

## Curriculum

The coursework includes a graduate major and a separate minor.

### Non-education majors

Students whose major is not education must complete [the education sciences minor](#), including

- Two graduate professional socialization courses (introduction to educational research and experimental methods);
- Two advanced courses on cognitive approaches to learning; and
- Two advanced courses on experimental research design and statistical methods.

### Education majors

Students majoring in education must complete the above courses, but may do so as part of their major. Education majors must also complete a minor in a discipline outside of education.

### Research experience

All students must successfully complete one to three years of research experience on an education related topic at a research or field site before embarking on their dissertation. Research experiences will assist the student in synthesizing their major and minor disciplines. For these research experiences, the following university research centers and off-campus field sites have been selected for their ability to provide fellows with experience that will make them attractive to potential employers. The University research centers include:

- The Brain Sciences Center
- The Cognitive Sciences Center
- The Roy Wilkins Center for Human Relations and Social Justice

Participating field sites include the American Guidance Service, Inc. (AGS Publishing), the Anoka-Hennepin, Minneapolis and St. Paul Public School Districts, and the Minnesota Department of Education.

### Teaching

To prepare for careers in higher education, MITER fellows typically spend at least one year in teaching, first assisting a regular faculty member and then independently teaching a course. Fellows also participate in a weekly seminar, present at professional conferences, publish in journals, and participate in a journal club and campus research day.

### Prerequisite coursework

#### Research methods and statistics

*All students must take two courses (at least 3-credits per course) in a single disciplinary sequence:*

- EPsy 8261 (3 credits) and EPsy 8262 (3 credits), OR
- PubH 7405 (4 credits) and PubH 7406 (4 credits), OR
- Psy 8814 (4 credits) and Psy 8815 (4 credits), OR
- Soc. 5811 (4 credits) and Soc 8811 (4 credits)

#### Cognition and learning

*All students must choose two courses:*

- EPsy 5112 (3 credits), OR
- EPsy 5114 (3 credits), OR
- EPsy 5118 (3 credits)

[Education sciences minor: Coursework requirements](#)

## Education sciences minor: Coursework requirements

### Prerequisite coursework:

#### Research methods and statistics

*All students must take two courses (at least 3-credits per course) in a single disciplinary sequence:*

- EPsy 8261 (3 credits) and EPsy 8262 (3 credits), OR
- PubH 7405 (4 credits) and PubH 7406 (4 credits), OR
- Psy 8814 (4 credits) and Psy 8815 (4 credits), OR
- Soc. 5811 (4 credits) and Soc 8811 (4 credits)

#### Cognition and learning

*All students must choose two courses:*

- EPsy 5112 (3 credits), OR
- EPsy 5114 (3 credits), OR
- EPsy 5118 (3 credits)

### Education sciences coursework requirements:

#### Professional socialization

*All students must take both courses:*

- EPsy 8117 (3 credits), AND
- [EPsy 8311—Education Sciences Proseminar](#) (3 credits)

#### Research methods and statistics

*required for all students:*

- EPsy 8222/Psy 5865 (3 credits), AND

*Students choose one of the following (earning at least 3 credits):*

- EPsy 8215 (3 credits) , OR
- CPsy 8304 (3 credits) , OR
- PA 8386 (3 credits) , OR
- Soc 8801 (4 credits)

#### Cognition and learning

*Students must take either EPsy 8114 or EPsy 8116. A second course (earning at least 3 credits) must be chosen from any of the courses listed below, including Educational Psychology:*

- EPsy 8114 (3 credits), OR
- EPsy 8116 (3 credits), OR
- CPsy 8301 (3 credits), OR
- Psy 8010 (2 credits) AND Psy 8020 (2 credits), OR
- Psy 8056 (3 credits), OR
- Psy 8060 (3 credits), OR
- NSc 5661 (3 credits)

## Course descriptions

### Prerequisite courses: Research methods and statistics

**Note:** *students choose a two-course sequence (a total of at least 6 credits) in one disciplinary area.*

#### **EPsy 8261—Statistical Methods I: Probability and Inference**

(3.0 cr; Prereq-3264 or 5261 or equiv; fall, spring, summer, every year) Advanced theory, derivations of quantitative statistics. Descriptive statistics, probability, normal distribution. One-/two-sample hypothesis tests, confidence intervals. One-way analysis of variance, follow up tests.

#### **EPsy 8262—Statistical Methods II: Regression and the General Linear Model**

(3.0 cr; Prereq-[8260, 8261] or equiv; fall, spring, summer, every year) Analysis of variance designs (two-/three-way), repeated measures, correlation, simple/multiple regression methods, non-parametric procedures, multivariate analyses.

#### **Psy 8814—Analysis of Psychological Data**

(4.0 cr; Prereq-Undergrad course in statistics, grad student in [psychology or child psychology], #) Data-analytic procedures used in psychological research. Types of variables used in psychological research. Data collection designs, their limitations. Procedures for analyzing experimental/ nonexperimental data, both univariate and multivariate. Emphasizes selection of data-analytic procedures. Procedures and their assumptions. Computation using statistical software. Limitations, interpretation. Lecture, lab.

#### **Psy 8815—Analysis of Psychological Data**

(4.0 cr; Prereq-Undergrad course in statistics, grad student in [psychology or child psychology], #) Data-analytic procedures used in psychological research. Types of variables used in psychological research. Data collection designs, their limitations. Procedures for analyzing experimental/nonexperimental data, both univariate and multivariate. Emphasizes selection of data-analytic procedures. Procedures and their assumptions. Computation using statistical software. Limitations, interpretation. Lecture, lab.

#### **PubH 7405—Biostatistics: Regression**

(4.0 cr; prereq [7405, [Stat 5101 ], biostatistics major] or #; spring, every year) T-tests, confidence intervals, power, type I/II errors. Exploratory data analysis. Simple linear regression, regression in matrix notation, multiple regression, diagnostics. Ordinary least squares, violations, generalized least squares, nonlinear least squares regression. Introduction to General linear Model. SAS and S-Plus used.

#### **PubH 7406—Biostatistics: ANOVA and Design**

(4.0 cr; prereq-7405, [Stat 5102, biostatistics major] or #; spring, every year) Single factor ANOVA, diagnostics, classical non-parametrics, multifactor ANOVA, multiple comparisons, power and sample size determination, calculating expected mean squares, random/mixed effects models. ANOVA in regression notation. Randomized block designs, nested designs, repeated measures designs, cross-over designs. SAS and S-Plus used.

#### **Soc 5811—Intermediate Social Statistics**

(4.0 cr; Prereq-3811 or equiv; fall, every year) Measurement, theory of probability, and bivariate statistics. Focus on multiple regression analyses of sociological data. Primarily for first-year sociology graduate students who need preparation for advanced social statistics. Undergraduates preparing for graduate programs may register upon availability.

#### **Soc 8811—Advanced Social Statistics**

(4.0 cr; Prereq-5811 or equiv, grad soc major or #; A-F or Aud, fall, spring, every year) Statistical methods for analyzing social data. Sample topics: advanced multiple regression, logistic regression, limited dependent variable analysis, analysis of variance and covariance, log-linear models, structural equations, and event history analysis. Applications to datasets using computers.

### Prerequisite courses: Cognition and learning

**Note:** *students choose one course (3 credits).*

#### **EPsy 5112—Knowing, Learning, and Thinking**

(4.0 cr; A-F or Aud, fall, spring, summer, every year) Principles of human information processing, memory, and thought; mental operations in comprehension and problem solving; developing expertise and automaticity; emphasis on applied settings.

#### **EPsy 5114—Psychology of Student Learning**

(3.0 cr; A-F or Aud, fall, spring, summer, every year) Principles of educational psychology: how learning occurs, why it fails, and implications for instruction. Topics include models of learning, development, creativity, problem-solving, intelligence, character education, motivation, diversity, special populations.

#### **EPsy 5118—Language: Psycholinguistic Research and Educational Application**

(3.0 cr; A-F or Aud) Psychological study of language. Psychological processes involved in language use, mechanisms that guide these processes. Failures of these mechanisms. How language operates.

### Required courses: Professional socialization:

**Note:** *all students must complete both courses (a total of 6 credits).*

**EPsy 8117—Writing Empirical Paper and Research/Grant Proposals in Education and Psychology** (3.0 cr; Prereq-#) Scientific writing skills. Focuses on logic/argumentation. Each student produces an empirical paper or research proposal. Breaks down the writing process into components: one component per week. Each week, students write a section of their paper/proposal and critique others'.

#### **EPsy 8311—Education Sciences Proseminar**

Topics will involve education-related research issues such as problems of school-based research and diverse research methodologies, educational research and the diversity of K–12 students, the role of laboratory-based studies in education research, critiques of education research, the relation of cognitive theory to school-based research, and translating research into school-based practice. There will be an emphasis on the importance of causal inferences and generality of findings from educational research.

### Required courses: Research methods and statistics:

**Note:** *students are required to take two courses (a total of at least 6 credits), of which one must be EPsy 8222/Psy 5865.*

#### **CPsy 8304—Research Methods in Child Psychology**

(3.0 cr; Prereq-Doctoral student or #; spring, every year) Review of principal research methods and designs in developmental psychology and consideration of special issues concerning research, including scientific integrity.

#### **EPsy 8222/PSY 5865—Advanced Measurement: Theory and Application**

(4.0 cr; =[PSY 5865]; Prereq-[5221 or Psy 5862 or equiv], [8261 or 8262 or equiv]; spring, even years) Generalizability theory, item response theory, factor models for test items, binomial model. Application to problems of designing, linking assessments. Includes a computer lab.

#### **EPsy 8215—Advanced Research Methodologies in Education**

(3.0 cr; Prereq-5221, 5247, 8261, 8262, #) Quantitative research methods, including models of scientific inquiry, role of theories/research design, role of measurement error in quantitative data-based inference, and qualitative methods of inquiry. Focuses on advanced quantitative/qualitative methodologies used in methodologically oriented studies in educational measurement, evaluation, and stats.

#### **PA 8386—Research Methods in Social and Labor Policy**

(3.0 cr; Prereq-5032 or 5033, 5022 or equiv; A-F or Aud) Use of social science research methods in analyzing and developing public policies.

#### **Soc 8801—Sociological Research Methods**

(4.0 cr; Prereq-Grad soc major or #; A-F or Aud, fall, spring) Multiple objectives of social research and how they inform research design. Conceptualization and measurement of complex concepts. Broad issues in research design and quantitative and qualitative approaches to data collection and management.

### Required courses: Cognition and learning:

**Note:** *students must take either EPsy 8114 or EPsy 8116 (3 credits). A second course (at least 3 credits) must be chosen from any of the remaining courses listed.*

#### **CPsy 8301—Developmental Psychology: Cognitive Processes**

(4.0 cr; Prereq-Doctoral student or #; fall, every year) Perceptual, motor, cognitive and language development, and biological bases of each. Conceptual framework of research issues.

#### **EPsy 8114—Seminar: Cognition and Learning**

(3.0 cr; fall, every year) Advanced study in critical analysis and application of contemporary psychological theory and research in cognition and learning for education.

#### **EPsy 8116—Reading for Meaning: Cognitive Processes in the Comprehension of Texts**

(3.0 cr; Prereq-#) Students read primary articles on cognitive processes involved in reading comprehension. Focuses on inference making during reading and on construction of a coherent memory representation. Computational models, neurological processes, developmental/individual differences, effects of text genre (e.g., expository, narrative).

#### **NSC 5661—Behavioral Neuroscience**

(3.0 cr; Prereq-Grad NSc major or grad NSc minor or #; A-F or Aud, spring, every year) Neural coding/representation of movement parameters. Neural mechanisms underlying higher order processes such as memorization, memory scanning, and mental rotation. Emphasizes experimental psychological studies in human subjects, single cell recording experiments in subhuman primates, and artificial neural network modeling.

#### **Psy 8010—Advanced Topics in Learning**

(2.0 cr; Prereq-5012 or #; S-N or Aud, fall, spring) Contemporary topics in learning and behavior theory. Note: if this course is selected, the student must also take Psy 8020, for a total of 4 credits.

**Psy 8020—Seminar in Conditioning and Learning**

(2.0 cr; Prereq-5012 or grad psych major or #; S-N or Aud) Review and discussion of ongoing research and perspectives on future research. Note: if this course is selected, the student must also take Psy 8010, for a total of 4 credits.

**Psy 8056—Seminar: Psychology of Language**

(3.0 cr; Prereq-Grad psych major or #; A-F or Aud) Selected topics in psycholinguistics.

**Psy 8060—Seminar: Neural Substrates of Mental Processes**

(3.0 cr [max 12.0 cr]; Prereq-5012 or 5061 or 5062 or 5064 or NSci 5661 or 8010 or CPsy 8301 or NSci 8401 or #; fall, every year) Neurobiological substrates of psychological processes such as memory, attention, and emotion. Neurobiological substrates of mental dysfunction.