of geography is rooted in concepts of place, location, and scale. Geographers draw on theories and methods from diverse fields of inquiry to form synergistic connections among the four primary areas of geographic inquiry: human geography, physical geography, nature-society relationships, and spatial analysis and mapping.

Human geography seeks to understand the creation and changing nature of places and regions, and how peoples and places are interconnected through social, economic, political, and cultural processes. Physical geography focuses on the earth's interrelated physical environmental systems (climate, vegetation, landforms, water, and soil), and the interactions between the physical environment and social, economic, and political systems. Nature-society geography examines how the human and biophysical worlds interact and affect one another in and across different societies, and how environments shape and are shaped by human and non-human processes. Geographic inquiry also addresses cartographic representation, such as new methods in geographic visualization, and undertakes fundamental and applied research into all aspects of geographic information science, including the societal dimensions of geographic technologies.

The program emphasizes research and teaching in political economy, international development, and globalization; urban geography; physical environmental systems; nature-society relationships; cultural and political landscapes; the geography of population and health; geographic information science and cartography; geographic education; and the history and philosophy of geography. In the first year of the graduate program students take a pair of core courses in geographic thought and research methodologies. Beyond this, the program is highly individualized with a limited number of requirements. Students work with their advisers to design individual programs suited to their educational and professional goals.

Prerequisites for Admission—Prospective students should have completed the equivalent of introductory courses in physical and human geography and at least seven upper division courses in systematic and regional geography. Students who were not undergraduate geography majors are encouraged to apply but may be required to make up deficiencies.

Special Application Requirements—Three letters of recommendation must be sent to the department. Scores from the General (Aptitude) Test of the GRE that are less than five years old are required of students with baccalaureate degrees from U.S. institutions. Graduate study in the program begins in the fall semester. The application deadline is December 15 for entrance the following September. All applications are evaluated once each year in early January.

Courses—Please refer to Geography (Geog) in the course section of this catalog for courses pertaining to the program.

Use of 4xxx Courses—No more than two 4xxx courses may be included on the degree program form without consent of the adviser and director of graduate studies.

M.A. Degree Requirements

The M.A. is offered under Plan A (with thesis) and Plan B (without thesis). Plan A requires at least 21 course credits (plus 10 thesis credits); Plan B requires at least 31 course credits and three Plan B papers. Each student is required to take Geog 8001 and 8002, plus two additional Geog 81xx and/or Geog 82xx courses. Geog 8970 and 8980 may be used for Geog 81xx or 82xx coursework with permission of the adviser. The M.A. program usually is completed within two years.

Language Requirements—M.A. students are expected to acquire competency in the foreign language/research methodology necessary for their graduate research. This requirement is set by the advising committee, which is also responsible for certifying that the requirement has been met before the final exam.

Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—A master's minor must be developed in consultation with a faculty adviser. Consult the director of graduate studies about selecting an adviser. The minor requires at least 6 credits (two courses).

Ph.D. Degree Requirements

Each student is required to take Geog 8001 and 8002, two additional Geog 81xx and/or 82xx courses, and a third Geog 82xx course. Geog 8970 and 8980 may be used for Geog 81xx or 82xx coursework with permission of the adviser. Students are also required to take 24 thesis credits and at least three elective courses. Course credits from the M.A. program may be transferred to the Ph.D. program. Further details on degree requirements may be found in the department publication The Graduate Program in Geography at the University of Minnesota.
Language Requirements—Ph.D. students are expected to acquire competency in the foreign language/research methodology necessary for their graduate research. This requirement is set by the advising committee, which is also responsible for certifying that the requirement has been met before the final exam.

Minor Requirements for Students Majoring in Other Fields—A doctoral minor program must be developed in consultation with an appropriate faculty adviser. Consult the director of graduate studies about selecting an adviser. The minor requires at least 9 credits (three courses).

Geological Engineering

Contact Information—Geological Engineering Program, University of Minnesota, Civil Engineering Building, 500 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-626-5522; fax 612-626-7750; gradsec@ce.umn.edu; www.ce.umn.edu). For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp.

Professor
Steven L. Crouch, SM
Peter A. Cundall, Civil Engineering, ASM
Gary A. Davis, M2
Emmanuel M. Detournay, SM
Andrew Drescher, SM
Efi Foufoula-Georgiou, SM
Catherine E. French, SM
Jerome F. Hajjar, SM
Joseph F. Labuz, SM
Karl A. Smith, SM
Henryk K. Stolarski, SM
Otto D. L. Strack, SM
Vaughan R. Voller, SM

Associate Professor
William A. Arnold, M2
Randal J. Barnes, SM
Bojan B. Guzina, SM
Miki Hondzo, M2
Raymond M. Hožálek, M
Lev Khazanovich, SM
David M. Levinson, M
Paige J. Novak, M
Fernando Porté-Agel, M2
Arturo E. Schultz, M
Catherine E. French, SM
Carol K. Shield, SM

Assistant Professor
Timothy M. LaParra, SM
Mihai O. Marasteanu, SM

Senior Research Associate
Soﬁa G. Mogilevskaia, AM2

Along with the program-speciﬁc requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major ﬁelds.

Curriculum—Emphases are in fundamental aspects of geomechanics and its applications. Research focuses on the use and development of discrete and continuum theories such as elasticity, plasticity, fracture mechanics, and poroelasticity for solving engineering problems. Numerical methods are being developed for obtaining solutions; experimental methods and novel apparatus are being developed for gathering physical evidence. Applications include processes of comminution, ﬂow of granular materials, hydraulic fracturing, and nondestructive testing. The graduate program in geological engineering is administered in the Department of Civil Engineering.

Prerequisites for Admission—A bachelor’s degree in engineering, basic science, or mathematics is preferred. Admission depends primarily on the applicant’s academic record and letters of recommendation. Applicants who lack geological engineering training are often required to complete at least one appropriate course from the undergraduate program. Graduate degree credit is not awarded for such preparatory work. For the M.Geo.E. program, an ABET-accredited bachelor’s degree in geological engineering is required.

Special Application Requirements—Applicants are required to submit results of the GRE in support of their applications. The TOEFL is required of foreign applicants from non-English-speaking countries. A TOEFL score of at least 550 on the paper-based test or 213 on the computer-based test is required for admission. Admission requirements also include three letters of recommendation and a statement of purpose that outlines the prospective student’s research interests, reasons for pursuing graduate studies, and career plans after graduation. Students are admitted each semester, but applicants are encouraged to begin fall semester and to submit their applications by December 31 before the year their studies are expected to begin.

Courses—Please refer to Geological Engineering (GeoE) in the course section of this catalog for courses pertaining to the program.

Use of 4xxx Courses—Inclusion of 4xxx departmental courses on degree program forms is subject to adviser and director of graduate studies approval. Students from other majors may include such courses subject to their own program’s approval.

M.Geo.E. Design Project Degree Requirements

The master of geological engineering (M.Geo.E.) degree is for the practicing engineer who would like to obtain an advanced degree, enrolling part-time or full-time. Students who intend to proceed to the Ph.D. program or think they may later wish to be admitted to the Ph.D. program should apply for the master of science program. Students are expected to follow a coherent program of coursework selected with the help of a faculty adviser and approved by the director of graduate studies. Students also must demonstrate professional competence by carrying out and defending a design project. The degree typically takes 12 to 18 months, full-time, to complete.

The M.Geo.E. requires at least 30 credits and is offered under two plans. One requires at least 20 course credits and preparation of a design project (10 credits); the design project must be carried out by the student in consultation with a faculty adviser. The other plan is a coursework-only degree program and requires at least 30 course credits. At least 6 of the course credits must be taken outside the department for either plan.

Language Requirements—None.

Final Exam—A final oral exam is required of all M.Geo.E. students.

Minor Requirements for Students Majoring in Other Fields—For a master’s minor, two or more 5xxx to 8xxx courses from the same area of geological engineering are required, for a total of 6 or more credits.

M.S. Degree Requirements

The master of science (M.S.) degree balances education in engineering fundamentals and design with research and development. The M.S. degree is for students wishing to pursue a career in industry or to continue toward a Ph.D. degree. Students follow a program selected with the help of a faculty adviser and approved by the director of graduate studies. A program typically takes 18 to 24 months to complete.

The M.S. requires at least 30 credits and is offered under two plans. Plan A emphasizes research and preparation of a thesis; Plan B emphasizes coursework. The thesis is written on a research project carried out in consultation with a faculty adviser. Under Plan B, students complete one to three Plan B papers as determined by the faculty adviser. Plan B papers can include computer programs, annotated bibliographies, field investigations, and analysis/design of special engineering problems. Plan A requires at least 20 course credits and 10 thesis credits. Plan B requires at least 30 course credits. At least 6 credits of coursework must be from outside the department for either Plan A or Plan B.

Language Requirements—None.

Final Exam—The ﬁnal exam is oral.

Minor Requirements for Students Majoring in Other Fields—For a master’s minor, two or more 5xxx to 8xxx courses from geological engineering are required, for a total of 6 or more credits.

Ph.D. Degree Requirements

The Ph.D. degree couples independent research with coursework in a comprehensive program. Research performance, as judged by preparation of a dissertation on an independently pursued research topic, is the primary requirement for the Ph.D. degree. Students usually enter the program after completing the M.S. degree. The program is typically completed in 5 to 6 years following the bachelor’s degree.
Each program of study is designed in consultation with a faculty adviser and must be approved by the director of graduate studies. A typical program consists of 45 credits of coursework and 24 thesis credits.

A supporting program or minor of at least 12 credits outside the department must be included. Credits earned in a M.S. program may be presented in partial fulfillment of the Ph.D. requirements.

Language Requirements—None.

Minor Requirements for Students Majoring in Other Fields—For a Ph.D. minor, four or more 5xxx to 8xxx courses are required, for a total of at least 12 credits.

Geology

Contact Information—Department of Geology and Geophysics, University of Minnesota, 310 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-624-1333; fax 612-625-3819; geology@umn.edu; www.geo.umn.edu). For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp.

Regents Professor
Herbert E. Wright, Jr. (emeritus), ASM

Professor
E. Calvin Alexander, Jr., SM
Subir K. Banerjee, M2
Steve Colman, Geological Sciences, Duluth, ASM
R. Lawrence Edwards, SM
John W. Goodge, Geological Sciences, Duluth, ASM
Vicki L. Hansen, Geological Sciences, Duluth, ASM
Peter J. Hudleston, SM
Emi Ito, SM
Thomas C. Johnson, Geological Sciences, Duluth, ASM
David L. Kohlstedt, M2
Ronald L. Morton, Geological Sciences, Duluth, ASM
V. Rama Murthy, SM
Christopher Paola, SM
Hans-Olaf Pfannkuch, SM
William E. Seyfried, SM
James H. Stout, SM
Christian P. Teyssier, SM
Harvey Thorleifson, SM
Donna L. Whitney, SM

Adjunct Professor
James Almendinger, AM2
Anthony C. Runkel, AM2
Wayne C. Shanks III, AM

Associate Professor
Erik Brown, ASM
Marc Hirschmann, SM
Karen L. Kleinseph, SM
Howard D. Mooers, Geological Sciences, Duluth, ASM
Nigel J. Wattrus, Geological Sciences, Duluth, ASM

Assistant Professor
Timothy Demko, Geological Sciences, Duluth, ASM
Annia K. Fayon, AM2
David Fox, SM
Christina Gallup, Duluth, Geological Sciences, Duluth, ASM
Lee Penn, Department of Chemistry, AM2
Lesley Perg, SM
Bryan Shuman, Department of Geography, AM2
John Swenson, Geological Sciences, Duluth, ASM

Senior Research Associate
Kang Ding, AM
Paul H. Glaser, AM2
Mark Zimmerman, AM2

Other
Val W. Chandler, AM2
Mark Edlund, AM2
Daniel R. Engstrom, AM2
Michael J. Jackson, AM2
Carrie Jennings, AM2
Robert G. Johnson, AM
James D. Miller, AM2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—The geology major includes the areas of structural geology, tectonics, metamorphic geology, Quaternary studies, climate and environmental change, limnology, paleontology, groundwater geology, hydrogeology, geofluids, surface processes, geomorphology, stratigraphy, sedimentology, mineralogy, experimental and theoretical petrology, experimental geochemistry, isotopic and aqueous geochemistry. Students may accommodate other areas of interest such as earth resources, engineering geology, environmental geology, materials science, soil science, and paleoecology by choosing a minor or supporting field from outside the department.

Prerequisites for Admission—Most candidates for advanced degrees have completed a bachelor’s degree in geology, geophysics or in the broad field of earth and material sciences. However, applications from students in fields such as chemistry, physics, or biology are encouraged. At least one year of study in calculus, chemistry, and physics are required. In general, an outstanding academic record is expected.

Special Application Requirements—The student’s statement of purpose, three letters of recommendation, and official GRE scores are required for admission and financial aid consideration. Applications for admission are considered at any time, although applications for financial aid should be submitted to the department by January 15 to ensure consideration. Studies may begin in any semester or summer session, although fall semester is preferable. Please refer to the Graduate Programs section of the department Web site for a listing of all required applications materials.

Courses—Please refer to Geology and Geophysics (Geo) in the course section of this catalog for courses pertaining to the program. All courses must be taken at 4xxx and 5xxx, with several formal courses to be included at 8xxx.

Use of 4xxx Courses—For both the M.S. and Ph.D., typically no more than 30 percent of the total course credits are 4xxx.

M.S. Plan A, Plan B, and Plan C Degree Requirements
The M.S. is offered Plan A (with thesis), Plan B (with project), and Plan C (coursework only with emphasis in hydrogeology and environmental geoscience). Plan A requires a minimum of 30 course credits consisting of at least 14 course credits in the major, 6 course credits in the related field, and 10 thesis credits. Plan B requires a minimum of 30 course credits consisting of at least 14 credits in the major and 8 credits in the related field. Plan C is the coursework-only option, which requires a minimum of 30 course credits consisting of at least 14 credits in the major and 9 credits in the related field or a minor. Courses in the minor and related field are normally taken from outside the department, although they may be taken from within in special cases.

Language Requirements—None.

Final Exam—Plan A students must pass the final oral examination in defense of their thesis. Plan B students must pass the final oral and/or written examination.

Minor Requirements for Students Majoring in Other Fields—The master’s minor is established individually with approval by the graduate studies committee. Typically no more than 50 percent of the total course credits are 4xxx.

Ph.D. Degree Requirements
The Ph.D. requires a minimum of 36 course credits consisting of at least 12 course credits in the minor or supporting field. In some cases, fewer than 24 credits in the major field are acceptable provided the total is at least 36. Courses in the minor and supporting program are normally taken from outside the department, although they may be taken from within in special cases.

Language Requirements—None.

Final Exam—Ph.D. students must pass the final oral examinations in defense of their thesis.

Minor Requirements for Students Majoring in Other Fields—The Ph.D. minor is established individually with approval by the graduate studies committee. Typically, no more than 50 percent of the total course credits are 4xxx.
Degree Programs and Faculty

Geophysics

Contact Information—Department of Geology and Geophysics, University of Minnesota, 310 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-624-1333; fax 612-625-3819; geology@umn.edu; www.geo.umn.edu).

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp.

Professor
Subir K. Banerjee, SM
David L. Kohlstedt, SM
Bruce M. Moskowitz, SM
V. Rama Murthy, SM
Chris Paola, M2
Justin Revenaugh, SM
James H. Stout, SM
Christian P. Teyssier, M2
David A. Yuen, SM

Associate Professor
Marc Hirschmann, M2
Karen L. Kleinsepn, M2
Renata M. Wentzocwitch, Chemical Engineering and Materials Science, AM2

Senior Research Associate
Mark Zimmerman, AM2

Other
Val W. Chandler, AM2
Michael J. Jackson, AM2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—The geophysics major includes the areas of applied and theoretical geophysics, paleomagnetism and rock magnetism, mineral and rock physics, seismology and geostatistics. Students may accommodate other areas of interest such as earth resources, engineering geology, environmental geology, materials science, soil science, and paleoecology by choosing a minor or supporting field from outside the department.

Prerequisites for Admission—Most candidates for advanced degrees have completed a bachelor’s degree in geology, geophysics, or earth and material sciences. However, applications from students in fields such as chemistry, physics, or biology are encouraged. At least one year of calculus, chemistry, and physics are required. In general, an outstanding academic record is expected.

Special Application Requirements—The student’s statement of purpose, three letters of recommendation, and official GRE scores are required for admission and financial aid consideration. Applications for admission are considered at any time, although applications for financial aid should be submitted to the department by January 15 to ensure consideration. Studies may begin in any semester or summer session, although fall semester is preferable. Please refer to the Graduate Programs section of the department Web site for a listing of all required applications materials.

Courses—Please refer to Geology and Geophysics (Geo) in the course section of this catalog for courses pertaining to the program. All courses must be taken at 4xxx and 5xxx, with several formal courses to be included at 8xxx.

Use of 4xxx Courses—For both the M.S. and Ph.D., typically no more than 30 percent of the total course credits are 4xxx.

M.S. Degree Requirements
The M.S. is offered Plan A (with thesis) and Plan B (with project). Plan A requires a minimum of 30 course credits consisting of at least 14 course credits in the major, 6 course credits in the related field, and 10 thesis credits. Plan B requires a minimum of 30 course credits consisting of at least 14 credits in the major and 8 credits in the related field. Plan C is the coursework-only option which requires a minimum of 30 course credits consisting of at least 14 credits in the major and 9 credits in the related field or a minor. Courses in the minor and related field are normally taken from outside the department, although they may be taken from within in special cases.

Language Requirements—None.

Final Exam—Plan A students must pass the final oral examination in defense of their thesis. Plan B students must pass the final oral and/or written examination.

Minor Requirements for Students Majoring in Other Fields—The master’s minor is established individually with approval by the graduate studies committee. Typically no more than 50 percent of the total course credits are 4xxx.

Ph.D. Degree Requirements
The Ph.D. requires a minimum of 36 course credits consisting of at least 12 course credits in the minor or supporting field. In some cases, fewer than 24 credits in the major field are acceptable provided the total is at least 36. Courses in the minor and supporting program are normally taken from outside the department, although they may be taken from within in special cases.

Language Requirements—None.

Final Exam—Ph.D. students must pass the final oral examination in defense of their thesis.

Minor Requirements for Students Majoring in Other Fields—The Ph.D. minor is established individually with approval by the graduate studies committee. Typically, no more than 50 percent of the total course credits are 4xxx.

Germanic Studies

Contact Information—Department of German, Scandinavian and Dutch, University of Minnesota, 205 Folwell Hall, 9 Pleasant St. SE, Minneapolis, MN 55455 (612-625-2080; fax 612-624-8297; gsd@umn.edu; www.folwell.umn.edu/gsd). For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp.

Professor
Evelyn S. Firchow, German, Germanic Medieval, SM
Paul Houe, Scandinavian, SM
Ruth Ellen B. Joeses, German, SM
Ruth M. Karras, History, Scandinavian, AM
Anatoly Liberman, German, Germanic Medieval, Scandinavian, SM
Richard W. McCormick, German, SM
James A. Parente, Jr., German, Scandinavian, Germanic Medieval, SM
Jochen Schulte-Sasse, German, SM
Goran K. N. Stockenstrom, Scandinavian, SM
Arlene A. Teraoka, German, SM
Jack D. Zipes, German, SM

Associate Professor
Leonard L. Duroche, Sr., German, SM
G. Lee Fullerton, German, M2
Andreas Gailus, German, M2
Kaaren E. Grimstad, Scandinavian, Germanic Medieval, SM
Patrizia C. McBride, Germanic Medieval, SM
Charlotte A. Melin, German, SM
Leslie Morris, German, SM
Ray M. Wakefield, German, Germanic Medieval, SM
Monika Zagar, Scandinavian, SM

Assistant Professor
Eric Baker, German, M2
Rembert Hueser, German, M2

Along with the program- and track-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—There are five tracks within the Germanic studies graduate program: German (M.A. and Ph.D.), Scandinavian Studies (M.A.), Teaching (M.A.), Germanic Medieval Studies (M.A. and Ph.D.), and German and Scandinavian Studies (Ph.D.).

Prerequisites for Admission—A B.A. or M.A. or equivalent in German, Scandinavian, or related field (depending on the track to which one applies) is required. Students with bachelor’s degrees who apply for the German track or the Germanic Medieval Studies track usually are admitted into the Ph.D. program with the understanding that the M.A. will be attained first. Students with bachelor’s degrees who are interested in the German and Scandinavian Studies Ph.D. must first complete an M.A. in the German track or the Scandinavian track and should have either near-native fluency in German plus an advanced level of proficiency in a Scandinavian language or near-native fluency in a Scandinavian
language plus an advanced level of proficiency in German. Applicants to the Scandinavian studies M.A. must have a strong competency in a Scandinavian language, and they should have taken at least four Scandinavian literature courses or the equivalent. Applicants to the Germanic Medieval Studies M.A. should have a strong command of German; knowledge of another Germanic language is preferred. Applicants for any track whose preparatory work evidences gaps may be asked to complete supplemental work before admission.

Special Application Requirements—The following must be sent directly to the department: the department’s Application for Graduate Study form; a statement of professional goals describing the applicant’s intellectual development and plans for the future; a copy of one or more papers representative of the applicant’s level of scholarly development; three letters of recommendation; and a complete set of transcripts (in addition to transcripts sent to the Graduate School). For master’s program applicants, and for all students who wish to be considered for the Graduate School Fellowship, the General (Aptitude) Test of the GRE is required; the GRE is optional for applicants whose native language is not English. Students are admitted in the fall semester only. All application materials must be received by January 10.

Use of 4xxx Courses—A limited number of 4xxx courses may be included in degree programs of Germanic Studies majors or minors, subject to the approval of the adviser and the director of graduate studies. 4xxx courses counted on graduate programs must be taught by a member of the graduate faculty and must include work that is at the graduate level.

Minor Requirements for Students Majoring in Other Fields—M.A. minors are required to take the basic seminar in either German (Ger 8002) or Scandinavian (Scan 8002) and two other courses, for at least 9 credits. Ph.D. minors who have not completed one of the basic seminars at the M.A. level must fulfill this requirement at the Ph.D. level. In addition, Ph.D. minors must complete at least three other courses for a total of at least 12 credits (usually four courses).

German Track

M.A. Degree Requirements

The M.A. offers students the opportunity to do advanced work in German studies and prepares them with the theoretical and practical tools to enter a Ph.D. program. The M.A. requires at least 35 credits, including an introductory course in contemporary literary and cultural theory (CLit 8001) and an introductory course in German studies (Ger 8002), four courses in different periods of German literature, a philology course, an elective in German literature/culture, a pedagogy course, two courses outside the German track; demonstration of oral and written proficiency in German and one Plan B paper.

Courses—Please refer to German (Ger); German, Scandinavian, and Dutch (GSD); Dutch (Dutch); and Comparative Literature (CLit) in the course section of this catalog for courses pertaining to this track.

Language Requirements—Students who intend to continue in the Ph.D. program are strongly encouraged to acquire a reading proficiency in one other foreign language during their M.A. program (refer to requirements for the Ph.D.).

Final Exam—The final exam is oral.

Ph.D. Degree Requirements

The Ph.D. offers students the opportunity to do advanced work in German studies and prepares them with theoretical and practical tools to serve as researchers, scholars, and teachers. The Ph.D. requires at least 39 credits, including six courses in German literature/culture, a course in Germanic philology, a pedagogy course (if it has not been taken for the M.A.), the dissertation seminars, and four courses outside the German track. At least 24 thesis credits are required.

Courses—Please refer to German (Ger); German, Scandinavian, and Dutch (GSD); and Dutch (Dutch) in the course section of this catalog for courses pertaining to this track.

Language Requirements—The program requires reading competence in at least two languages or a high degree of proficiency in one language other than German or English.

Scandinavian Studies Track

M.A. Degree Requirements

The M.A. offers students the opportunity to do advanced work and prepares them with the theoretical and practical tools to enter the Ph.D. track in German and Scandinavian at the University of Minnesota, to enter a Ph.D. program in Scandinavian at another university, or to embark on a career that requires specialized knowledge of Scandinavia. Students enrolled in the M.A. in the Scandinavian track emphasize one of the three Scandinavian languages and literatures while acquiring a general knowledge of the other two. The M.A. in the Scandinavian track may also include Finnish.

The M.A. requires at least 35 credits, including an introductory course in contemporary literary and cultural theory (CLit 8001), and a course introducing students to graduate studies in Scandinavian (Scan 8002), five courses in different periods of Scandinavian literature/culture, a course in Old Norse or Scandinavian linguistics, a pedagogy course, two courses outside the Scandinavian track, and one Plan B paper.

Courses—Please refer to German (Ger); German, Scandinavian, and Dutch (GSD); Scandinavian (Scan); and Comparative Literature (CLit) in the course section of this catalog for courses pertaining to this track.

Language Requirements—The track requires advanced competency in at least one Scandinavian language or Finnish, and reading knowledge of two other Scandinavian languages.

Final Exam—The final exam is written and oral.

Teaching Track

M.A. Degree Requirements

The M.A. in teaching combines a disciplinary focus in Germanic studies with a concentration in foreign language teaching and second language acquisition. The track does not lead to teacher licensure. Students interested in teacher licensure should contact the College of Education and Human Development.

The M.A. requires at least 34 credits, including a pedagogy course; three courses on the history and structure of the German language; Ling 5505—Introduction to Second Language Acquisition; CI 5662—Issues in Second Language Curriculum Design; two or more courses in language teaching, curriculum and instruction or teaching English as a second language or linguistics; two German literature and culture courses; one elective: demonstration of oral and written proficiency in German, and one Plan B paper.

Courses—Please refer to German (Ger); Linguistics (Ling); Curriculum and Instruction (CI); Language, Teaching, and Technology (LgTT); and Teaching English as a Second Language (TESL) in the course section of this catalog for courses pertaining to this track.

Final Exam—The final exam is oral.

Germanic Medieval Studies Track

M.A. Degree Requirements

The M.A. offers students the opportunity to do advanced work in Germanic medieval studies and prepares them with theoretical and practical tools to enter the Ph.D. track.

The M.A. requires at least 35 credits, including an introductory course on contemporary literary and cultural theory (CLit 8001) and a course introducing students to graduate studies in either German or Scandinavian (Ger 8002 or Scan 8002); four courses chosen from two of the three following groups: 1) Middle High German; 2) Old Norse; 3) Old English, Middle English, Old High German, Gothic, Old Saxon, Middle Dutch, Early Modern Dutch, Old Frisian; two courses in Germanic medieval studies; a pedagogy course; at least two courses in related fields or a designated minor; demonstration oral and written proficiency in German, and one Plan B paper.

Courses—Please refer to English (EngL, EngG); Dutch (Dutch); German (Ger); German, Scandinavian, and Dutch (GSD); Scandinavian (Scan); and Comparative Literature (CLit) in the course section of this catalog for courses pertaining to this track.
Students who intend to continue in the Ph.D. program are encouraged to acquire a reading proficiency in Dutch or a modern Scandinavian language.

**Final Exam**—The final exam is written and oral.

**Ph.D. Degree Requirements**
The Ph.D. offers students the opportunity to do advanced work in Germanic medieval studies and prepares them with theoretical and practical tools to serve as researchers, scholars, and teachers. The Ph.D. requires at least 36 credits, including four courses in Germanic Medieval Studies, two courses in a third medieval Germanic language (supplementing the two languages for the M.A.), a pedagogy course (if it has not been taken for the M.A.), the dissertation seminars, and four courses in a designated minor or supporting field; 24 thesis credits are also required.

**Courses**—Please refer to English (EngL, EngC); Dutch (Dtch); German (Ger); German, Scandinavian, and Dutch (GSD); and Scandinavian (Scan) in the course section of this catalog for courses pertaining to this track.

**Language Requirement**—Reading competence in Latin and one modern Germanic language other than German or English (e.g., Dutch or one of the Scandinavian languages).

## German and Scandinavian Studies Track

### Ph.D. Degree Requirements

The Ph.D. offers the student the opportunity to do advanced work in German and Scandinavian studies and prepares students with theoretical and practical tools to serve as researchers, scholars, and teachers in either German or Scandinavian studies, with a basic foundation in the other field as well. The Ph.D. requires at least 39 credits. The German emphasis requires at least four courses from the German list (8xxx literature or theory courses above 8002) and one course from each of three Scandinavian groups: 1) Old Norse group; 2) 19th century group; 3) 20th century group. The Scandinavian emphasis requires at least one course from each of the three Scandinavian groups plus an additional course from any of them and three courses from the German list. Students in both emphases are required to take a pedagogy course (if it has not been taken for the M.A.), the dissertation seminars, and 4 courses in a designated minor or supporting program. 24 thesis credits are required.

**Courses**—Please refer to German (Ger); German, Scandinavian, and Dutch (GSD); and Scandinavian (Scan) in the course section of this catalog for courses pertaining to this track.

**Language Requirements**—Reading competence in one language other than German, English, or a Scandinavian language.

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### Gerontology

#### Minor Only

**Contact Information**—Graduate Minor Program in Gerontology, Center on Aging, University of Minnesota, MMC 197, 420 Delaware Street S.E., Minneapolis, MN 55455 (612-624-3904; fax 612-624-8448;  
[www.grad.umn.edu](http://www.grad.umn.edu) [www.hsr.umn.edu/coa](http://www.hsr.umn.edu/coa).

For up-to-date graduate faculty listings, see [www.grad.umn.edu/faculty_rosters/step1.asp](http://www.grad.umn.edu/faculty_rosters/step1.asp).

**Professor**

- Dennis A. Ahlborg, Industrial Relations, M
- Donna Z. Bliss, Nursing, M
- David O. Born, Preventative Services, M
- Pauline G. Boss, Family Social Science, M
- James C. Floyd, Pharmacy Practice, M
- Jim Curtissinger, Ecology, Evolution, and Behavior, M
- Daniel F. Detzner, Family Social Science, M
- Richard P. DiFabio, Physical Medicine and Rehabilitation, M
- William Durfee, Mechanical Engineering, M
- Maurice W. Dysken, Psychiatry, M
- Nancy N. Eustis, Public Affairs, M
- Judith M. Garrard, Public Health, M
- Cynthia R. Gross, Pharmacy Practice, M
- David R. Guay, Pharmacy Practice, M
- Lois J. Heller, Medicine, Duluth, M
- Kenneth W. Hepburn, School of Nursing, M
- Robert L. Kane, Public Health, M
- Rosalie A. Kane, Public Health, M
- Helen Q. Kivnick, Social Work, M
- Thomas E. Lackner, Pharmacy, M
- Alice Larson, Veterinary Pathobiology, M
- Tom A. Larson, Pharmacy Practice, M
- Frank M. Lassman, Otolaryngology, AM
- Chap Le, Biostatistics, M
- Matthew K. McGuire, Psychology, M
- Steven H. Miles, M
- Phyllis Moea, Sociology, M
- Jeylan T. Mortimer, Sociology, M
- Christine A. Mueller, E, Nursing, M
- Jean K. Quam, Social Work, M
- Jon Schommer, Pharmaceutical Care and Health Systems, M
- Stephen Schondelmayr, Pharmacy Practice, M
- Virginia Seybold, Cell Biology and Neuroanatomy, M
- Marc Siewkowskii, Orthopedic Surgery, M
- David Thomas, Biochemistry, M
- Michael Wade, Kinesiology, M
- Jean Wyman, Nursing, M
- Shirley L. Zimmerman (emeritus), AM

**Associate Professor**

- Lynn Blewett, Public Health, M
- James Gambucci, Preventive Sciences, M
- Priscilla A. Gibson, Social Work, M
- Leslie A. Grant, Carlson School of Management, M
- Merrie J. Kaas, Nursing, M
- Kathleen Krichbaum, Nursing, M
- Terry Lum, Social Work, M
- James T. Pacala, Family Medicine and Community Health, M
- Rosemarie J. Park, Work, Community, and Family Education, M
- James R. Reinardy, Social Work, M
- Robert C. Serfass, Kinesiology, M
- Stephen K. Shuman, Preventive Sciences, M
- Marlene S. Stum, Family Social Science, M
- Carla E. S. Tabourne, Kinesiology, M
- LaDora V. Thompson, Physical Medicine and Rehabilitation, M

**Assistant Professor**

- Debra Ferrington, Ophthalmology, M
- Jeremy L. Holtzman, Medicine, M
- Teresa Kimberly, Physical Medicine and Rehabilitation, M
- Jennifer Lightfoot, Social Work, M
- Dawn Annette Lowe, Biochemistry, M
- David Lake, English Language and Literature, M
- Teresa C. McCarthy, Family Medicine and Community Health, M

**Clinical Assistant Professor**

- Patrick W. Irvine, Medicine, M

**Lecturer**

- Wayne Caron, Family Social Science, M
- Anne Kane, Public Health, M

**Research Associate**

- Lois Cutler, Public Health, M
- Celia W. Gershenson, Psychology, M

**Other**

- Ursula Beake Kranke, Health, M
- LeAnn Snow, Physical Medicine and Rehabilitation, M

**Curriculum**—The gerontology minor is available to master’s (M.A. and M.S.) and doctoral students. The minor provides a multidisciplinary foundation in gerontology for master’s minors and a more intensive preparation in aging for Ph.D. minors. Students who have minored in gerontology have majored in many departments, including but not limited to: curriculum and instruction (adult education); communication disorders; dentistry; design, housing, and apparel; family medicine and community health; family social science; journalism and mass communication; kinesiology; nursing; psychology; social work; and sociology. The program of courses is tailored in advanced consultation between the student and the director of graduate studies of the gerontology minor.

**Prerequisites for Admission**—Students must have gained admission to a master’s or doctoral degree-granting program within the Graduate School, and have prepared a minor program of coursework approved by the director of graduate studies in gerontology.

**Courses**—Courses are ordinarily taken from a designated course list provided by the Center on Aging and annually updated by the minor program. Students are welcome to identify and propose to the director of graduate studies additional courses on aging that might fulfill the minor requirements.

**Use of 4xxx Courses**—4xxx courses may not be included on degree program forms.
Minor Only Requirements

The master’s and doctoral minors are developed in consultation with, and should be approved in advance by, the director of graduate studies for gerontology. The master’s minor requires at least 8 credits, including Ger 5105—Multidisciplinary Perspectives on Aging (3 cr), or an alternative course approved by the director of graduate studies.

The doctoral minor requires at least 12 credits, ordinarily including Nurs 8320—Multidisciplinary Seminar on Social Perspectives of Aging (3 cr). Other courses may be substituted upon the recommendation of the director of graduate studies.

Greek

See Classical and Near Eastern Studies.

Health Informatics

Contact Information—Director of Graduate Studies in Health Informatics, Division of Health Informatics, University of Minnesota, MMC 511, 420 Delaware Street S.E., Minneapolis, MN 55455 (612-625-8440; fax 612-625-7166; www.hinf.umn.edu).

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp.

Professor
Christopher G. Chute, SM
Donald P. Connelly, SM
Shawn Curley, Information and Decision Sciences, SM
Lynda B. Ellis, SM
David P. Fan, Genetics and Cell Biology, SM
Stanley M. Finkelstein, SM
John R. Finnegan, Jr., Epidemiology, SM
James R. Fricton, Diagnostic/Surgical Sciences, SM
Laël C. Gatewood, SM
Paul E. Johnson, Information and Decision Sciences, SM
George G. Klee, M2
Robert P. Patterson, Physical Medicine and Rehabilitation, SM
Stuart M. Speedie, SM
Douglas R. Wholey, Health Services Research and Policy, SM
George L. Wilcox, Neuroscience, SM

Associate Professor
Sandra J. Potthoff, Healthcare Management, SM
Edward Ratner, Medicine, M2

Assistant Professor
Marcelline Harris, M2
Stephen T. Parente, Health Care Management, M2
George Vasmatis, M2
Amy Wilson, Health Sciences Research/Policy, M2

Other
Ernest F. Retzel, M2
Brian J. Westrich, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—Health informatics is an interdisciplinary field of scholarship that applies computer, information, and cognitive sciences to promote the effective and efficient use and analysis of information, ultimately improving the health, well-being, and economic functioning of society. Students take a sequence of core courses in health informatics and biostatistics, and electives in technical and health science areas. Possible areas of emphasis include health information systems, telemedicine, bioinformatics, user interface design, system impact evaluation, database construction and analysis, clinical decision-making, evaluation of health programs, image and signal processing, and physiological monitoring and control.

Prerequisites for Admission—Applicants are expected to have at least a bachelor of science or equivalent degree from a recognized institution of higher education. Although students are accepted into the program with different backgrounds and varying degrees of experience, some prerequisites are required, usually in the form of college coursework. Acceptance into the program is not precluded by minor deficiencies in background; rather it is conditional on these being made up before or during the first year of study. See the prerequisites listed in the table for areas of study that must be completed before admission to the program. Courses used to fulfill prerequisites are not given graduate credit. Courses in the curriculum assume that these prerequisite courses have been taken.

Note: These prerequisites are subject to change. Please check the Web site at www.hinf.umn.edu for current information about the program.

Special Application Requirements—The GRE or similar professional examination (e.g., MCAT, GMAT, PCAT) is required. Three letters of recommendation and a statement of purpose must be submitted with the application. Students are advised to apply for admission for fall semester, since spring semester admission may entail the student taking longer to complete the program.

Courses—Please refer to Health Informatics (HInf) in the course section of this catalog for courses pertaining to the program.

Use of 4xxx Courses—4xxx courses in computer science may be used to satisfy the elective requirements for the M.H.I., M.S., and Ph.D. degrees if the student has not previously taken a computer science course in the same subarea (e.g., database design) at a higher level. Acceptance of 4xxx courses from other departments or programs requires the approval of the adviser and the director of graduate studies.

M.H.I. Degree Requirements

The master of health informatics emphasizes the role of informatics-trained professionals as liaisons who bring both a background of medicine and a knowledge of information technology to the task of solving health care problems. The curriculum consists of 32 credits of coursework that includes: 8 credits of health informatics, 4 credits of technology-focused health administration, 3 credits of statistics and research design, 6 credits of coursework in the student’s chosen area of specialization, 6 credits of electives, 2 credits of seminar, and a 3 credit capstone course in which the student completes a project directly applicable to their own work environment. The program is designed to be completed in one calendar year for full-time students and in up to three years for part-time students. Many of the classes are offered in the late afternoon and on Saturdays; classes may also meet monthly or semi-monthly. Distance learning technologies facilitate work and class participation at off-campus locations.

M.S. Degree Requirements

The research-oriented Plan A master’s degree is available to advanced applicants, such as those with a professional degree in a health sciences discipline. It requires 32 course credits and 10 thesis credits. The Plan B option requires 42 course credits, including 6-7 credits from a technical area and 6-7 credits from the health sciences. Both plans require seven core courses, a sequence in statistics or biostatistics,
and registration in the health informatics seminar (5436) for the first year and for at least two semesters after that (1 credit each semester). For most students, the program requires two academic years and one summer.

**Ph.D. Degree Requirements**

The Ph.D. program is for students who want to obtain advanced training and conduct research. Students are expected to complete the same requirements as those for the Plan B master's program (a survey of health informatics, biostatistics, selected health science areas, and advanced training in selected informatics areas), as well as advanced coursework in health informatics and an area of concentration complementary to health informatics. The work is completed with an original research project reported in the doctoral dissertation. Students are expected to have earned the equivalent of at least 70 credits including 24 thesis credits.

**Language Requirement**—None.

**Minor Requirements for Students Majoring in Other Fields**—Master's students must successfully complete the introductory sequence in health informatics (HInf 5430 and HInf 5431). Ph.D. students must take the introductory sequence and one 8xxx course in health informatics.

### Health Journalism

**Contact Information**—Graduate Studies Office, Health Journalism M.A. Program, School of Journalism and Mass Communication, University of Minnesota, 110 Murphy Hall, 206 Church Street S.E., Minneapolis, MN 55455 (612-625-4054; fax 612-626-8251; sjmcgrad@umn.edu). For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp.

**Professor**

John R. Finnegan, Jr., M2
Russell V. Laepker, M2
Daniel J. Sullivan, M2
Douglas R. Wholey, M2

**Associate Professor**

Kenneth O. Doyle, Jr., M2
Jan A. Greaves, M2

**Assistant Professor**

Donald Brazeal, M2
Gary Schwitter, M2

Along with the program-speciﬁc requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—A joint program of the School of Journalism and Mass Communication and the School of Public Health, the professional master’s in health journalism promotes improved public communication about health matters by combining knowledge, skills, and experience from both disciplines. Professionals in journalism and public health earn an M.A. degree in health journalism. Those pursuing other master’s degrees, (e.g., master’s in public health), earn the M.A. in health journalism in addition to the other degree.

**Prerequisites for Admission**—The minimum requirement for admission is a B.A. or equivalent.

**Special Application Requirements**—Applicants must submit a departmental application; a clearly written statement of career interests, goals, and objectives; three letters of recommendation; a complete set of transcripts; academic work samples; and scores from the GRE. The director of graduate studies may waive the GRE requirement for students who have at least two years of professional experience and a strong academic record. This program uses a rolling admission process: the sooner an application is received, the sooner the applicant receives a decision. The deadline for application is March 15.

**Courses**—Please refer to Journalism and Mass Communications (Jour) and Public Health (PubH) in the course section of this catalog for courses pertaining to this program.

**Use of 4xxx Courses**—Use of 4xxx courses is discouraged.

**M.A. Degree Requirements**

A minimum of 32 credits and a capstone project are required. All students must take a minimum of 16 credits in journalism. All coursework must be taken A-F.

**Language Requirements**—Foreign language study is recommended for students who plan to work internationally.

**Final Exam**—The final examination is oral.

### Health Services Research, Policy, and Administration

**Contact Information**—Division of Health Services Research and Policy (HSRP), School of Public Health, University of Minnesota, MMC 729 Mayo Building, 420 Delaware Street S.E., Minneapolis, MN 55455 (612-626-3500; fax 612-624-4498; sbs-sc@umn.edu).

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp.

**Professor**

James W. Begun, Health Care Management, SM
Jon B. Christianson, Health Care Management, SM
Bryan E. Dowd, Public Health, SM
Roger D. Feldman, Public Health, SM
Judith M. Garrard, Public Health, SM
Robert L. Kane, Public Health, SM
Rosalie A. Kane, Public Health, SM
John E. Krakowski, Public Health, SM
A. Marshall McBean, Public Health, SM
Ira S. Moscovice, Public Health, SM
John A. Nyman, Public Health, SM
Stuart M. Speedie, Health Informatics, SM
Vernon E. Weckwerth, Health Care Management, SM
Douglas R. Wholey, Public Health, SM

**Associate Professor**

Lynn A. Blewett, Public Health, SM
Kathleen T. Call, Public Health, SM
Robert A. Connor, Health Care Management, SM
Susan Bartlett Fote, Public Health, SM
Leslie A. Grant, Health Care Management, SM
Sandra J. Poitthoff, Health Care Management, SM
William J. Riley, Public Health, M2
Todd H. Rockwood, Public Health, M2
Robert James Town, Public Health, SM
Beth A. Virnig, Public Health, SM

**Adjunct Associate Professor**

Michael D. Finch, Public Health, SM

**Assistant Professor**

Jean Marie Abraham, Health Care Management, M2
Boris Bershadsky, Public Health, M2
Michael E. Davern, Public Health, SM
Jeremy L. Holtzman, Medicine, M
Donna D. McAlpine, Public Health, M2
Stephen T. Parente, Health Care Management, M2
David M. Radosevich, Surgery, M
Amy Reed Wilson, Public Health, M2

**Adjunct Assistant Professor**

Yvonne Catharina Maria Jonk, Public Health, M

**Other**

Tor Dahl, AM

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—Health services research focuses on the organization and delivery of cost-effective health services. It deals with policy issues related to costs, access, and quality of health services and equitable distribution of health resources. The M.S. program prepares health services researchers and health policy analysts to carry out empirical studies, formulate policy options, work in the political arena to shape and implement policies, and evaluate policies once implemented.

Health services research at the Ph.D. level is for those interested in affecting public policy related to health care systems. Students come from a variety of educational backgrounds, including economics, political science, sociology, and public affairs. Strong quantitative skills are essential. The program is primarily for students interested in academic careers or senior research positions in government or the private sector. The core curriculum is a multidisciplinary examination of the social, political, and economic forces that affect the organization, financing, and delivery of health care services. The emphasis is on theory, modeling, and quantitative methods. Coursework is supported by the student’s involvement with faculty on research projects. The program provides further interchange with faculty through research seminars and doctoral colloquia.
**Prerequisites for Admission**—The M.S. program does not have specific course prerequisites, but some college-level math is recommended. The Ph.D program requires calculus, statistics, and intermediate microeconomics. Applicants who have not completed the prerequisites, but are otherwise qualified for admission, are required to take relevant courses at the University or another accredited institution before beginning the program.

**Special Application Requirements**—A 3.00 GPA for previous coursework is preferred. The GRE general exam is required. GRE exam scores for M.S. program applicants: 1000 (500 verbal, 500 quantitative) and 3.5 analytical writing. Ph.D. applicants: 1200 (600 verbal, 600 quantitative) and 5.0 analytical writing. Unless exempt, international students must complete the TOEFL exam with a preferred score of 600 (or 250 on the computer exam). The TOEFL is not required for students from English speaking countries, or those who have completed 16 semester credits or 24 quarter credits within the past 24 months at a recognized institution of higher learning in the United States.

The M.S. and Ph.D. programs in HSRPA reside in the School of Public Health and all accepted students are required to obtain certain immunizations as a condition of enrollment.

All applicants submit the following: official grade transcripts from all previous academic institutions; a statement indicating reasons for seeking the health services research, policy, and administration M.S. or Ph.D. that also includes research interests; three letters of reference attesting to the applicant’s academic ability and potential for a career in health services research or academia; evaluation forms to accompany each letter, résumé, or CV. Students are admitted fall semester only. The programs are full time.

For an online application, see the School of Public Health Web site at www.sph.umn.edu/students/application/home.html.

**Note:** If you are or ever were a student in the University of Minnesota Graduate School and you are applying to any graduate or professional program in the University of Minnesota, you must complete a change of status application. See the Graduate School Web site for the appropriate form and fee www.grad.umn.edu/current_students/forms/cos.pdf.

**Courses**—Please refer to Public Health (PubH), particularly numbers 58xx and 88xx, in the course section of this catalog for courses pertaining to the program.

**Use of 4xxx Courses**—Use of 4xxx courses toward degree requirements requires the approval of the director of graduate study.

**M.S. Degree Requirements**
The M.S. offered under Plan A is in outcomes research. Plan A requires a thesis (publishable research paper), and a final oral exam. Plan B requires an internship, project, and final oral exam. Both Plan A and Plan B are full-time, two-year programs.

Plan A requires 47-50 credits, including 31-34 core credits, 6 elective credits in one or more related fields outside the major, and 10 thesis credits. Plan B requires 46 credits, including 40 core credits and 6 elective credits in one or more related fields outside the major.

**Ph.D. Degree Requirements**
The Ph.D. requires at least 76 credits, including 40 core credits in the major, a minimum of 12 credits in the minor or supporting program, and 24 thesis credits. The minor or supporting program may be in areas such as economics, statistics, sociology, bioethics, gerontology, business administration, or epidemiology.

**Language Requirements**—None.

**Minor Requirements for Students Majoring in Other Fields**—The minor is developed uniquely for each student with the advice and counsel of the director of graduate studies.

**Hispanic and Luso-Brazilian Literature and Linguistics**

**Contact Information**—Department of Spanish and Portuguese Studies, University of Minnesota, 34 Folwell Hall, 9 Pleasant Street S.E., Minneapolis, MN 55455 (612-625-5858; fax 612-625-3549).

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.ashx.

**Professor**
René Jara, SM
Amy K. Kaminsky, Women's Studies, ASM
Antonio Ramos-Gascon (emeritus), ASM
Nicholas Spadaccini, SM
Hernán Vidal (emeritus), ASM
Anthony Zahareas (emeritus), ASM

**Associate Professor**
Fernando E. Arenas, SM
Carol A. Klee, SM
Francisco A. Ocampo, SM
Joanna O’Connell, SM
Luis Ramos-García, SM
Barbara Weissberger, SM

**Assistant Professor**
Timothy Face, M2
Ofelia Ferrán, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The department offers three M.A. programs: Hispanic literature, Luso-Brazilian literature, and Hispanic linguistics. The department offers a Ph.D. in Hispanic and Luso-Brazilian literature and linguistics. The Ph.D. offers four areas of emphasis: Spanish peninsular literature, Spanish-American literature, Luso-Brazilian literature, and Hispanic linguistics.

The department integrates cultural and language areas into each degree program. Students study the main problems, issues, topics, and polemics that constitute their various fields and develop skills, theories, and methodologies to research, analyze, organize, reproduce, and communicate the material. Ph.D. students are expected to make scholarly contributions based on a thorough understanding of the history of the field of specialization and of the approaches used to study it. The department encourages and promotes a diversity of philosophies, approaches, and methods.

**Prerequisites for Admission**—Prospective students generally have completed an undergraduate degree or substantial coursework in the field, although individuals with other backgrounds may be admitted. The Graduate Studies Committee may require completion of background coursework, without graduate degree credit, for admitted students with insufficient preparation.

**Special Application Requirements**—Three letters of recommendation from previously attended institutions evaluating the applicant’s scholarship, a sample of a writing project, and a complete set of transcripts in addition to that required by the Graduate School should be sent to the director of graduate studies. The GRE is desirable. The deadline for application for admission and financial aid is January 15 for fall entry. Applicants who wish to be considered for teaching assistantships or Graduate School fellowships are encouraged to apply early.

**Courses**—Please refer to Portuguese (Port), Spanish (Span), and Spanish-Portuguese (SpPt) in the course section of this catalog for courses pertaining to the program.

**Use of 4xxx Courses**—Inclusion of 4xxx courses on degree program forms is subject to adviser and director of graduate studies approval.

**Ph.D. Degree Requirements**
The Ph.D. requires at least 54 course credits (seventeen courses, excluding SpPt 5999), including 39 credits in the major and 15 credits (five courses) in either a supporting work or a minor, depending on the requirements of the minor program. The program also requires 24 thesis credits.

**Language Requirements**—Normally students have proficiency in Spanish or Portuguese and at least one other foreign language (see the department’s Graduate Handbook).

**Minor Requirements for Students Majoring in Other Fields**—The doctoral minor requires at least 18 credits of 5xx or 8xx courses (six courses), to be determined in consultation with the director of graduate studies.
Hispanic Linguistics

Contact Information—See Hispanic and Luso-Brazilian Literature and Linguistics. For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp.

Associate Professor
Carol A. Klec, M2
Francisco A. Ocampo, M2

Assistant Professor
Timothy Face, M2

Majoring in Other Fields
Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—See Hispanic and Luso-Brazilian Literatures and Linguistics for program description.

Prerequisites for Admission—Prospective students generally have completed an undergraduate degree or substantial coursework in the field, although individuals with other backgrounds may be admitted. The Graduate Studies Committee may require completion of background coursework, without graduate degree credit, for admitted students with insufficient preparation.

Special Application Requirements—Three letters of recommendation from previously attended institutions evaluating the applicant’s scholarship, a sample of a writing project, and a complete set of transcripts in addition to that required by the Graduate School should be sent to the director of graduate studies. The GRE is desirable. The deadline for application for admission and financial aid is January 15 for fall entry. Applicants who wish to be considered for teaching assistantships or Graduate School fellowships are encouraged to apply early.

Courses—Please refer to Portuguese (Port), Spanish (Span), and Spanish-Portuguese (SpPt) in the course section of this catalog for courses pertaining to the program.

Use of 4xxx Courses—Inclusion of 4xxx courses on degree program forms is subject to adviser and director of graduate studies approval.

Minor Requirements for Students

Minor Requirements for Students Majoring in Other Fields—For a master’s minor, students may choose any 6 credits (two courses), preferably in related areas, in consultation with the director of graduate studies.

Hispanic Literature

Contact Information—See Hispanic and Luso-Brazilian Literature and Linguistics. For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp.

Professor
René Jara, M2
Antonio Ramos-Gascón (emeritus), AM2
Nicholas Spadaccini, M2
Hernán Vidal (emeritus), AM2
Anthony Zahareas (emeritus), AM2

Associate Professor
Fernando E. Arenas, M2
Joanna O’Connell, M2
Luis A. Ramos-García, M2
Barbara Weissberger, M2

Assistant Professor
Ofelia Ferrán, M2
Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—See Hispanic and Luso-Brazilian Literatures and Linguistics for program description.

Prerequisites for Admission—Prospective students generally have completed an undergraduate degree or substantial coursework in the field, although individuals with other backgrounds may be admitted. The Graduate Studies Committee may require completion of background coursework, without graduate degree credit, for admitted students with insufficient preparation.

Special Application Requirements—Three letters of recommendation from previously attended institutions evaluating the applicant’s scholarship, a sample of a writing project, and a complete set of transcripts in addition to that required by the Graduate School should be sent to the director of graduate studies. The GRE is desirable. The deadline for application for admission and financial aid is January 15 for fall entry. Applicants who wish to be considered for teaching assistantships or Graduate School fellowships are encouraged to apply early.

Courses—Please refer to Portuguese (Port), Spanish (Span), and Spanish-Portuguese (SpPt) in the course section of this catalog for courses pertaining to the program.

Use of 4xxx Courses—Inclusion of 4xxx courses on degree program forms is subject to adviser and director of graduate studies approval.

M.A. Degree Requirements

The M.A. is offered under both Plan A and Plan B. Plan A requires at least 33 credits, including 15 credits in the major field taken from among designated 5xxx core courses, 6 credits outside the program, and 12 thesis credits. Plan B requires at least 33 course credits and two Plan B papers. Most students pursue Plan B.

Language Requirements—Students must have a reading knowledge of at least one foreign language in addition to Spanish.

Final Exam—The final exams are written and oral.

Minor Requirements for Students

Minor Requirements for Students Majoring in Other Fields—A master’s minor requires at least 6 credits.

History

Contact Information—Department of History, University of Minnesota, 546 Social Sciences Building, 267 19th Avenue S., Minneapolis, MN 55455 (612-624-5840; fax 612-624-7096; histdgs@umn.edu; www.hist.umn.edu)

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp.

Regents Professor
Sara M. Evans, SM
Allen F. Isaacman, SM

Professor
Frederich Asher, Art History, AM2
Bernard S. Bachrach, SM
Anna K. Clark, SM
Gary Cohen, SM
John K. Evans, SM
John M. Eyler, History of Medicine, ASM
Cesar E. Farah, SM
Edward L. Farmer, SM
Stephen C. Feinstein, Holocaust and Genocide Studies, AM
David F. Good, SM
Ruth M. Karras, SM
Sally G. Kohlstedt, History of Science and Technology, ASM
Elaine Tyler May, American Studies, SM
Lary May, American Studies, SM
Mary Jo Maynes, SM
Robert E. McCaa, SM
Russell R. Menard, SM
David W. Noble, American Studies, ASM
Carla R. Phillips, SM
William D. Phillips, Jr., SM
Kathryn L. Reyerson, SM
Steven Ruggles, SM
Joel B. Samaha, SM
Theofanis G. Stavrou, SM
James D. Tracy, SM
Rudolph J. Vecoli, SM
Ann B. Waltner, SM
Eric D. Weitz, SM

Associate Professor
Catherine Asher, Art History, AM2
Keletso E. Atkins, African American and African Studies, AM2

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp.
Sarah C. Chambers, SM
Brenda Child, American Studies, AM2
Kirsten Fischer, SM
Tamara Giles-Vernick, M2
George D. Green, SM
Christopher M. Isett, M2
Erika Lee, SM
Patricia Lorcin, SM
Lisa A. Norling, SM
Jean M. O’Brien-Kehoe, SM
Ajay Skaria, SM
Liping Wang, SM
Barbara Y. Welke, SM
Thomas C. Wolfe, M2

Adjunct Associate Professor
Taner Akcam, AM2

Assistant Professor
Jennifer Alexander, History of Science and Technology, AM2
Giancarlos Casale, M2
David Chang, M2
Victoria B. Coifman, African American and African Studies, AM2
Tracey Deutsch, M2
Andrea Gallia, M2
Malinda Lindquist, M2
Michael Lower, M2
Patrick J. McNamara, M2
Hiromi Mizuno, M2
Kevin Murphy, M2
J.B. Shank, M2
Eva Von Dassow, Classical and Near Eastern Studies, AM2
Michele Wagner, M2

Lecturer
Julia Roos, AM2
Robert Schneider, AM2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—Areas of concentration include Africa; Ancient; East and South Asia; comparative women’s history; medieval, early modern, and modern Europe; early modern world; Middle East, Latin America; and the United States and its colonial background. Scholarly resources include Center for Austrian Studies, Center for Advanced Feminist Studies, Center for German and European Studies, Center for Medieval Studies, Immigration History Research Center, Minnesota Population Center, Modern Greek Studies, Center for Early Modern History, and Social Welfare History Archives.

Prerequisites for Admission—The only prerequisite for admission is a bachelor’s degree. The program admits only to the Ph.D. program. They may complete an M.A. while studying for the Ph.D. The M.A. is offered under Plan A and Plan B. The Plan A requires six history courses (including Hist 8015), two non-history courses, ten M.A. thesis credits, and submission of a defendable thesis. The Plan B requires eight history courses (including Hist 8015), two non-history courses, and three Plan B papers (see department Web site for details). Language Requirements—A reading knowledge of at least one foreign language is required before admission to the master’s exam.

Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—The M.A. minor in history typically involves a concentration in a single subarea of history and the completion of a minimum of three graduate courses in history (6 credit minimum). Normally, there is a representative from the history department on the student’s oral examining committee.

Ph.D. Degree Requirements
The Ph.D. requires twelve history courses (including Hist 8015) (roughly 48 credits), four non-history courses (roughly 12 credits), and 24 Ph.D. thesis credits to total 72 credits.

Language Requirements—Reading knowledge of at least two foreign languages is required before admission to the preliminary exam. Some areas of concentration may require additional foreign languages. In some cases, quantitative methods may be considered a foreign language.

Minor Requirements for Students Majoring in Other Fields—The Ph.D. minor in history typically involves four to five history courses (including Hist 8015), and a written examination or substantial written project. The topic chosen must be logically related to the student’s major work (must prepare for a written examination or substantial written project either in one general area and an associated subarea, or in two subareas). One or two representatives from history must serve on the student’s preliminary oral examining and thesis committees. The preliminary oral exam also serves as the exam for the minor.

History of Medicine and Biological Sciences

Contact Information—Program in History of Medicine, University of Minnesota, MMC 506, 420 Delaware Street S.E., Minneapolis, MN 55455 (612-624-4416; fax: 612-625-7938; www.med.umn.edu/history/home.html). For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/stepl.asp.

Professor
C. Carlyle Clawson, Pediatrics, M2
John M. Eyler, SM
Sally Gregory Kohlstedt, History of Science and Technology, SM
Elaine Tyler May, American Studies, SM
Claus A. Pierach, Medicine, M2

Assistant Professor
Mark E. Borrello, SM
Jennifer L. Gunn, SM

Adjunct Assistant Professor
Jon Harkness, M2
David Rhee, M2
Jole Shackelford, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalogue for Graduate School requirements that apply to all major fields.

Curriculum—The history of medicine explores the changing ideas of health and disease, the evolution of health care, and the changing patterns of disease from antiquity to the present. It employs the methods of intellectual, social, and cultural history to explicate the forces that created the biomedical world in which we live. Students enter with diverse backgrounds, typically in medicine, science, or history. Some begin their graduate study immediately after receiving the bachelor’s degree. Others do their training in mid-career. The Ph.D. program is for those who seek a career of historical research and teaching. The M.A. is especially suitable for those who intend to combine historical pursuits with a career in one of the health sciences.

Prerequisites for Admission—There are no universal prerequisites for admission, but some training in both history and the biological sciences is desirable.

Special Application Requirements—Applicants should submit a statement describing their historical interests and their goals for graduate study and ask three persons who know their academic work well to submit letters of recommendation on their behalf to the director of graduate studies for the program. It is also recommended that they submit scores from the General Test of the Graduate Record Exam and a writing sample. New students are ordinarily admitted for fall semester. For an applicant to be considered for financial aid, the applicant’s materials must be received by December 31.
Courses—Please refer to History of Medicine (HMed) in the course section of this catalog for courses pertaining to the program.

Use of 4xxx Courses—Use of 4xxx courses is permitted only with permission of the director of graduate studies.

M.A. Degree Requirements
The M.A. is offered under Plan A or Plan B. The degree is normally completed in two to three semesters of full-time study or its part-time equivalent.
For Plan A, 12 credits of required courses in the history of medicine, plus 2 elective credits in the history of medicine, 6 credits in a minor or related field, and 10 thesis credits.
For Plan B, 12 credits of required courses in the history of medicine, plus an approved program of 12 credits of electives in history of medicine and related subjects, and 6 credits in a minor or related field.

Language Requirements—M.A. students must demonstrate competence in one foreign language, preferably French or German.

Final Exam—The final exam is oral. For Plan A, the examination centers on the thesis. For Plan B, it focuses on two or more revised course or seminar papers.

Minor Requirements for Students Majoring in Other Fields—A master’s minor requires 6 credits in the history of medicine and biological sciences.

Ph.D. Degree Requirements
Twelve credits of required courses in the history of medicine, plus 9 additional elective credits in history of medicine, a minor or related field of 12 credits, and 24 thesis credits. A comprehensive written and oral preliminary examination precedes admission to candidacy.

Language Requirements—Ph.D. students must demonstrate competence in two foreign languages, preferably French and German. One language examination must be passed before the end of the first academic year.

Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—A Ph.D. minor requires at least 12 credits in the history of medicine and biological sciences.

History of Science and Technology

Contact Information—Program in History of Science and Technology, University of Minnesota, Tate Lab of Physics, 116 Church Street S.E., Minneapolis, MN 55455, 612-624-7086; fax 612-624-4578; hst1@physics.umn.edu; http://groups.physics.umn.edu/hsci.

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp.

Professor
John M. Eyler, History of Medicine, SM
Michel Janssen, Physics, SM
Sally Gregory Kohlstedt, Geology and Geophysics, SM
Arthur L. Norberg, Computer Science, SM
Robert W. Seidel, Chemical Engineering, SM
Alan E. Shapiro, Physics, SM
Roger H. Stuewer (emeritus), Physics, ASM

Assistant Professor
Jennifer Karns Alexander, Mechanical Engineering, SM
Mark E. Borrello, Ecology, Evolution, and Behavior, SM

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—The program offers opportunities for advanced research and study in four general areas: history of the physical sciences, history of the biological sciences, history of technology, and history of American science and technology. Students focus on the following approaches: conceptual development of the disciplinary fields; social, economic, and cultural contexts; the interactions among science, technology, and society; or a combination of these. The faculty's interests span the period from the Scientific Revolution into the twenty-first century.

Prerequisites for Admission—Students must have a bachelor's degree with a preferred grade average of B and should be capable of interdisciplinary study. Depending on background and career objectives, additional preparatory studies may be necessary in either the science-technology area or in the humanities and social sciences.

Special Application Requirements—In addition to the application sent to the Graduate School, a complete copy of the application must be submitted to the program including three letters of recommendation. A writing sample and GRE scores are also recommended.

Courses—Please refer to History of Science and Technology (HSci) in the course section of this catalog for courses pertaining to this program.

Use of 4xxx Courses—Use of 4xxx courses on degree programs is subject to approval by the director of graduate studies.

M.A. Degree Requirements
The M.A. is offered under Plan A and Plan B. Plan A requires a minimum of 20 course credits and 10 thesis credits; Plan B requires a minimum of 30 course credits. M.A. students must choose two of the general areas (history of the physical sciences, biological sciences, technology, or American science and technology). Six courses (18 credits) must be taken in these two areas with at least two courses (6 credits) in any one area. Two courses (6 credits) must cover the pre-1800 period and two courses (6 credits) the post-1800 period. Courses used to satisfy the area requirements also can be used to satisfy these period requirements. Because of this possible overlap, these course credits may not add up to 18 credits. In addition, each student must take the historiography course (HSci 8111) and two courses (6 credits) in a minor or related field. Under the Plan A option, students must also take 10 thesis credits. All of the courses selected for the requirements must be passed with a grade of B or better. HSci 4xxx courses may be included as appropriate for the area and period requirements.

Language Requirements—M.A. students must demonstrate reading proficiency in one foreign language, normally French or German.

Final Exam—The final exam is oral.

Minor Requirements for Students Majoring in Other Fields—The master’s minor requires 6 credits and is structured for the student’s interests.

Ph.D. Degree Requirements
The Ph.D. is for those planning professional careers that require a high degree of scholarly competence, including teaching and research. Students must choose two of the general areas (history of the physical sciences, the biological sciences, technology, or American science and technology) in preparation for preliminary written and oral exams. Six courses (18 credits) must be taken in these two areas with at least two courses (6 credits) in any one area. Two courses (6 credits) must cover the pre-1800 period and two courses (6 credits) the post-1800 period. Courses used to satisfy the area requirements also can be used to satisfy these period requirements. In addition, each student must take the historiography course (HSci 8111) and a minor or supporting program consisting of four courses (12 credits). Students must also take 24 thesis credits. All of the courses selected for the requirements must be passed with a grade of B or better.

Language Requirements—Before taking the preliminary exams, students must demonstrate reading proficiency in two foreign languages, normally French and German.

Minor Requirements for Students Majoring in Other Fields—The doctoral minor requires 12 credits and is structured for each student’s interests in discussion with the director of graduate studies.

Housing Studies

Postbaccalaureate Certificate

Contact Information—Housing Studies Certificate, College of Continuing Education, Student Support Services, 101 Westbrook Hall, 77 Pleasant Street S.E., Minneapolis, MN 55455 (612-624-4000; adv@cce.umn.edu; www.cce.umn.edu/certificates).
Human Factors/ Ergonomics

Minor Only

Contact Information—Doctoral Minor Program in Human Factors/Ergonomics, Human Factors Research Laboratory, School of Kinesiology, College of Education and Human Development, University of Minnesota, 202B Cooke Hall, 1900 University Ave S.E., Minneapolis, MN 55455 (612-626-1056).

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.aspx

Professor
John C. Carmody, AM
Arthur G. Erdman, Mechanical Engineering, AM
Lail C. Gatewood, Laboratory Medicine and Pathology, AM
Susan G. Gerberich, Environmental/Occupational Health, AM
Denise A. Guerin, Design, Housing, and Apparel, AM
Joseph A. Konstan, Computer Science, M
Gordon E. Legge, Psychology, M
Shashi Shekhar, Computer Science, AM
Thomas Stoffregen, Kinesiology, M
Michael Wade, Kinesiology, M

Associate Professor
Karen L. LaBat, Design, Housing, and Apparel, AM

Senior Research Fellow
Victor Koscheiev, Kinesiology, M
Thomas Smith, Kinesiology, M

Curriculum—Human factors/ergonomics (HF/E) is an interdisciplinary area of study focusing on how human performance and behavior are influenced by design factors in the performance environment. HF/E has its roots in psychology, engineering, physiology, kinesiology, cognitive science, computer science, software engineering, and operations research. The minor, which is available to master’s (M.A. and M.S.) and doctoral students, provides integrated coursework that emphasizes conceptual, empirical, and practical aspects of HF/E. The minor complements graduate training in traditional disciplines as a foundation for diverse career opportunities in the field.

Coursework addresses the question of how and why variability in human performance—with quality, productivity, efficiency, safety, and health implications—is influenced by interaction with designs of systems and system components such as machines and tools, computers and software, complex technological systems, jobs and working conditions, organizations, and sociotechnical institutions.

Prerequisites for Admission—Admission to the minor is contingent upon prior admission to a doctoral degree-granting program within the Graduate School. Admission is limited and only by permission of the director of graduate studies in the human factors/ergonomics minor.

Courses—Please refer to Human Factors/ Ergonomics (HumF) in the course section of this catalog for courses pertaining to this program.

Use of 4xxx Courses—Use of 4xxx courses is permitted based on adviser and director of graduate studies approval.

Minor Only Requirements
A master’s minor requires 10 graduate credits, including 7-8 credits of core courses and 2-3 credits of electives. A doctoral minor requires 16 credits, including the three core courses (7-8 credits) and 8-9 credits of electives. The core courses consist of HumF 5001, 8001, and 8002.

Human Genetics

Minor Only

Contact Information—Graduate Minor Program in Human Genetics, Department of Genetics, Cell Biology and Development, University of Minnesota, 321 Church St. S.E., 6-160 Jackson Hall, Minneapolis, MN 55455 (612-624-3110; fax 612-626-6140; www.gcd.med.umn.edu).

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.aspx

Professor
Susan Berry, Pediatrics, M
John West Day, Neurology, M
Perry B. Hackett, Genetics, Cell Biology, Developmental Biology, M
Richard A. King, Medicine, M
Matt Mc Gue, Psychology, M
R. Scott McIvor, Genetics, Cell Biology, Developmental Biology, M
Harry T. Orr, Lab Medicine/Pathology, M
Laura P. W. Runum, Genetics, Cell Biology, Developmental Biology, M
Brian George Van Ness, Genetics, Cell Biology, Developmental Biology, M
Chester B. Whitley, Pediatrics, M

Associate Professor
Kathleen F. Conklin, Genetics, Cell Biology, Developmental Biology, M
Stephen C. Ekker, Genetics, Cell Biology, Developmental Biology, M
Betsy Anne Hirsch, Laboratory Medicine/Pathology, M
David Andrew Largaespada, Cancer Center, M
Bonnie S. Le Roy, Genetics, Cell Biology, Developmental Biology, M
James Scott Pankow, Epidemiology, M

Assistant Professor
Michael D. Koob, Laboratory Medicine/Pathology, M
Michael B. Miller, Epidemiology, M
Kathy Lynn Moser, Medicine, M
Nikunj V. Somia, Genetics, Cell Biology, Developmental Biology, M
Karen-Sue Tausig, Medicine, M

Curriculum—The courses for the human genetics minor require a basic understanding of human and molecular genetics and some statistics.
Prerequisites for Admission—No specific course prerequisites are required for admission to the minor in human genetics. The following courses serve as prerequisites for the core courses that can be included in the minor: Biol 4003—Genetics (3 cr), GCD 4143—Human Genetics (3 cr), GCD 4034—Molecular Genetics (3 cr) or GCD 8121/BioC 8002—Advanced Molecular Genetics (3 cr), Stat 3011—Introduction to Statistical Analysis (3 cr), PubH 5414—Biostatistical Methods I (3 cr) and basic introduction courses to prokaryotic and eukaryotic molecular genetics. If a student has an insufficient background in a particular area the Steering Committee may recommend specific courses prior to starting the human genetics minor program. These courses do not count toward the minor requirements.

Courses—All students in the minor must take a basic graduate level human genetics course (such as GCD8073—Advanced Human Genetics). Additional courses to fulfill the requirements for the minor are selected from courses that are appropriate for advanced study in human genetics. Representative courses are listed in: genetics, epidemiology/public health, psychology, law. All courses for the minor cannot be from the same department/program, and students are encouraged to take at least one course that is outside of their major course area (such as taking a non-GCD course for a MCDBIG student). Contact the program for specific courses for the minor program.

Minor Only Requirements
A master’s minor in human genetics requires nine credits, and a doctoral minor requires 12 credits.

Human Resources and Industrial Relations

Contact Information—Industrial Relations Center, University of Minnesota, 3-300 Carlson School of Management, 321 19th Avenue S., Minneapolis, MN 55455; phone 612-624-5810; fax 612-624-8360; hrirgrad@umn.edu; www.hrir.csom.umn.edu.

For up-to-date graduate faculty listings, see www.grad.umn.edu/faculty_rosters/step1.asp

Professor
Dennis A. Ahlburg, SM
Richard D. Arvey, SM
Avner Ben-Ner, SM
Maria F. Bogmanno, SM
John W. Budd, SM
John P. Campbell, Psychology, SM
Zvi Eckstein, Economics, SM
John A. Fossum, SM
Jo-Ida C. Hansen, Psychology, SM
Morris M. Kleiner, Public Affairs, SM
Brian P. McCall, SM
Jeylan T. Mortimer, Sociology, SM
John Remington, SM
Paul R. Sackett, Psychology, SM
James G. Scoville, SM
Connie R. Wanberg, SM
Yijiang Wang, SM
Mahmood A. Zaidi, SM

Associate Professor
Ross E. Azvedo, SM
Theresa M. Glomb, SM
Maria J. Hanratty, Public Affairs, SM
Deniz S. Ones, Psychology, SM

Assistant Professor
Joyce E. Bono, Psychology, AM2
Stephanie L. Lussier

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

Curriculum—Human resources and industrial relations (HRIR) studies the employment relationship. Teaching and research are guided by the belief that the employment relationship must be investigated through the lenses of different disciplines using systems thinking. The professional M.A. degree is for individuals interested in private and public sector careers in human resource management, labor relations, and related fields. The Ph.D. degree is a research degree for individuals interested in academic careers.

The curriculum is structured around the core HRIR areas of staffing, training, and development; compensation and benefits; and labor relations and collective bargaining and is rooted in key concepts from the social and behavioral sciences and business such as organizational behavior and theory; labor market analysis; leadership, and strategy. Research methods and quantitative analysis of employment problems and issues are also included. Specialization in two areas is required for Ph.D. candidates, while M.A. candidates are encouraged to choose electives to support a generalist orientation with key business knowledge.

Prerequisites for Admission—An undergraduate course in microeconomics must be completed with a grade of at least C before enrolling.

Special Application Requirements—Applicants must submit three letters of recommendations, a complete set of transcripts, a résumé, GRE scores, and a clearly written statement of career interests, goals, and objectives. M.A. applicants may substitute the GMAT for the GRE. Applicants whose native language is not English must also submit score results from the TOEFL or IELTS.

Entry in both the day and evening M.A. programs is in fall or spring semester, and the application deadlines are June 15 and October 15. The M.A. financial aid deadline for fall semester is February 1. Entry in the Ph.D. program is only in the fall, and the application deadline is January 1. Applicants for all programs are encouraged to apply early, particularly for fall semester.

Courses—Please refer to Human Resources and Industrial Relations (HRIR) in the course section of this catalog for courses pertaining to the program.

Use of 4xxx Courses—4xxx courses are not permitted toward M.A. or Ph.D. degree requirements.

M.A. Degree Requirements
The M.A. is offered under Plan A (thesis) and coursework only (capstone project) in day (full-time) and evening (part-time) programs. Coursework only requires at least 48 credits and a capstone project. Major coursework includes 8011, 8031, 8041, 8051, and 8071 and elective credits in HRIR. At least 8 credits must be earned in related fields. Plan A requires at least 38 course credits and 10 thesis credits. Major coursework includes 8011; three courses from among 8031, 8041, 8051, and 8071; and 12-16 additional HRIR credits. Also required are 6-10 credits in an approved field or fields of study related to human resources and industrial relations. Plan A is generally limited to students who have considerable related graduate coursework.

Commonly-selected related fields include accounting, finance, operations management, managerial communications, economics, human resource development, law, psychology, public affairs, sociology, and research methods.

Language Requirements—None.

Final Exam—The final exam is oral.

Ph.D. Degree Requirements
Students must complete at least 12 credits of research methods (most complete 18 or more credits); at least 6 credits of human resources and industrial relations doctoral seminars in each of two areas of specialization and other credits in these areas as needed; at least 3 credits in each of the other three subfields; and at least 12 credits in a minor or supporting program in one or more of the following social and behavioral sciences—applied economics, business administration, economics, history, political science, psychology, and sociology.

Research methods courses taken outside the program may be applied toward the minor or supporting program requirement. Specific coursework is planned in consultation with the student’s adviser, the Ph.D. coordinator, and the director of graduate studies. Students must pass preliminary exams in each of their subfields and research methods.

Language Requirements—None.

Minor Requirements for Students Majoring in Other Fields—A doctoral minor or supporting program may be selected by students majoring in business administration, education, hospital and health care administration, or the social and behavioral sciences. The minor must consist of at least 21 credits, including five courses in at least four subfields, plus a doctoral seminar.