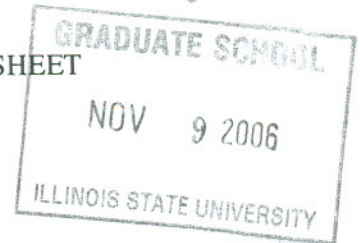07-42

Signature

GRADUATE
NEW/REVISED/DELETED GRADUATE PROGRAMS COVERSHEET
(Degree Programs, Sequences, Graduate-Level Certificates)
Graduate Curriculum Committee
2006-07

Deadlines for receipt by Graduate Curriculum Committee:
Revised Degree Program, Sequence, Graduate-Level Certificates: **October 1**, 2006, for inclusion in 2007-08 catalog.
New Sequence, New Graduate-Level Certificates: **September 15**, 2006, for inclusion in 2007-08 catalog.
New Degree Program: **February 10, 2006**, for inclusion in **2008-09** catalog.

DEPARTMENT/SCHOOL Mathematics **DATE** 10/25/06
TITLE OF DEGREE, SEQUENCE, OR CERTIFICATE Master Of Science In Mathematics: Applied Statistics Sequence

Proposed Action: (Refer to Part I, Section C of *GCC Proposal Guidelines and Procedures*.)

☒ New*: (Check one.)
    ☐ Degree Program** (goes beyond Graduate Curriculum Committee)
    ☒ Sequence (goes beyond Graduate Curriculum Committee)
    ☐ Post-Master's Graduate Certificate (goes beyond Graduate Curriculum Committee)
    ☐ Post-Baccalaureate Graduate Certificate (goes beyond Graduate Curriculum Committee)
    ☐ Graduate Certificate

☐ Change in requirements for: (Check one.)
    ☐ Degree Program   ☐ Sequence   ☐ Certificate

☐ Other program revisions

☐ Deletion of: (Check one.)
    ☐ Degree Program (goes beyond Graduate Curriculum Committee)
    ☐ Sequence (goes beyond Graduate Curriculum Committee)
    ☐ Post-Master's Graduate Certificate (goes beyond Graduate Curriculum Committee)
    ☐ Post-Baccalaureate Graduate Certificate (goes beyond Graduate Curriculum Committee)
    ☐ Graduate Certificate

*Attach approved *Request for New Program Approval: Reporting of Financial Implications* form (available at www.academicsenate.ilstu.edu/documents.html).
**Obtain the New Program Request (NEPR) format from the Office of the Provost.

Attachment: Summary of proposed action. For all proposals, provide current title and current catalog copy. Provide new title and new catalog copy for new programs, and for revised programs if catalog copy/title is altered. For revised programs, provide a summary of the changes. (Refer to New/Revised/Deleted Programs checklist in *GCC Guidelines and Procedures*.)

SEE ATTACHED.

Routing and action summary:

1. _____ _____
  Dept./School Curriculum Committee Chair   Date Approved

2. _____ _____
  Department Chair/School Director   Date Approved

3. _____ _____
  College Curriculum Committee Chair   Date Approved

4. _____ _____
  College Dean   Date Approved

5. _____ _____
  Teacher Education Council Chair   Date Approved
  (28 copies to Dean of College of Education)

6. _____ _____
  Graduate School   Date Approved

*Submit **10** copies of proposal to the Graduate Curriculum Committee. In addition, for new and deleted degree programs, sequences, and Post-Baccalaureate and Post-Master's certificates, submit an electronic version (MS Word format). These proposals are routed by GCC to the Academic Senate. The Senate requires electronic submission of all materials for posting to the Senate Web site.*

Curriculum Proposal Guidelines and Procedures, Fall 2006

Illinois State University
Department of Mathematics
Proposed Sequence Title: Applied Statistics Sequence

CIPS Classification:
Date of Implementation: Fall, 2007

Description: Sequence within the Mathematics program, allowing specialization in courses related to applied statistics

Executive Summary:
Master of Science in Mathematics, Applied Statistics Sequence

This proposal seeks to introduce an Applied Statistics Sequence within the Master of Science program in Mathematics. The proposal does not require new funding; continuing the current level of course offerings will be adequate for this sequence. This sequence simply streamlines the existing course requirements so that students who seek to have training in applied statistics have better focus. In addition this proposal seeks to rationalize and align the requirements for the Applied Statistics Sequence in the Master's program in Mathematics with current university requirements and Departmental program standards. Students seeking the Master of Science degree in following the Applied Statistics Sequence will be need to fulfill the following requirements:

Option I: 32 credit hours of graduate work and a culminating experience in the form of MAT 490 or MAT 498 (only projects in Statistics are accepted for this sequence).

Option II: 30 hours of graduate work and an approved Master's thesis.

Moreover, in both options, the following courses are required: MAT 350, MAT 351, one of MAT 336, 337, or 347, and three of MAT 450, MAT 453, MAT 455, MAT 456, or MAT 458. Other requirements will be the same as the Master's degree requirements in Mathematics.

Proposed Sequence
Master of Science in Mathematics: Applied Statistics
Rationale:

The following is a direct quote from the American Statistical Association webpage of career opportunities for statisticians (http://www.amstat.org/careers/index.cfm?fuseaction=brochure):

"The world is becoming more and more quantitative and data focused. Many professions depend on numerical measurements to make decisions in the face of uncertainty."

Statistics is the science and art of decision making under uncertainty. The field of statistics serves science and society through the development, understanding, abstraction, and communication of state-of-the art techniques for collecting, analyzing, and making inferences from data. Statisticians enthusiastically reach out to all areas of science, engineering and education in the pursuit of interesting and important problems.

We propose a sequence in applied statistics for our Master's degree in mathematics so that our graduates will have a good chance to tap into the demand for statisticians in the work place. As pointed out by the U.S. Department of Labor, almost any field in science, technology, or business employs statisticians and hence there is a constant demand in the work place for individuals trained in applied statistics. In the past our students who had the concentration in statistics in their masters degree were very successful in getting employment in companies like Caterpillar and Nelson's ratings. Our focus and proposed sequence is applied in the sense we deliver statistics courses more data driven with real data analysis projects built into them. This emphasis will help our graduates to get employment as applied statisticians.

As pointed out by the U.S Department of Labor in its Occupational Outlook Handbook, "a master's degree in statistics or mathematics is the minimum educational requirement for most jobs as a statistician." Thus people seeking work in this area are advised to obtain a master's degree. The Department of Mathematics already has a significant number of graduate level courses in statistics (4 at the 300-level, 5 at the 400-level), taken both by students by students interested in specializing in Statistics, and by students who need Statistics to help in other specialty areas. Grouping

these courses in a sequence will give the program higher visibility, and hopefully attract more strong students to ISU.

Sequence Requirements

Applied Statistics Sequence, Option I

Thirty-two (32) hours of courses, with at least 28 mathematics, including MAT 350, MAT 351, one of the following: MAT 336, 337, 347, 407, or 447 as well as three of the following: MAT 450, 453, 455, 456, or 458, are required. Fifteen hours must be at the 400 level including at least 12 in mathematics. Three mathematics courses numbered 400 or above are required. Culminating experience in the form MAT 490 or MAT 498 or comprehensive examinations is required. All electives are subject to approval by the department's graduate committee.

Applied Statistics Sequence, Option II

Thirty (30) hours of courses, with at least 24 mathematics, including MAT 350, MAT 351, one of the following: MAT 336, 337, 347, 407, or 447 as well as three of the following: MAT 450, 453, 455, 456, or 458, are required. Fifteen hours must be at the 400 level including at least 10 in mathematics. Three mathematics courses numbered 400 or above are required. All electives are subject to approval by the department's graduate committee. A written approved thesis is required.

Expected Impact on existing programs:
No impact is expected outside the Department of Mathematics. Within the Department, this specialization will mean students in this area will take fewer of the other regular courses in mathematics. Higher visibility as a sequence may attract more students.

Expected curricular changes:
Courses required by this sequence are already in place, and generally have room for more students. The one new course proposal that forms part of this overall proposal, MAT 490, is being set up to help structure culminating experiences.

Anticipated staffing arrangements: To be made within Department lines.

Anticipated funding needs: Because this proposal is designed to serve the type of students already in the Department, no new funding requirements are projected for the near future.

New graduate catalog contents for this proposal, replacing the analogous existing contents concerning the Master degree in Mathematics:

Programs Offered

The Department of Mathematics offers varied programs leading to the Master of Science in Mathematics and Doctor of Philosophy in Mathematics Education degrees. At the master's level, concentrations are available for persons interested in secondary mathematics education, pure mathematics, computational mathematics, and applied mathematics. Sequences are available in Actuarial Science and also in Applied Statistics, and a Sequence in Elementary and Middle School Mathematics Education is available for teachers at those levels. The Ph.D. program is for persons seeking advanced preparation as teacher educators and mathematics education researchers. Graduate assistantships and instructorships are available.

Master's Degree Programs

The student must meet the general university requirements listed elsewhere in this catalog for the Master of Science degree. In addition, the student must complete either Option I or Option II in Mathematics, the Actuarial Science Sequence, the Applied Statistics Sequence, or the Sequence in Elementary and Middle School Mathematics Education as described below. Any course substitutions must be approved by the Department's Master's Program director. Option I requires a culminating experience in the form of an approved master's project, comprehensive exam, or professional practice; Option II requires a master's thesis. The culminating experience/thesis project must be approved in advance by the Department's Master's Program committee.

Admission Requirements

Admission to the Mathematics program normally requires an undergraduate major in mathematics or secondary mathematics education. Admission to the Actuarial Science Sequence or the Applied Statistics Sequence normally requires an appropriate background in mathematics, actuarial science, statistics, or mathematical finance. Admission to the Sequence in Elementary and Middle School Mathematics Education requires an appropriate background in mathematics content and methodology. Applicants lacking the required background for these programs may be admitted with deficiencies at the discretion of the department's graduate committee. Applicants whose undergraduate grade point average for the last sixty hours is less than 3.0 (but at least 2.8) may be admitted probationally and must make a grade point average of 3.0 during their first term (summer or semester) of study.

Program Options

Each student must complete a program in one of four areas: Mathematics, the Actuarial Science Sequence, the Applied Statistics Sequence, or the Sequence in Elementary and Middle School Mathematics Education. In each, the student completes one of two options:

Option I

Thirty-two (32) hours are required, with at least 26 in mathematics; fifteen hours must be at the 400 level, including at least 12 in mathematics. A culminating experience in the form of MAT 490, or MAT 498, or comprehensive examinations, is required.

Option II

Thirty (30) hours are required, with at least 24 in mathematics; fifteen hours must be at the 400 level, including at least 10 in mathematics. A written approved thesis is required.

Additional requirements are given below.

Mathematics

MAT 336, 337 and 347 are required. Three mathematics courses numbered 407 or above are required. All electives are subject to approval by the department's graduate director. Students may select an area of concentration from the following:

Areas of Concentration:

Secondary mathematics education: 401, 403, 421, 422

Doctoral study in mathematics: 407, 447, 448

Computational mathematics: 356, 361, 363, 370, 461

Applied mathematics: 340, 341, 345, 356, 361, 362, 363, 370, 378

Other courses not yet listed in this catalog are also available. Contact the graduate advisor.

Actuarial Science Sequence

One of MAT 336, 337, 347, as well as three of the following: 380, 383, 384, 480, or 483, are required. Three mathematics courses numbered 407 or above are required. All electives are subject to approval by the department's graduate director.

Applied Statistics Sequence

MAT 350, MAT 351, and one of MAT 336, 337, or 347 are required. Three of the following: MAT 450, 453, 455, 456, or 458, are required. All electives are subject to approval by the department's graduate director.

Sequence in Elementary and Middle School Mathematics Education

Persons who are teaching or who plan to teach at the elementary or middle school level may elect the Sequence in Elementary and Middle School Mathematics Education. Each student who elects this sequence must complete MAT 304, 401,

402, 403, and 409. All electives are subject to approval by the department's graduate director.

Students in this sequence who are considering entering the Mathematics Education Ph.D. program at Illinois State University are advised to take MAT 145 and 146 and, as part of their master's program, the following courses: MAT 304, 307, 309 or 330, 312, 315, 320, 326, 409, 421 and 422. Please see the Ph.D. advisor for more information.