

## Quantitative Methods

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### COLLEGE OF EDUCATION AND HUMAN SERVICES

#### Graduate Faculty:

**Elmore, Patricia B.**, Professor, *Emerita*, Ph.D., Southern Illinois University Carbondale, 1970; 1967.

**Headrick, Todd Christopher**, Professor, Ph.D., Wayne State University, 1997; 1999.

**Koran, Jennifer**, Associate Professor, Ph.D., University of Maryland, 2009; 2009.

**Kowalchuk, Rhonda K.**, Associate Professor, Ph.D., University of Manitoba, 2000; 2004.

**Leitner, Dennis W.**, Associate Professor, *Emeritus*, Ph.D., University of Maryland, 1975; 1974.

**Lewis, Ernest**, Professor, *Emeritus*, Ph.D., Southern Illinois University Carbondale, 1971; 1970.

**Sheng, Yanyan**, Professor, Ph.D., University of Missouri - Columbia, 2005; 2005.

#### Doctor of Philosophy Degree in Education

The Department of Counseling, Quantitative Methods, and Special Education offers graduate studies leading to the Ph.D. degree majoring in Education with a concentration in Quantitative Methods. The purposes of this graduate program are to prepare professional quantitative methodologists to pursue careers or research in their areas of interest.

Individualized courses of study are linked to the teaching and research capabilities of the faculty. Sufficient latitude is provided so that students in concert with their advisor and committee plan programs that capitalize on student interests and faculty capabilities.

**Application.** Students must apply to the Department of Counseling, Quantitative Methods, and Special Education, Southern Illinois University, Mail Code 4618, Carbondale, IL 62901. Phone: 618/536-7763. Specific questions about the major in Education or the concentration in Quantitative Methods and how to apply should be directed to the address identified above or by phone.

A non-refundable application fee of \$65 must be submitted with the application. Applicants must pay this fee with a credit card.

**Admission and Retention.** Applications are reviewed by the Quantitative Methods faculty and recommendations forwarded to the College of Education and Human Services and the Graduate School. Test scores from the Graduate Record Examination are required. A personal interview with a candidate is required. Admission to the program is dependent on (1) the applicant's grades in their graduate program, (2) GRE scores, (3) prior course work, and (4) availability of qualified faculty to supervise the applicant's doctoral work. Applicants must also meet other admission requirements of the program. The performance of each doctoral candidate is reviewed each semester. Maintenance of a grade point average of 3.0 and compliance with policies of the department, college, and Graduate School are also required.

**Core Requirements.** Specific courses or other degree requirements are determined by the program upon recommendation from the student's doctoral committee.

**Research and Teaching.** Each student is required to demonstrate professional competence through supervised experiences. These experiences include research, teaching, and personal interactions in consulting or assessment situations.

**Preliminary Examinations.** All Ph.D. candidates must pass a preliminary examination over their doctoral course work before formal admission to candidacy. The doctoral committee with the concurrence of the program is responsible for the development and evaluation of the preliminary examination.

**Doctoral Committees.** Students are assigned a doctoral advisor upon admission to the program. Before the end of the first year of doctoral study each student and his/her advisor should discuss prospective doctoral committee chairpersons based on the student's research interests. Each doctoral student works with his/her doctoral committee to develop and approve a rigorous program of study. The committee is also responsible for an oral examination over the completed dissertation and student's general knowledge of the professional field.

#### Certificate in Quantitative Methods (QM)

The Graduate Certificate in QM is designed to provide advanced training in quantitative methods for graduate students majoring in other programs. This certificate requires a minimum of 24 graduate credit hours. A total of 9 credits of QM courses may also count for credit toward a graduate degree program, as appropriately and jointly determined (as needed) by the QM Graduate Certificate Program faculty, the office of the Dean of COEHS, the Graduate School, the office of the Provost, and any particular graduate program advisory committee associated for a student. Further, the student must be currently enrolled in a graduate degree program at SIUC or an individual holding a bachelor's degree and admitted to the Graduate School. Doctoral students enrolled in the Quantitative Methods concentration, however, are not eligible to earn this certificate. This certificate requires 18 credits in core courses:

|          |                           |           |
|----------|---------------------------|-----------|
| QUAN 506 | Inferential Statistics    | (4 hours) |
| QUAN 507 | Multiple Regression       | (4 hours) |
| QUAN 508 | Experimental Design       | (4 hours) |
| QUAN 531 | Principles of Measurement | (3 hours) |
| QUAN 533 | Survey Research Methods   | (3 hours) |

and a minimum of 6 credit hours in QUAN 580A-I- "Selected Topics" (variable 2-4 hours per course).

Students admitted to the QM Graduate Certificate course must complete each with a letter grade of at least a B, and maintain an overall grade point average of at least 3.5 in courses taken under the auspices of the graduate certificate program. If a lower grade is obtained in any given course, then the same course must be repeated until this overall grade point average requirement is achieved. Otherwise, credit will not be given for the course(s) associated with this certificate and other course(s) would subsequently be required to be selected in lieu of course(s) where credit has not been earned.

## Courses (QUAN)

*Courses in this program may require the purchase of supplemental materials.*

**QUAN 402-3 Basic Statistics.** A master's level terminal statistics course. Emphasis on descriptive statistics, graphical representation of data, correlation, and simple regression. Includes an introduction to hypothesis testing procedures and analysis of variance.

**QUAN 506-4 Inferential Statistics.** Covers basic descriptive techniques such as central tendency, measures of variability and graphical presentation of data. In addition, hypothesis testing, analysis of variance, nonparametrics and simple linear prediction will be covered.

**QUAN 507-4 Multiple Regression.** The general linear model is presented which allows for hypothesis testing including correlational analysis, analysis of variance and analysis of covariance. Non-linear relationships are presented. Emphasis is placed on testing the stated research hypotheses. Prerequisite: QUAN 506 or PSYC 522.

**QUAN 508-4 Experimental Design.** (Same as PSYC 522) Strategies of designing research studies and the analysis of data from studies using linear models are examined. Emphasis will be placed on internal and external validity and factors that affect power in variance designs including completely randomized designs, Latin square, repeated measures and analysis of covariance with each of the above designs. Prerequisite: QUAN 506 or equivalent.

**QUAN 531-3 Principles of Measurement.** (Same as PSYC 525) Intended to provide theoretical principles of measurement which are applicable to both teaching and research. Part of the course will be devoted to current issues in measurement and to practical applications to these theoretical principles. Prerequisite: QUAN 506 or PSYC 522.

**QUAN 533-3 Survey Research Methods.** Overview of survey methods covering topics such as the purpose of survey research methods, the process of survey research, ethical considerations in survey research, questionnaire design and administration, sampling designs, data processing, and reporting of survey research. Prerequisite: QUAN 506 or PSYC 522 & QUAN 531 or PSYC 525, or equivalent.

**QUAN 580A-3 to 4 Doctoral Seminar in Quantitative Methods-Structural Equation Modeling.** A series of advanced seminars on statistics and measurement. Sections A through H may be taken only once each. Section I may be repeated as topics vary. Prerequisite: QUAN 507.

**QUAN 580B-3 to 4 Doctoral Seminar in Quantitative Methods-Factor Analysis.** A series of advanced seminars on statistics and measurement. Sections A through H may be taken only once each. Section I may be repeated as topics vary. Prerequisite: QUAN 507.

**QUAN 580C-3 Doctoral Seminar in Quantitative Methods-Multivariate Methods.** A series of advanced seminars on statistics and measurement. Sections A through H may be taken only once each. Section I may be repeated as topics vary. Prerequisite: QUAN 507.

**QUAN 580D-3 to 4 Doctoral Seminar in Quantitative Methods-Bayesian Inference.** A series of advanced seminars on statistics and measurement. Sections A through H may be taken only once each. Section I may be repeated as topics vary.

Prerequisite: QUAN 507.

**QUAN 580E-3 Doctoral Seminar in Quantitative Methods-Program Evaluation.** A series of advanced seminars on statistics and measurement. Sections A through H may be taken only once each. Section I may be repeated as topics vary. Prerequisite: QUAN 531 or PSYC 525.

**QUAN 580F-3 Doctoral Seminar in Quantitative Methods-Advanced Experimental Design.** A series of advanced seminars on statistics and measurement. Sections A through H may be taken only once each. Section I may be repeated as topics vary. Prerequisite: QUAN 508 or PSYC 522.

**QUAN 580G-3 Doctoral Seminar in Quantitative Methods-Item Response Theory.** A series of advanced seminars on statistics and measurement. Sections A through H may be taken only once each. Section I may be repeated as topics vary. Prerequisite: QUAN 531 or PSYC 525.

**QUAN 580H-3 to 4 Doctoral Seminar in Quantitative Methods-Monte Carlo and Simulation Techniques.** A series of advanced seminars on statistics and measurement. Sections A through H may be taken only once each. Section I may be repeated as topics vary. Prerequisite: QUAN 507.

**QUAN 580I-2 to 6 Doctoral Seminar in Quantitative Methods-Selected Topics.** A series of advanced seminars on statistics and measurement. Sections A through H may be taken only once each. Section I may be repeated as topics vary. Prerequisite: QUAN 507.

**QUAN 592-1 to 8 (1 to 6 per semester) Independent Study and Investigation.** For advanced graduate students. Topics of interest to the individual student are studied under supervision of a department staff member. Special approval needed from the department.

**QUAN 593-1 to 4 Individual Research.** For advanced graduate students in Quantitative Methods. Formulating, investigating and reporting of research problems in the area of Quantitative Methods. Special approval needed from the department.

**QUAN 600-1 to 32 (1 to 16 per semester) Dissertation.**

**QUAN 601-1 per semester Continuing Enrollment.** For those graduate students who have not finished their degree programs and who are in the process of working on their dissertation, thesis, or research paper. The student must have completed a minimum of 24 hours of dissertation research, or the minimum thesis, or research hours before being eligible to register for this course. Concurrent enrollment in any other course is not permitted. Graded S/U or DEF only.