

Minnesota State University, Mankato HOLD and CLEAR buttons only compatible with Acrobat V. 4 and 5
Curriculum Proposal

Please type or select the requested information. Print completed forms, add appropriate paper attachments, and route through MSU's curricular process for recommendations and decisions.

(Check all that apply):		Proposal #	<u>268</u>
College:	<u>Science, Engineering and Technology</u>	<input checked="" type="checkbox"/> Undergraduate	Effective Date of Change:
Department:	<u>Mathematics and Statistics</u>	<input type="checkbox"/> Graduate	Academic Year
Program:		CIP #:	<u>06-09</u>
Type of Change:	<u>PROGRAM PROPOSALS</u>	(For Office Use Only)	
Proposed:	<u>Redesign--Add/Delete Program Option</u>	Course Designator	Number of Credits
Title Current:			
Title Proposed:	<u>Statistics</u>		
24-Char. Abbrev:	<u>Statistics</u>		

Include a course or program description for the Bulletin (30-40 words maximum for courses, 100 for programs):
See Draft Bulletin Attachment.

Rationale or Justification for change:
We are currently offering majors in mathematics and mathematics teaching as well as minors in statistics and mathematics. We are redesigning the statistics program to include a statistics major. By repackaging the existing courses into a new program option we can increase marketability of our students in broad application areas.

*****For General Education or Cultural Diversity Courses Only*****

General Education Course:		Cultural Diversity Course:
GE Category #	GE Category Name (Maximum of 3 Categories)	(Please check one.)
<u>N/A</u>		<input type="checkbox"/> Core (At least 75% devoted to topics of race, gender, sexual orientation, age, class, and disabilities as they occur in United States Society.) <input type="checkbox"/> Related (At least 25% devoted to the above topics or to a global perspective on topics related to African American, Asian, Hispanic, and Native American inhabitants of the United States.)
<u>N/A</u>		
<u>N/A</u>		

? For Writing Intensive Courses, attach a description of the kind and quantity of writing.
 ? For Upper Division Courses, include a description of the respects in which it is broad and general rather than narrow and specific, and so suitable as GE.

Attach paper copies of the following:
 a. Syllabus or course outline.
 b. Course's student learning outcomes associated with each GE competency or CD designation.
 c. List of strategies to be used to assess students' achievement of each GE competency or CD designation.

*****For New Courses*****

(Check all that apply):	Instructional Type: <u>Lecture</u>	Course will be offered:
<input type="checkbox"/> Course is an elective.	Grading Format: <input type="checkbox"/> Grade <input type="checkbox"/> P/N	<input type="checkbox"/> Fall Semester
<input type="checkbox"/> Course is required for program		<input type="checkbox"/> Spring Semester
<input type="checkbox"/> Pre- or Co-requisites:		<input type="checkbox"/> Summer Session
<input type="checkbox"/> Other courses are being changed or eliminated. (Explain.)		

Course content or title is similar to courses in other departments. (Attach copy of letter of agreement with other program(s) contacted. Indicate the nature of the discussions and/or resolution of differences or potential conflicts.)

Attach paper copies of the following:
 a. Syllabus or course outline.
 b. Course's student learning outcomes.
 c. A list of resources required to offer and support this course.
 d. A description of how teaching this course will affect department staffing.
 e. If 400/500 level course, an explanation of added expectations of graduate students.



Minnesota State University, Mankato
Curriculum Proposal

Signature Page

Department

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

Larry on Pearson 10/18/06
 Department Chair Date

Comments: SEE attached minutes of department meeting.

College Curriculum Committee

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

Karen C. Chow 11/2/06
 Committee Chair Date

Comments:

College Dean

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

[Signature] 11/4/06
 Dean Date

Comments:

General Education Subcommittee

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

 General Education Subcommittee Chair Date

Comments:

Undergraduate Curriculum and Academic Policy Committee

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

 UCAP Faculty Chair Date

Comments:

Faculty Association Graduate Committee

Recommended
 Not Recommended

 Faculty Association Graduate Chair Date

Comments:

Graduate Dean

Recommended
 Not Recommended

 Graduate Dean Date

Comments:

Academic Affairs Council

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

 Assistant Vice President Date

Comments:

Senior Vice President and Vice President for Academic Affairs

Approved (Category/ies _____)
 Not Approved (Category/ies _____)

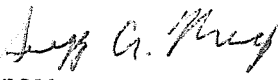
 Sr. Vice President / Vice Pres. Academic Affairs Date

Comments:



September 11, 2006

To: Larry Pearson, Chairperson
Department of Mathematics and Statistics

From: Gregg Marg, Chairperson 
Department of Biological Sciences

RE: Program Proposal in Applied Statistics

The main reason for this note is to verify support for the Biological and Health Science track within the Baccalaureate Program in Applied Statistics. Our faculty discussed this program at our department meeting on Sept. 8 and we are very supportive of the program in general and the Biological and Health Sciences track in particular.

As I discussed with you earlier, the specific courses to be included in that track could be quite varied. A good starting point could be Biology 105 General Biology 1, Biology 211 Genetics, Biology 320 Cell Biology, and Biology 479 Molecular Biology (which will total 16 credits). This would be a good set of courses which, in combination with the other program requirements, could lead to work in the bioinformatics area as well as several related areas. There are several other possible combinations of courses but this set of four is probably the best starting point. We can handle other variations through substitution forms.

Good luck with your program proposal. Let me know if I can be of further assistance.

Pearson, Larry M

From: Haglin, David
Sent: Wednesday, October 18, 2006 4:29 PM
To: Pearson, Larry M
Subject: Broad Stats Major

Larry,

I understand that you are proposing a new broad STATS major that includes courses from our CIS department. I have passed your proposal around our department and received only positive feedback. We welcome the opportunity to have STATS majors interacting with our students in several of our courses.

As you are aware, we are proposing some changes to our curriculum which may mean you will need to adjust your program to match our updated curriculum.

Sincerely,

David Haglin

Dr. David J. Haglin, Chair
Computer and Information Sciences Department
Minnesota State University, Mankato, MN 56001
<http://theory.cs.mnsu.edu/haglin>

10/18/2006

Current Bulletin for Statistics

STATISTICS

Statistics

College of Science, Engineering, & Technology
Department of Mathematics & Statistics
273 Wissink Hall • 507-389-1453
Web site: www.mnsu.edu/dept/mathstat/

Chair: Larry Pearson

Mezbahur Rahman

Statistics in this department is designed to provide a basic theoretical background for statistical inference and some techniques and practice in applying the theory. Courses in statistics would be useful for anyone as a tool in another area of study or as preparation for more advanced study of statistics.

STATISTICS MINOR

Required for Minor (20-21 credits):

MATH 121 Calculus I (4)
MATH 122 Calculus II (4)
STAT 354 Concepts of Probability and Statistics (3)
STAT 450 Regression Analysis (3)
STAT 451 Experimental Designs (3)

Choose one course from the following:

STAT 357 Sample Survey and Design (3)
STAT 358 Categorical Data Analysis (3)
STAT 359 Nonparametric Methods (3)
STAT 455 Theory of Statistics I (4)

POLICIES/INFORMATION

GPA Policy. Statistics minors must earn a grade of C or better in all courses applied to the minor.

P/N Grading Policy. All 300- and 400-level courses are offered for grade only with the exception of STAT 498 and 499 which are available for both P/N and letter grade.

Credit by examination. Will not be approved for courses in which a student has already received a grade.

Credit Limitation. A student may not receive credit for STAT 354 after completing MATH 455 or STAT 455.

COURSE DESCRIPTIONS

STAT 154 (3) Elementary Statistics

Basic descriptive measures of data, elementary probability concepts and their relation to statistical inference, tests of hypotheses and confidence intervals. An appropriate preparation for more advanced statistics courses in any area.

Pre: Three years high school algebra or MATH 098 F, S
GE-4

STAT 354 (3) Concepts of Probability & Statistics

This is a calculus-based course covering introductory level topics of probability and statistics. It is designed to meet the needs of both the practitioner and the person who plans further in-depth study. Topics include probability, random variables and probability distributions, joint probability distributions, statistical inference (both estimation and hypothesis testing), analysis of variance, regression, and correlation. Same as MATH 354.

Pre: MATH 122 F, S

STAT 357 (3) Sample Survey and Design

Random sampling, systematic sampling methods including stratified random sampling, cluster sampling and two-stage sampling, ratio estimation, regression, and population size estimation.

Pre: elementary STAT course or consent ALT-F

STAT 358 (3) Categorical Data Analysis

Forms of multivariate analysis for discrete data, two dimensional tables, models of independence, log linear models, estimation of expected values, model selection, higher dimensional tables, logit models and incompleteness.

Pre: elementary STAT course or consent ALT-F

STAT 359 (3) Nonparametric Methods

Derivation and usage of nonparametric statistical methods, applications in count and rank data, analysis of variance for ranked data, statistical quality control.

Pre: any STAT course

STAT 450 (3) Regression Analysis

Simple and multiple regression, correlation, analysis of variance and covariance.

Pre: MATH/STAT 354 or 455 ALT-S

STAT 451 (3) Experimental Designs

Completely randomized, block, fractional factorial, incomplete block, split-plot, Latin squares, expected mean squares, response surfaces, confounding, fixed effects and random effects models.

Pre: MATH/STAT 354 or 455 ALT-S

STAT 455 (4) Theory of Statistics I

A mathematical approach to statistics with derivation of theoretical results and of basic techniques used in applications. Includes probability, continuous probability distributions, multivariate distributions, functions of random variables, central limit theorem and statistical inference. Same as MATH 455.

Pre: MATH 223 F

STAT 456 (4) Theory of Statistics II

A mathematical approach to statistics with derivation of theoretical results and of basic techniques used in applications, including sufficient statistics, additional statistical inference, theory of statistical tests, inferences about normal models and nonparametric methods. Same as MATH 456.

Pre: MATH/STAT 455

STAT 488 (1-3) Seminar

The study of a particular topic primarily based upon recent literature. May be repeated for credit on each new topic.

STAT 491 (1-4) In-Service

A course designed to upgrade the qualifications of persons on-the-job. May be repeated for credit on each new topic.

STAT 495 (1-4) Selected Topics

A course in an area of statistics not regularly offered. May be repeated for credit on each new topic.

STAT 498 (1-12) Internship

Provides a student the opportunity to gain expertise and experience in a special field under the supervision of a qualified person.

STAT 499 (1-4) Individual Study

Independent individual study under the guidance and direction of a faculty member. Special arrangements must be made with an appropriate faculty member. May be repeated for credit of each new topic.

Proposed New Bulletin for Statistics

STATISTICS

Statistics

College of Science, Engineering, & Technology

Department of Mathematics & Statistics

273 Wissink Hall • 507-389-1453

Web site: www.mnsu.edu/dept/mathstat/

Chair: Larry M. Pearson

Mezbahur Rahman, Deepak Sanjel

Statistics in this department is designed to provide a basic theoretical background for statistical inference and some techniques and practice in applying the theory. Courses in statistics would be useful for anyone as a tool in another area of study or as preparation for more advanced study of statistics. Many students choose statistics as an option in their general education or take statistics as a requirement for their major. The Department of Statistics also offers both a major and a minor in statistics.

The major provides a background in statistics, mathematics, and computer science to enable students to pursue a career in business, industry, or actuarial science as well as to pursue advanced study in statistics. The major is organized into 3 tracks to allow an emphasis in applied mathematics, computer science, or biological science. A well prepared student can expect to complete the major in four years. The minor gives students a basic core of statistics that would compliment majors in many areas by providing a thorough grounding in basic statistical principles, methods of data analysis, and a knowledge base to assist in understanding statistical procedures applied to a variety of disciplines.

A student must be admitted to a major to be permitted to take 300- and 400-level courses. Admission is granted by the department. In addition to minimum university admission requirements of: a minimum of 32 earned semester credit hours and a minimum cumulative GPA of 2.00, students must complete 10 credits in mathematics and statistics counting towards the Major with a 2.5 GPA.

STATISTICS MAJOR

Required for Major (76 credits):

STAT 154 Elementary Statistics (3)
STAT 354 Concepts of Probability and Statistics (3)
STAT 357 Sample Survey and Design (3)
STAT 358 Categorical Data Analysis (3)
STAT 359 Nonparametric Methods (3)
STAT 450 Regression Analysis (3)
STAT 451 Experimental Designs (3)
STAT 492 Statistics Capstone Experience (3)
MATH/STAT 455 Theory of Statistics I (4)
MATH/STAT 456 Theory of Statistics II (4)
MATH 121 Calculus I (4)
MATH 122 Calculus II (4)
MATH 223 Calculus III (4)
MATH 247 Linear Algebra I (4)
CS 110 Computer Science I (4)
CS 111 Computer Science II (4)
CS 230 Intelligent Systems (4)

Choose one of the following options:

Applied Mathematics Track (minimum of 16 credits from the following list):

MATH 290 Foundations of Mathematics (4)
MATH 321 Ordinary Differential Equations (4)
MATH 375 Introduction to Discrete Mathematics (4)
MATH 422 Partial Differential Equations (4)
MATH 425 Mathematical Modeling (4)
MATH 470 Numerical Analysis I (4)
MATH 471 Numerical Analysis II (4)

Computer Science Track (minimum of 16 credits from the following list):

CS 210 Data Structures (4)
CS 220 Machine Structures and Programming (4)
CS 320 Computer Architecture (3)

CS 340 Concepts of Database Management Systems (3)
CS 350 Network Architectures (3)
CS 370 Concepts of Programming Language (3)
CS 433 Data Mining/Machine Learning (3)
MATH 470 Numerical Analysis I (4)
MATH 471 Numerical Analysis II (4)

Biological Science Track (minimum of 16 credits from the following list):

BIOL 105W General Biology I (4)

BIOL 211 Genetics (4)

Note: BIOL 211 will be adding a lab component and change from 3 to 4 credits. The Chairperson of Biology recommended changing the credit to 4 in our proposal.

BIOL 320 Cell Biology (4)

BIOL 479 Molecular Biology (4)

STATISTICS MINOR

(No changes in this area.)

POLICIES/INFORMATION

(No changes in this area.)

COURSE DESCRIPTIONS .

(One new course and no other changes in this area.)

STAT 492 Statistics Capstone Experience (3)

This course is designed to allow undergraduate students an opportunity to integrate their statistics experiences by engaging each student in working on problems in applied or theoretical statistics.

Prerequisites: Any two of STAT 357, STAT 358, STAT 359, and STAT 450 and senior standing. S

Student Learning Outcomes for the Program

A broad major in statistics provides the student with the following skills/ /expertise:

1. Quantitative statistical reasoning in business and industry.
2. Being able to interpret the results of a statistical analysis and draw a practical conclusion.
3. Communicating the findings of a statistical analysis to nonexperts in statistics.
4. A sense of ethics in the application of statistics and in consulting.
5. An increased capacity in critical thinking.
6. An awareness of the applicability of mathematics, statistics, and computing.
7. The biological sciences track will give students an advantage in applying for jobs in bio-medical industries.

Specific Objectives: Students will obtain

1. Basic knowledge in applying Exploratory Data Analysis techniques.
2. Fundamental background in mathematical techniques and applications.
3. Basic statistical information for carrying out statistical procedures in the areas of nonparametric statistics, regression analysis, non-linear modeling, design of experiments and sample survey.
4. Knowledge about theoretical statistics.
5. A working knowledge of the statistical packages SPSS, SAS, Matlab/Mathematica, Maple, and MINITAB/S-Plus.
6. Basic knowledge in programming languages, data structures, and operating systems.
7. Preparation for graduate work in Statistics or employment in business or industry as a statistician.

Mathematics and Statistics Department
Meeting Minutes
October 16, 2006

Present: Boyd, Guy, Haskins, Hermann, Kapplinger, Kim, B. Lee, N. Lee, Martensen, Pearson, Rahman, Regas, Sanjel, Singer, Waters, Wiest, Zuiker.

Minutes of the September 15, 2006 meeting were approved by consensus.

Mark Zuiker presented the proposal for the Broad Major in Statistics. (See attached)

Zuiker moved that Stat 492 Capstone Experience be approved and sent to the college curriculum committee. It was seconded by Wiest, a vote was taken and it was approved.

Zuiker moved that the Broad Statistics Major be accepted and sent to the college curriculum committee. Waters seconded the motion.
Motion passed.

Bill Lee moved and that the prerequisites for Stat 154 and Math 130 be changed to

Must achieve a score of 18 or better on the MNSCU Math readiness Test, or have achieved an ACT Math subscore of 19 or higher, or successful completion of Math 098

Boyd seconded the motion.
Motion passed.

Boyd moved that the catalog description on Math 181 delete the words "to the fields of business and economics" Namyong Lee seconded the motion. A vote was taken and the motion passed.

The curriculum committee was given the charge to review all prerequisites in the catalog. The committee was also charged with developing a calculus course that will meet the needs of students seeking middle school licensure.

Zuiker moved that the department support CS option to take Math 181 for their new major. Wiest seconded the motion. A vote was taken and the motion passed.

Rahman presented a proposal for two MAX Scholar Seminars. (See attached)
Namyong Lee moved that the MAX Courses be accepted.
Zuiker seconded the motion.
Motion passed.

Zuiker reported on the status of Chaska High School students' concurrent enrollment in Math 112. After the first year requirements to enroll in the course will be the same as on campus, There will be 3 sight visits, tests will be monitored for content and students will take the same final as students on campus.

Rahman reminded the faculty that the department does not have a representative to the search committee for the new dean and asked for volunteers.

MSU Assessment Plan Preparation Form

- 1. Student Learning Outcome:** Knowledge about theoretical statistics and basic mathematics.

Related College Goal: Providing degree programs that give students in-depth knowledge, inspire critical thinking skills, problem solving skills, oral and written communication skills and laboratory skills.

Related University Goal: The university will prepare students for careers and for life-long learning by providing focused undergraduate pre-professional programs.

Method of Assessment: Students will participate in an undergraduate research project. The instructor supervising these projects will assess a student's knowledge of theoretical statistics and basic mathematics during the background study required to prepare for the research project. The instructor will report to the departmental assessment committee this assessment on a scale from 1 (lacking basic knowledge) to 5 (very knowledgeable).

Who assessed: All students majoring in statistics will be required to take Stat 492, Statistics Capstone Experience. The assessment will be completed in that course.

When assessed: The assessment report will be completed at the end of the semester every time the course Stat 492 is offered.

Standard of Mastery: The standard of mastery for this outcome is a score of 3 or better. The departmental goal will be to have all students score 4 or 5.

What's to be Learned: The outcome of this assessment will determine whether or not students have retained the basic knowledge from the courses Math 121, 122, 247, and Stat 357, 358, 359. If there is a high percentage of students failing the standard of mastery, then the department will need to re-evaluate the scope of the prerequisite courses.
- 2. Student Learning Outcome:** Basic skills in performing exploratory data analysis techniques, including the areas of nonparametric statistics, regression analysis, non-linear modeling, design of experiments and sample survey.

Related College Goal: Providing degree programs that give students in-depth knowledge, inspire critical thinking skills, problem solving skills, oral and written communication skills and laboratory skills.

Related University Goal: The university will prepare students for careers and for life-long learning by providing focused undergraduate pre-professional programs.

Method of Assessment: Students will participate in an undergraduate research project. The instructor supervising these projects will assess a student's ability to perform exploratory data analysis techniques used in the methodology section of the research project and to interpret them in the results section of the research project. The instructor will report to the departmental assessment committee this assessment on a scale from 1 (unable to perform basic techniques) to 5 (very capable).

Who assessed: All seniors majoring in statistics will be required to take Stat 492, Statistics Capstone Experience. The assessment will be completed in that course.

When assessed: The assessment report will be completed at the end of the semester every time the course Stat 492 is offered.

Standard of Mastery: The standard of mastery for this outcome is a score of 3 or better. The departmental goal will be to have all students score 4 or 5.

What's to be Learned: The outcome of this assessment will determine whether or not students can perform exploratory data analysis techniques in a research project. If there is a high percentage of students failing the standard of mastery, then the department will need to re-evaluate the scope of Stat 358, 359 and 450.
- 3. Student Learning Outcome:** A working knowledge of the statistical packages SPSS, SAS, Matlab/Mathematica, Maple, and MINITAB/S-Plus, along with basic knowledge of operating systems and data structures.

- Related College Goal:** Providing degree programs that give students in-depth knowledge, inspire critical thinking skills, problem solving skills, oral and written communication skills and laboratory skills.
- Related University Goal:** The university will prepare students for careers and for life-long learning by providing focused undergraduate pre-professional programs.
- Method of Assessment:** Students will participate in an undergraduate research project. The instructor supervising these projects will assess a student's ability to use statistical software in the methodology section of the research project. The instructor will report to the departmental assessment committee this assessment on a scale from 1 (not skilled in using statistical software) to 5 (very capable).
- Who assessed:** All seniors majoring in statistics will be required to take Stat 492, Statistics Capstone Experience. The assessment will be completed in that course.
- When assessed:** The assessment report will be completed at the end of the semester every time the course Stat 492 is offered.
- Standard of Mastery:** The standard of mastery for this outcome is a score of 3 or better. The departmental goal will be to have all students score 4 or 5.
- What's to be Learned:** The outcome of this assessment will determine whether or not students can use statistical software. If there is a high percentage of students failing the standard of mastery, then the department will need to consider creating a special course in using statistical software.
- 4. Student Learning Outcome:** Ability to write a professional statistical report.
- Related College Goal:** Providing degree programs that give students in-depth knowledge, inspire critical thinking skills, problem solving skills, oral and written communication skills and laboratory skills.
- Related University Goal:** The university will prepare students for careers and for life-long learning by providing focused undergraduate pre-professional programs.
- Method of Assessment:** Students will participate in an undergraduate research project. Each student will be required to present a written report on the project. The instructor will report to the departmental assessment committee this assessment on a scale from 1 (poorly written) to 5 (very well written).
- Who assessed:** All seniors majoring in statistics will be required to take Stat 492, Statistics Capstone Experience. The assessment will be completed in that course.
- When assessed:** The assessment report will be completed at the end of the semester every time the course Stat 492 is offered.
- Standard of Mastery:** The standard of mastery for this outcome is a score of 3 or better. The departmental goal will be to have all students score 4 or 5.
- What's to be Learned:** The outcome of this assessment will determine whether or not students can write a professional statistical report. If there is a high percentage of students failing the standard of mastery, then the department will need to consider how to require more technical writing in our courses.
- 5. Student Learning Outcome:** Ability to communicate a professional statistical report orally.
- Related College Goal:** Providing degree programs that give students in-depth knowledge, inspire critical thinking skills, problem solving skills, oral and written communication skills and laboratory skills.
- Related University Goal:** The university will prepare students for careers and for life-long learning by providing focused undergraduate pre-professional programs.
- Method of Assessment:** Students will participate in an undergraduate research project. Each student will be required to present a seminar talk on the project. The instructor will report to the departmental assessment committee this assessment on a scale from 1 (poorly presented) to 5 (very well presented).
- Who assessed:** All seniors majoring in statistics will be required to take Stat 492, Statistics Capstone Experience. The assessment will be completed in that course.
- When assessed:** The assessment report will be completed at the end of the semester every time the course Stat 492 is offered.

- Standard of Mastery:** The standard of mastery for this outcome is a score of 3 or better. The departmental goal will be to have all students score 4 or 5.
- What's to be Learned:** The outcome of this assessment will determine whether or not students can present a professional statistical talk. If there is a high percentage of students failing the standard of mastery, then the department will need to consider how to include more oral presentations in our courses.
- 6. Student Learning Outcome:** Professional attitude for graduate work in statistics or employment in business or industry as a statistician.
- Related College Goal:** Providing degree programs that give students in-depth knowledge, inspire critical thinking skills, problem solving skills, oral and written communication skills and laboratory skills.
- Related University Goal:** The university will prepare students for careers and for life-long learning by providing focused undergraduate pre-professional programs.
- Method of Assessment:** Students will participate in an undergraduate research project. Each student will complete a survey asking him/her to express his/her attitude towards doing the project. The survey will include questions to determine a level of confidence in his/her abilities to apply statistical methods, confidence in presenting the results both orally and in writing, and confidence that he/she is well prepared to enter graduate school in statistics or professional employment as a statistician.
- Who assessed:** All seniors majoring in statistics will be required to take Stat 492, Statistics Capstone Experience. The survey will be completed in that course and forwarded directly to the departmental assessment committee.
- When assessed:** The assessment report will be completed at the end of the semester every time the course Stat 492 is offered.
- Standard of Mastery:** The standard of mastery for this outcome is to have a student express positive attitudes toward the projects and confidence in his/her abilities. The departmental goal will be to have all students express positive attitudes toward the projects and confidence in their abilities
- What's to be Learned:** The outcome of this assessment will determine whether or not students have the attitudes and confidence to be professional statisticians. If there is a high percentage of students failing the standard of mastery, then the department will need to consider how to engage students more completely within the community of statisticians.

Proposed Curriculum Summary

This broad statistics major provides a background in statistics, mathematics, and computer science to enable students to pursue a career in business, industry, or actuarial science as well as to pursue advanced study in statistics. The major is organized into 3 tracks to allow an emphasis in applied mathematics, computer science, or biological science.

Current Statistics Minor

Required for Minor (20-21 credits):

- MATH 121 Calculus I (4)
- MATH 122 Calculus II (4)
- STAT 354 Concepts of Probability and Statistics (3)
- STAT 450 Regression Analysis (3)
- STAT 451 Experimental Designs (3)

Currently Offered or New Course

- Currently offered
- Currently offered
- Currently offered
- Currently offered
- Currently offered

Proposed Statistics Broad Major

Required for Major (76 credits):

- MATH 121 Calculus I (4)
- MATH 122 Calculus II (4)
- STAT 354 Concepts of Probability and Statistics (3)
- STAT 450 Regression Analysis (3)
- STAT 451 Experimental Designs (3)

Choose one course from the following:

- STAT 357 Sample Survey and Design (3)
- STAT 358 Categorical Data Analysis (3)
- STAT 359 Nonparametric Methods (3)

* This course not currently offered; however, rearrangement of offerings of bi-annual offering of Stat 357 & 358 to 3-year cycle to include Stat 359 is possible without additional staffing.

- MATH/STAT 455 Theory of Statistics I (4)

Currently offered

- MATH/STAT 455 Theory of Statistics I (4)

Required courses not in current Statistics Minor:

- STAT 492 Statistics Capstone Experience (3)

New course**

- STAT 492 Statistics Capstone Experience (3)

** New course proposal submitted this fall.

- MATH/STAT 456 Theory of Statistics II (4)
- MATH 223 Calculus III (4)
- MATH 247 Linear Algebra I (4)
- COMS 230 Intelligent Systems (4)
- COMS 211 (4) Fundamentals of Computer Science I
- COMS 212 (4) Fundamentals of Computer Science II

Currently offered
 Currently offered
 Currently offered
 Currently offered
 Currently offered
 Currently offered

- MATH/STAT 456 Theory of Statistics II (4)
- MATH 223 Calculus III (4)
- MATH 247 Linear Algebra I (4)
- COMS 230 Intelligent Systems (4)
- COMS 211 (4) Fundamentals of Computer Science I
- COMS 212 (4) Fundamentals of Computer Science II

Choose one of the following options:

Applied Mathematics Track (minimum of 16 credits from the following list):

MATH 290 Foundations of Mathematics (4)	Currently offered	MATH 290 Foundations of Mathematics (4)
MATH 321 Ordinary Differential Equations (4)	Currently offered	MATH 321 Ordinary Differential Equations (4)
MATH 375 Introduction to Discrete Mathematics (4)	Currently offered	MATH 375 Introduction to Discrete Mathematics (4)
MATH 422 Partial Differential Equations (4)	Currently offered	MATH 422 Partial Differential Equations (4)
MATH 425 Mathematical Modeling (4)	Currently offered	MATH 425 Mathematical Modeling (4)
MATH 470 Numerical Analysis I (4)	Currently offered	MATH 470 Numerical Analysis I (4)
MATH 471 Numerical Analysis II (4)	Currently offered	MATH 471 Numerical Analysis II (4)

Computer Science Track (minimum of 16 credits from the following list):

COMS 310 Data Structures & Algorithms (4)	Currently offered	COMS 310 Data Structures & Algorithms (4)
COMS 340 Database Management Systems I (4)	Currently offered	COMS 340 Database Management Systems I (4)
COMS 362 Introduction to Data Communication and Networking (4)	Currently offered	COMS 362 Introduction to Data Communication and Networking (4)
COMS 370 Concepts of Programming Languages (4)	Currently offered	COMS 370 Concepts of Programming Languages (4)
MATH 470 Numerical Analysis I (4)	Currently offered	MATH 470 Numerical Analysis I (4)
MATH 471 Numerical Analysis II (4)	Currently offered	MATH 471 Numerical Analysis II (4)

Biological Science Track (minimum of 16 credits from the following list):

BIOL 105W General Biology I (4)	Currently offered	BIOL 105W General Biology I (4)
BIOL 211 Genetics (4)	Currently offered	BIOL 211 Genetics (4)

Note: BIOL 211 will be adding a lab component and change from 3 to 4 credits. The Chairperson of Biology recommended changing the credit to 4 in our proposal.

BIOL 320 Cell Biology (4)	Currently offered	BIOL 320 Cell Biology (4)
BIOL 479 Molecular Biology (4)	Currently offered	BIOL 479 Molecular Biology (4)

Summary:

General Education – COMS 110 (4) is a pre-requisite for the computer science core and MATH 121 (4) is included in the mathematics core. Thus 36 additional credits of General Education are required.

Core requirements – Statistics (32 credits), Mathematics (16 credits), and Computer Science (12 credits)*

One of three possible tracks (Applied Mathematics Track, Computer Science Track*, or Biological Science Track) for a total of 16 credits.

Electives – 16 credits

Note: This program is based on current course offerings by the Department of Computer Information Science. As the proposed curricular changes take place in computer science, appropriate substitutions for computer science courses will be made and a revision in computer science requirements will be proposed through UCAP at a later date.

List of resources required to offer and support this program: This program requires one new course from Mathematics and Statistics (Stat 492). This course can be taught by current department faculty. This program would also increase enrollments in some computer science and biology courses. Letters of support have been included from both departments. No additional resources/materials are needed.

Description of how teaching this course will affect department staffing: The new course will require 3 credits of faculty load per year. All of the other courses in mathematics and statistics are offered at least bi-annually with the exception of Stat 359. This course could possibly be offered in a 3-year cycle with two other courses (Stat 357 and 358) compared to the current 2-year cycle.

No additional library holdings are required.

PROGRAM REDESIGN APPLICATION

Completion of the *Program Redesign Application* is the means by which most program modifications can be made. The various kinds of modifications are shown below. Program redesigns may be considered at any time of the year. In most cases, the review and approval of the application will be handled by Academic Programs Unit staff, and will not require formal Board review and approval.

PROGRAM REDESIGN POSSIBILITIES

1. Change program name
2. Change program CIP at the 6-digit level
3. Change credit length within policy limitations
4. Change credit length beyond policy limitations
5. Add program alternative:

Emphases (baccalaureate, AAS/diploma only)
Option (baccalaureate or master's programs only)

6. Change or delete program emphasis or option
7. Redesign of a degree or diploma to add or convert an award

- AAS to add or convert to an AS (Creation of an AS award requires a formal articulation agreement with a baccalaureate degree-granting institution)
- AAS or AS to include a diploma or certificate
- Diploma to add or convert to an AAS or AS degree or certificate (AS requires articulation agreement; diploma must be at least 42 credits)
- AS to add or convert to an AAS
- BA to add or convert to a BS or other baccalaureate degree
- MA to add or convert to an MS or other master's degree

8. Delete an award related to an existing program
9. Redesign or addition of a program within the same or a related 6-digit CIP classification (check with Academic Program staff for approved list of related CIP classifications)

Questions regarding the redesign application process and completion of this form should be addressed to the staff member working with your application. Submit one electronic copy of the completed application via e-mail, and one paper copy via fax or mail to the following address:

Academic Program Review Unit
Colleges: JoAnn Simser, 651-297-2285, joann.simser@so.mnscu.edu
State Universities: Mitchell Rubinstein, 651-296-5793, mitchell.rubinstein@so.mnscu.edu
Minnesota State Colleges and Universities
500 World Trade Center 30 E. Seventh Street
Saint Paul, MN 55101
FAX: (651) 296-3214

MnSCU Board Policy - 3.19 ACADEMIC PROGRAM REDESIGN POLICY

Minnesota State Colleges and Universities
PROGRAM REDESIGN APPLICATION

RELATED POLICY or STATUTE: MS 1996, Ch. 368, Sec. 33; MS 1995, Ch. 248, Article 11, Sec. 10; and MS 1996, Ch. 398, Sec. 38; Board Policy 3.14, 3.17, 3.19

[This form is designed for electronic use. You should have some familiarity with the Word table-making function. Enter your information in the correct box on the Tables below.] Please submit an individual form for each program you are redesigning. Multiple changes to the same program may be made on the same form. You may delete all the tables that do not apply to your redesign request.]

SECTION I: DESCRIPTION OF CURRENTLY APPROVED PROGRAM

8-Digit CIP #	Program Name Statistics	Award BS	Cr Length 128	Location/s MSU, Mankato
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Name of affiliated educational institution that offers one or more credits in this program:

Is this award jointly offered: Yes No

SECTION II: PROPOSED CHANGES TO PROGRAM

Effective start date/s: Fall, 2007

Rationale for Proposed Change/s: We are currently offering majors in mathematics and mathematics teaching as well as minors in statistics and mathematics. By repackaging the existing courses into a new program option we can increase marketability of our students in broad application areas.

Section IIA: NAME CHANGE

Current:	Proposed:
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Section IIB: CIP CHANGE*

Current:	Proposed:
Current Program Outcomes:	Proposed Program Outcomes:

*Contact staff to determine whether change is permitted as a redesign, or whether a new program proposal is required.

Section IIC: CHANGE CREDIT LENGTH WITHIN POLICY

Previous:	Proposed:
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Section IID: CHANGE CREDIT LENGTH TO EXCEED POLICY

Credit length beyond the policy limits will be approved only if one or more of the following conditions exist: a) the length is required by a state or national licensing body or other regulatory agency, accrediting association, or board; b) the program is employer-sponsored where the employer specifies the required credits as a condition for conferring the award; or c) a formal task analysis has been conducted within the last three years and the results endorsed by an advisory committee. Request for a program length in excess of policy from a professional association or advisory committee is not sufficient for approval.

Previous Length:	Proposed Length:
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State Rationale for Exceeding Policy Limits (Attach evidence as appropriate in an appendix):

Section IIE: ADD CURRICULUM ALTERNATIVE/S*

Name:

CIP Code:

Total Credits:

Option or Emphasis or certificate that is a subcredentialed award (choose one):

Courses unique to this alternative:

COURSE TITLE/NUMBER	Number of Credits	EXISTING COURSE/S	
		Yes	No

*Change in Curriculum Alternative/s: If you are adding multiple alternatives to a single program, please identify each separately and list courses separately by copying and pasting this section as many times as necessary.

Section IIF: DELETE EXISTING CURRICULUM ALTERNATIVE/S*

Name of Alternative:

CIP:

*Delete Curriculum Alternative/s: If you are deleting multiple alternatives, identify each separately. Add additional lines as necessary.

Section IIG: AWARD CHANGE

Current Award:

Proposed Award:

List courses for both current award and proposed award

CURRENT AWARD:	COURSE TITLE/NUMBER	Number of Credits	EXISTING COURSE/S	
			Yes	No
PROPOSED AWARD:	COURSE TITLE/NUMBER	Number of Credits	EXISTING COURSE/S	
			Yes	No

Section III: CREATE NEW AWARD IN RELATED ACADEMIC AREA			
Name:	6-digit CIP:	Total Credits:	
Please list all courses for the new award below:			Award:
COURSE TITLE/NUMBER	Number of Credits	EXISTING COURSE/S	
		Yes	No

*Creating new awards in related academic areas: Before completing this section, contact Academic Program staff to verify that you can make these proposed changes as redesigns. If you are adding awards in multiple related areas, identify each

separately
and list courses separately by replicating this table.

SECTION III: REDESIGNED PROGRAM SUMMARY

Program Requirements:

Complete this section if the number of credits in the award has increased from the previous design, or if it is a new award.

Use the following headings to provide information on **each** of the components in the program. List all credit totals required for the students to graduate, including prerequisites. If this application is for multiple awards (AAS and/or diplomas and/or certificates) duplicate this table and list requirements for each award separately.

Program Name: B.S. Statistics

Award:

Program Component	Previous Credits For Non-teaching Mathematics B.S. Degree	Proposed Credits For B.S. in Statistics
General Education/Liberal Studies	40 ¹	36 ²
Prerequisites	0	4 ³
Major-Core	27-28	76
Major-Alternative (see above)	15	16
Major-Restricted Electives	0	0
Required Minor (or est. 20 credits)	20	0
Free Electives	26	16
TOTAL PROGRAM CREDITS	128	128

SECTION IV: APPROVAL VERIFICATION

¹ 40 credits (Math 121 a general education course not include as it is required for major)

² 36 credits (Math 121 and COMS 110 are general education courses not include as they are required for major)

³ 4 credits for COMS 110 course

<i>Application Author:</i> Larry M. Pearson, Ph.D.
<i>Title:</i> Professor and Chairperson, Department of Mathematics and Statistics
<i>Campus:</i> Minnesota State University, Mankato
<i>Phone and E-Mail:</i> 507-389-1454 larry.pearson@mnsu.edu
<i>Approval Chief Academic Officer:</i>
<i>Approval of President:</i>
<i>Signature of cooperating institution's president for joint awards:</i>

SECTION V: APPENDICES/SUPPORTING DOCUMENTATION

- A. Institution Curriculum Committee Membership and Minutes showing recommendations (required)
- B. Occupational/Professional Demand Data (required, if adding a certificate or AAS to an AS).
- C. Copies of Agreements with Institutions (Joint and Articulated degrees) (required, if applicable)
- D. Justification for Exceeding Program Credit Lengths set in Policy (required, if applicable)
- E. Evidence of business/industry support (required for occupational programs, optional for others)
- F. Letters of Support (optional)

Description of how the new major relates to current majors.

The broad statistics major utilizes current courses in the statistics minor with one new statistics course (Stat 492). In addition, mathematics courses currently offered by the department for the non-teaching mathematics major are also used as part of the required core and options for the three tracks within the statistics major. Courses offered by the Department of Computer and Information Sciences and also the Department of Biological Sciences are also used in the core and within the three tracks.

College of Science, Engineering and Technology
Curriculum Committee Meeting Minutes
WA 303, Tuesday, October 31, 2006

Present: Harry Petersen (AMET), Beth Lavoie (Biology), Jim Rife (Chemistry/Geology), Gregg Asher (CIS), Julio Mandojana (ECET), Brian Wasserman (IDCM), Dan Singer (Math/Statistics), Karen Chou (ME/CivE), Youwen Xu (Physics/Astronomy), Mahbubur Syed (UCAP Representative for CSET).

Guests: David Haglin (CIS), Bill Hudson (ECET)

1. The meeting was called to order at 8:06 AM.
2. The minutes of 10-24-2006 meeting was approved as written.
3. Karen Chou thanked Jim Rife and Gregg Asher for chairing the 10-24-06 meeting.
4. David Haglin and Bill Hudson attended in order to clarify any confusion in the proposal CIS and ECET submitted. Bill Hudson also brought some of the previously required documentation to the committee for reviewing.
5. The committee reviewed 165 proposals. 164 proposals were approved contingent upon the required materials submitted in proper format. Please see attached spreadsheet for details. Proposal 07168 was tabled for insufficient of information.
3. Jim Rife left at 9 AM, and Beth Lavoie left at 9:20 AM, due to prior commitment.
4. Several members of the committee suggested UCAP to allow "Class action" for simple proposals such as change of designators or change of prerequisites. It would save the related parties a lot of work.
5. Two proposals were delivered to us yesterday (10-30-06) afternoon at 4 PM. Many committee members did not have a chance to review the proposal. They are general education proposals. We may vote on these proposals using email if possible.

Meeting adjourned at 9:50 am.

Respectfully submitted,

Youwen Xu, Secretary

