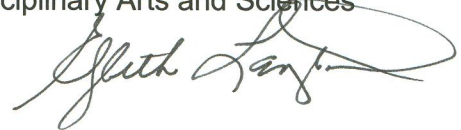


MEMORANDUM

To: Vice Provost John Hepburn

From: Elizabeth Langland, Dean, New College of Interdisciplinary Arts and Sciences

Date: September 8, 2010



RE: Proposal to establish the BS in Statistics

In response to your email of August 27<sup>th</sup> regarding New College's plan to institute a BS degree in Statistics, I can affirm unequivocally my support of the proposal and my commitment to provide any additional resources needed to launch the program. New College currently has two full professors in Statistics—Roger Berger, the director, and Connie Borrer—and we are capable of offering the curriculum now with no additional full-time faculty resources, and New College has the resources to hire a full-time lecturer and FAs, as necessary.

The reasons that I am both committed to and enthusiastic about this major are several. First this will be the first (and only) BS in Statistics in the State of Arizona. Second, AP enrollments in statistics have grown immensely, demonstrating interest among high school students who will be applying to college. Third, the *Wall Street Journal* recently put statistics among the top three areas in which there will be jobs in the next decade. And finally, in contrast to the majority of statistics majors that lead almost exclusively to graduate school, our major is designed so that it will also prepare graduates immediately for the job market. And these students will get jobs.

In conclusion, you also express concern about the other new programs planned for New College. In contrast to Statistics, these are all *interdisciplinary* majors, and thus they take advantage of faculty expertise that we already have and do not require new hires to launch. Should they be as successful as we hope they will be, then we will have the enrollment to support their continuing growth.

Please let me know if you need additional information.

**New College of Interdisciplinary Arts and Sciences  
Office of the Dean**



**ARIZONA STATE UNIVERSITY  
PROPOSAL TO ESTABLISH A NEW UNDERGRADUATE DEGREE**

This template is to be used only by programs that have received specific written approval from the Provost's office to proceed with internal proposal development and review. A separate proposal must be submitted for each individual new degree program.

**DEGREE PROGRAM INFORMATION**

**College/School(s) offering this degree:** New College of Interdisciplinary Arts and Sciences

**Unit(s) within college/school responsible for program:** Division of Mathematical and Natural Sciences

**If this is for an official joint degree program, list all units and colleges/schools that will be involved in offering the degree program and providing the necessary resources:**

**Proposed Degree Name:** BS in Statistics

**Undergraduate Degree Type:** BS-Bachelor of Science

**If Degree Type is Other, provide proposed degree type:**

**and proposed abbreviation:**

**Proposed title of major:** BS in Statistics

**Is a program fee required?** Yes  No

**Requested effective term: Spring and year:** 2011  
(The first semester and year for which students may begin applying to the program.)

**PROPOSAL CONTACT INFORMATION**

(Person to contact regarding this proposal)

**Name:** Roger L Berger

**Title:** Professor and Director

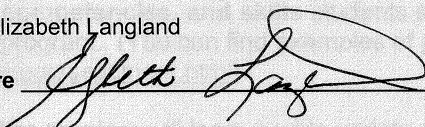
**Phone:** 602-543-8545

**email:** roger.berger@asu.edu

**DEAN APPROVAL**

This proposal has been approved by all necessary unit and College/School levels of review, and the College/School(s) has the resources to offer this degree program. I recommend implementation of the proposed degree program. *(Note: An electronic signature, an email from the dean or dean's designee, or a PDF of the signed signature page is acceptable.)*

**College Dean name:** Elizabeth Langland

**College Dean signature** 

**Date:** 7/19/10

**College Dean name:**  
(if more than one college involved)

**College Dean signature** \_\_\_\_\_

**Date:** \_\_\_\_\_

**ARIZONA STATE UNIVERSITY  
PROPOSAL TO ESTABLISH A NEW UNDERGRADUATE DEGREE**

This proposal template should be completed in full and submitted to the University Provost's Academic Council [<mailto:curriculum@asu.edu>]. It must undergo all internal university review and approval steps including those at the unit, college, and university levels. A program **may not** be implemented until the Provost's Office notifies the academic unit that the program may be offered.

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**DEGREE PROGRAM INFORMATION**

**Undergraduate:** BS-Bachelor of Science

**If Degree Type is Other, provide proposed degree type:  
and proposed abbreviation:**

**Proposed title of major:** BS in Statistics

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**1. PURPOSE AND NATURE OF PROGRAM**

- A. Brief program description** (This is a catalog type description of no more than 250 words. Include the distinctive features of the program that make it unique. Do not include program or admission requirements.)

The proposed BS degree in Statistics prepares students for entry level positions as statisticians and for graduate training in Statistics and related fields.

Statistics is the science of collection, description, analysis, and interpretation of data from experiments or surveys. Statisticians help to make decisions and solve problems in the face of uncertainty, using the limited data available from an experiment or survey. Because the use of statistical methods is common in all areas of business, government, and natural and social sciences, the demand for individuals with all levels of statistical training is great.

The program encompasses both theoretical and applied Statistics, as well as the requisite foundations in Mathematics and Computing. The emphasis is on the more practical and applied aspects of Statistics, matching the Division's current degrees in Applied Computing and Applied Mathematics. The program includes significant experience in the use of common professional statistical software and a capstone senior project, developed in conjunction with an outside industry or agency. The program requires coursework (beyond general studies) in a cognate discipline (e.g., social sciences, natural sciences, economics, finance) that makes significant use of statistical methods. Graduates of this program are equipped to utilize statistical techniques to explore interdisciplinary topics that span disciplines. These unique features emphasize the interdisciplinary nature of Statistics, support New College's interdisciplinary focus, and prepare graduates for employment as entry level statisticians or for graduate school.

**2. STUDENT LEARNING OUTCOMES AND ASSESSMENT**

- A. List the knowledge, competencies, and skills** students should have when they graduate from the proposed degree program. (You can find examples of program Learning Outcomes at <http://www.asu.edu/oue/assessment.html>)

Students in the Statistics program will learn a wide variety of applications of Statistics. They will also learn various analytical and computational techniques that are useful for real-world problems. The culmination of many courses and skills will be seen in the Senior Capstone course in which their work will be evaluated by an MNS grading committee and an external project sponsor.

Learning Outcome	Course Embedded Assessment	Capstone Course Project	Grading Committee/ Project Sponsor Evaluation
Demonstrate expertise in using statistics to solve real-world problems.	X	X	X
Conduct original research/problem-solving on a topic in statistics.	X	X	X
Apply analytical and computational skills from MNS courses in Capstone course project.	X	X	X
Demonstrate the ability to use statistical software to carry out statistical analyses.	X	X	
Understand a multitude of applications of statistics in the modern world.	X		
Demonstrate the ability to synthesize various statistical techniques and their applications and interpret the results.	X	X	X
Explain statistical methods and results clearly in written reports and oral presentations.	X	X	X

**B. Describe the plan and method to assess** whether students have achieved the knowledge, competencies and skills identified in the Learning Outcomes. (You can find examples of assessment methods at (<http://www.asu.edu/oue/assessment.html>))

Course Embedded Assessment – Each course in the BS degree in Statistics will specify a set of learning objectives that will be linked to the learning outcomes listed above. These learning objectives will be put into an assessment form in the context of the course material. The assessment will measure the learning outcomes above through the expected outcomes for the particular course. These forms will be created by a faculty committee and will be specific to each course (and not instructor dependent). We will use course embedded assessment (exams, assignments, and written and oral presentations) to assess students’ competence in the learning outcomes.

Capstone Course Project – The students’ work will be supervised by a faculty adviser with feedback given from the external project sponsor. The final product will be read by a committee of MNS faculty and the project sponsor, with constructive feedback given to the students.

Project Sponsor Evaluation – The Capstone Senior Course Project will involve an external project sponsor who will advise the student group and communicate with the MNS adviser. The feedback of the sponsor will help evaluate this group and improve future projects as well.

Program Assessment – We will conduct an exit survey of graduates to determine their job prospects and thoughts on the training they received. We will monitor the graduates after six and twelve months through e-mail surveys. This will allow us to see the placements of our graduates, determine whether our program fulfills the needs of our students, and may also create additional Capstone project sponsors.

### 3. CURRICULUM OF THE PROPOSED PROGRAM

Total credit hours must be 120 to include: first year composition, general studies, core/required courses, program specific electives, and any additional requirements.

**A. Major Map.** Please prepare and attach a Major Map. If there are concentrations in this degree program, prepare a separate Major Map for each one. (Examples of Major Maps can be found at <http://provost.asu.edu/curriculum>) Major map is attached.

**B. Total credit hours required for this program: 120**

**C. Core/Required Courses.**

- i. Total required and/or core course credit hours: **24**
- ii. List the name, prefix, and credit hours for each required/core class for this program:

\*\*\* Indicates a new course to be developed

**Statistics Courses (24 hours)**

STP 280 Probability and Statistics for Researchers (3 hours) \*\*\*

STP 281 Statistical Analysis for Researchers (3 hours) \*\*\*

STP 3XX Design and Analysis of Experiments (3 hours) \*\*\*

STP 3XX Applied Regression Analysis and Time Series (3 hours) \*\*\*

STP 3XX Statistical Computing (3 hours) \*\*\*

STP 421 Probability (3 hours)

STP 427 Mathematical Statistics (3 hours)

STP 4XX Senior Capstone Course (3 hours) \*\*\*

**D. Program Specific Electives.**

- i. Total required program elective credit hours: **6**
- ii. List the name, prefix, and credit hours for any program specific electives for this program:  
An additional 6 hours of electives from the following advanced Statistics courses.

**Statistics Electives (6 hours)**

Choose two from this group:

STP 425 Stochastic Processes (3 hours)

STP 4XX Quality Improvement (3 hours) \*\*\*

STP 4XX Categorical Data Analysis (3 hours) \*\*\*

STP 4XX Nonparametric Statistics (3 hours) \*\*\*

STP 4XX Multivariate Analysis (3 hours) \*\*\*

**E. Additional Program Requirements, if any:** List and describe any capstone experiences, milestone, and/or additional requirements for this degree program:

**Area of Focus (9 or more hours beyond courses used for general studies credit)**

To help guide the students' choice of courses, we are currently developing "tracks" that will suggest a coherent set of specific courses for students to take depending on their career goal. The fusion of the suggested courses in the respective tracks together with a Senior Capstone Project will successfully prepare the graduates of the Statistics program for work in their given field of application.

**Example Areas of Focus:** Mathematics, Computer Science, Chemistry, Physics, Biology, Engineering (any), Criminal Justice, Public Health, Business. Specific foci might be:

**Focus in Chemistry**

CHM 113 General Chemistry I (4 hours)

CHM 116 General Chemistry II (4 hours)

CHM 233 General Organic Chemistry I (3 hours)

**Focus in Mathematics**

In addition to the 15 hours of required MAT courses (see below):

MAT 243 Discrete Mathematical Structures (3 hours)

MAT 371 Advanced Calculus I (3 hours)

MAT 421 Applied Computational Methods (3 hours)

OR MAT 450 Mathematical Models in Biology (3 hours)

**Focus in Computer Science**

ACO 102 Principles of Computer Science (3 hours)

ACO 201 Data Structures and Algorithms (3 hours)

ACO 220 Introduction to Database Systems (3 hours)

**Major Pre-Requisites**

Students in this major must take the following pre-requisite courses:

**Mathematics Courses (15 hours)**

MAT 270 Calculus with Analytic Geometry I (4 hours)

MAT 271 Calculus with Analytic Geometry II (4 hours)

MAT 272 Calculus with Analytic Geometry III (4 hours)

MAT 343 Applied Linear Algebra (3 hours)

**Applied Computing Course (3 hours)**

ACO 101 Introduction to Computer Science (3 hours)

F. Are any concentrations to be established under this degree program?  Yes  No

i. If "Yes", please check one:

Students must select a concentration as part of this degree program

Concentrations are optional

ii. List courses & additional requirements for the proposed concentration(s): none

**4. NEW COURSE DEVELOPMENT**

A. Will a new course prefix(es) be required for this degree program?  Yes  No

If yes, complete the request for a new course prefix for each prefix and submit with this proposal.

B. **New Courses Required for Proposed Degree Program.** List all new courses required for this program, including course prefix, number and course description.

**Statistics Courses****STP 280 Probability and Statistics for Researchers (3 hours)**

Methods for data summary, numerical summary measures, probability concepts, discrete and continuous probability distributions, expected values, statistics, sampling distributions, point estimation, and introduction to statistical inference for a single parameter. Pre-requisite: MAT 251 or MAT 260 or MAT 265 or MAT 270.

**STP 281 Statistical Analysis for Researchers (3 hours)**

Confidence intervals, hypothesis testing, one and two-factor analysis of variance, simple linear regression, multiple regression, chi-square tests, and introduction to statistical quality control. Pre-requisite: STP 280.

**STP 3XX Design and Analysis of Experiments (3 hours)**

Factorial and nested designs, randomized designs, randomized complete block designs, Latin squares, fixed and random effects, expected mean squares, multiple comparisons, and analysis of covariance. Pre-requisite: STP 281.

**STP 3XX Applied Regression Analysis and Time Series (3 hours)**

Simple linear regression, multiple linear regression, indicator variables, influence diagnostics, stepwise selection, logistic regression, time series models, forecasting via exponential smoothing, evaluation of forecasts, autocorrelation, ARIMA models, and Box-Jenkins methods. Pre-requisite: STP 281.

**STP 3XX Statistical Computing (3 hours)**

Statistical techniques using a professional statistical programming language (e.g., SAS, R). Emphasis on correct methods, writing, and presentation of results. Pre-requisite: STP 281.

**Statistics Electives**

The courses in this section are not required, per se, for the degree program to be implemented. These elective courses will be developed as the program grows. These courses will have one or more STP 300-level courses as pre-requisites.

**STP 4XX Quality Improvement (3 hours)**

In-depth concentration on statistical process control for attribute and variables data, process capability analysis, and measurement systems analysis.

**STP 4XX Categorical Data Analysis (3 hours)**

Analysis of categorical data, contingency tables, goodness of fit tests, random sampling, and logistic regression.

**STP 4XX Nonparametric Statistics (3 hours)**

Statistical methods requiring relatively mild assumptions about the form of the population distribution. Hypothesis testing, point and interval estimation, and multiple comparison procedures for a variety of statistical problems.

**STA 4XX Multivariate Analysis (3 hours)**

Dimension reduction (principal components, factor analysis, and canonical correlation), clustering, and classification techniques.

**Senior Capstone Course (3 hours)**

**STP 4XX Senior Capstone Course (3 hours)**

Real-world experience for graduating seniors with focus on solution to a problem from an external sponsor (company, government agency, or non-profit organization). This is not an internship. This will be a team project with a defined scope of work, deliverables, oral presentation updates (and feedback from sponsor), and written midterm and final reports.

- 5. PROGRAM NEED.** Explain why the university needs to offer this program (include target audience and market).

Currently, there are no undergraduate degrees in Statistics offered in the state of Arizona. Some programs offer Mathematics degrees with a focus or concentration in Statistics. But these offer far less depth of education in Statistics than will the proposed degree. Arizona is the 14<sup>th</sup> largest state in terms of population and the only state in the top twenty without a bachelor's degree in Statistics.

Demand for continuous improvement and cost reduction in business, industry, and government (for example, Six Sigma and Lean initiatives) will require more in-depth statistical skills than are currently offered by any undergraduate program in the state of Arizona. Exponential increase in computing power and data collection capabilities has led to growth in demand for data analysis. The proposed degree in Statistics will provide necessary theory and practical skills for graduates to immediately apply in various fields and types of business and industry.

Twenty years ago, undergraduate degrees in Statistics were rare, but, according to the American Statistical Association, now 71 universities offer such degrees. The growth in programs is due to the demand for statisticians and to the fact that now students are learning about Statistics in high school, mainly through AP Statistics courses. The AP Statistics exam was first administered in 1997 to about 7,600 students, and the number of students taking the exam has grown by about 10% each year. In 2006, 2007, 2008, and 2009, the number of students taking the AP Statistics exam was 88,237, 98,033, 108,284, and 116,876, respectively. As a result, many high school graduates now have familiarity with Statistics and seek a degree in Statistics. As stated previously, despite this potential demand, there are no undergraduate degrees in Statistics offered in the state of Arizona.

This new degree supports the goals of Arizona State University. The senior project and the required coursework in other disciplines fulfills the interdisciplinary focus of New College. The senior project demonstrates the core values of community engagement and service. The whole curriculum supports the learning outcomes of developing mathematical skills, success in application of technical knowledge, and skill in the gathering and utilization of information to enhance knowledge. Because approximately one third of the required coursework for this degree is from the related fields of Mathematics and Applied Computing, this program supports the New College's goal of promoting interdisciplinary study. This interdisciplinary goal is further supported by the required 9 hours of advanced study in an Area of Focus.

- 6. IMPACT ON OTHER PROGRAMS.** List other academic units that might be impacted by the proposed program and describe the potential impact (e.g., how the implementation of this program might affect student headcount/enrollment, student recruitment, faculty participation, course content, etc. in other programs). Attach letters of collaboration/support from impacted programs.

The proposed program will have a positive impact on some graduate programs at ASU by providing a pool of potential graduate students highly trained in Statistics. The proposed program will have a positive impact on some undergraduate programs at ASU by providing classes that those students might take to fulfill requirements or electives in those programs. The proposed program does not duplicate any degree program in the state of Arizona; no university or college in Arizona offers any undergraduate degree in Statistics.

ASU offers MS and PhD degrees in Statistics. The proposed BS in Statistics will provide a pool of students with in depth training in Statistics who will be excellent candidates for these programs, should the students want to continue their education in graduate school. Some graduates from the proposed program will decide to pursue graduate degrees in other fields at ASU. Their course work in the Area of Focus will have led and prepared them to interests in specific applications of Statistics. We anticipate that these students with deep quantitative skills will be excellent candidates for other degree programs.

The undergraduate course offerings in Statistics at ASU will be greatly expanded when the proposed degree is offered. These courses will be available for enrollment for quantitatively oriented students in other degree programs. For example, we anticipate that some quantitatively oriented students in Mathematics, Applied Mathematics, Applied Math for the Life and Social Sciences, Psychology, Life Sciences, and Secondary Education (Mathematics concentration) will take new classes such as Applied Regression Analysis and Time Series or Design and Analysis of Experiments. Hence, the opportunities for these students will be expanded simply by the course offerings in the proposed degree.

The only potential negative impact on other programs that we foresee is that a few students who currently pursue the BS in Mathematics with a concentration in Statistics might be attracted to the new BS in Statistics because of its deeper focus and broader coverage of Statistics. We anticipate that the number of these students will be few, because most students will have other reasons for wanting to stay at the Tempe campus or West campus. On the positive side, the proposed BS in



Statistics might attract a few students from other universities and colleges in Arizona where only a BS in Mathematics with a concentration in Statistics is offered.

7. **PROJECTED ENROLLMENT.** How many new students do you anticipate enrolling in this program each year for the next five years? Please utilize the following tabular format.

<b>5-YEAR PROJECTED ANNUAL ENROLLMENT</b>					
	<b>1<sup>st</sup> Year</b>	<b>2<sup>nd</sup> Year</b> (Yr 1 continuing + new entering)	<b>3rd Year</b> (Yrs 1 & 2 continuing + new entering)	<b>4th Year</b> (Yrs 1, 2, 3 continuing + new entering)	<b>5th Year</b> (Yrs 1, 2, 3, 4 continuing + new entering)
Number of Students Majoring (Headcount)	<b>10</b>	<b>30</b>	<b>50</b>	<b>70</b>	<b>90</b>

8. **ACCREDITATION OR LICENSING REQUIREMENTS (if applicable).** Provide the names of the external agencies for accreditation, professional licensing, etc. that guide your curriculum for this program, if any. Describe any requirements for accreditation or licensing. None.

9. **FACULTY and STAFF**

- A. **Current Faculty.** List the name, rank, highest degree, area of specialization/expertise and estimate of level of involvement of all current faculty who will teach in the program.

<b>Name</b>	<b>Rank</b>	<b>Degree</b>	<b>Level of Involvement</b>
Roger Berger	Professor	Ph.D.	Director; will coordinate and oversee course implementation and assignments of courses; teach courses in statistics
Connie Borrer	Professor	Ph.D.	Teach courses in statistics; serve as capstone/independent research advisor
Erika Camacho	Assistant Professor	Ph.D.	Teach courses in applied mathematics
Theresa Devine	Assistant Professor	MFA	Teach courses in applied computing
Suzanne W. Dietrich	Associate Professor	Ph.D.	Teach courses in applied computing
Omayra Ortega	Assistant Professor	Ph.D.	Teach courses in applied mathematics and statistics; serve as capstone/independent research advisor
Yasin Silva	Assistant Professor	Ph.D.	Teach courses in applied computing
Haiyan Wang	Assistant Professor	Ph.D.	Teach courses in applied mathematics
Feng Wang	Assistant Professor	Ph.D.	Teach courses in applied computing
Stephen Wirkus	Associate Professor	Ph.D.	Teach courses in applied mathematics
Kuai Xu	Assistant Professor	Ph.D.	Teach courses in applied computing
Yuntao Zhu	Assistant Professor	Ph.D.	Teach courses in applied mathematics

- B. New Faculty.** Describe the new faculty hiring needed during the next three years to sustain the program. List the anticipated hiring schedule and financial sources for supporting the addition of these faculty.

The Division of Mathematical and Natural Sciences is well positioned to offer this new degree, because it has expertise in the related fields of Mathematics and Applied Computing, as well as in Statistics. Approximately 18 hours of required coursework for this degree consists of courses in Mathematics and Applied Computing offered by the Division. The Division currently offers BS degrees in Applied Computing and Applied Mathematics. By offering courses that are required by more than one of these degrees the Division achieves an efficiency in the utilization of faculty and classroom resources. More importantly, this atmosphere encourages students to explore interdisciplinary topics that span these disciplines.

Nevertheless, at least four full-time Statistics faculty will be needed to offer this program. Currently there are two Statisticians on our faculty (Berger and Borrer). Berger is currently Division Director, and currently has reduced teaching responsibilities. Ortega has a Masters in Public Health and might teach one or two of the lower level Statistics classes. Thus at least two more Statisticians will need to be hired. Because Berger and Borrer are both Full Professors, it would be appropriate to make these new hires at the Lecturer and Assistant Professor levels.

As the new program grows to full strength, the Statistics faculty should grow with it. Thus, the two new Statistics faculty should be hired in the Springs of 2011 and 2012.

Dean Langland, in her attached letter of support, affirms that this program may be fully implemented with reallocation of current resources. Nevertheless, this program does present the potential of new financial resources that can help support this new program. Some new funding should come from increased tuition from new students who will be attracted to this degree and will not need to go to another state to pursue a BS in Statistics. The College and Division should also benefit from increased tuition revenues from students in other programs attracted to classes offered in our new program and from our increased capacity to teach service courses in Statistics.

- C. Administration of the program.** Explain how the program will be administered for the purposes of admissions, advising, course offerings, etc. Discuss the available staff support.

The program will be administered by the Division of Mathematical and Natural Sciences in the New College of Interdisciplinary Arts and Sciences. Admissions will be handled by the usual ASU admissions procedures; there will be no special admission requirements for this program. Advising for this program will be provided by the advisers (currently two) in the Division. These advisers currently service the three majors in our Division; Applied Computing, Applied Mathematics, and Life Sciences. The advising for the new program will be added to their duties. Teaching schedules and course offerings by semester are determined by the Division Director in consultation with the Associate Director, faculty, and advisers. Technology support will be provided by ASU's UTO office and the New College technology support staff.

#### **10. RESOURCES (necessary to launch and sustain the program)**

- A.** Describe any new resources required for this program's success, such as new support staff, new facilities, new library resources, new technology resources, etc.

**New support staff:** The general office support needed by this new program will be provided by the current Division staff. Currently the Division has one Academic Success Coordinator and one Academic Success Specialist. They advise all the Division's majors in Applied Computing, Applied Mathematics, and Life Sciences. At the beginning they will be able to add the new Statistics major advising to their load. But it is anticipated that within a few years the growth of all four of these programs and other new programs that are in the planning stage will necessitate the hiring of another Academic Success Specialist.

**New facilities:** The Division's office space is currently full. The new faculty and staff will eventually require additional offices. There are currently vacant offices in the CLCC Building.

Most of the Statistics courses required by this new program will heavily use statistical software such as SAS, JMP, and R. A classroom that has computing facilities for 30-40 students will be required. This classroom must be structured like a traditional classroom where all students can be facing the board at all times, whether writing or using the computers. There should be sufficient space for students to have access to a computer and writing space simultaneously. This classroom should also have a computer with an LCD projector for the instructor's use. Many times students will need access to software during lecture. The student computer equipped classrooms on the West campus are currently sufficient for the new classes required by this new degree. However, growth of this new program may eventually require another classroom to be outfitted with student computers.

**New technology resources:** The Division currently operates an Applied Computing Lab and a Statistics Lab. The ACO Lab provides tutoring and computing facilities for Applied Computing majors. The Statistics Lab provides low level statistical software help for students in Statistics service courses. The Division is currently considering renovation of one or both of these labs so they can serve Applied Math and Statistics majors, also. This will enable our majors to do course-related work, e.g., homework and projects that involve extensive computer use and specialized software. Fortunately, currently the requisite software is covered by ASU licenses (e.g., SAS, SPSS, and MATLAB) or is open source (e.g., R), so no additional expense will be incurred in obtaining it. As the program develops, some specialized Statistics software may need to be purchased. In any case, some expense will be incurred in installing and maintaining all the software and in renovating the labs.

The senior capstone course will incur some expenses for supplies and travel.

**B. Explain where you will get the resources to support this program.**

Most of the financial resources for supporting this program will come from reallocation of New College funds. See Dean Langland's support letter. Other funds will come from increased tuition revenue from new students who will be attracted to this degree and will not need to go to another state to pursue a BS in Statistics. Under ASU's current licensing agreements, all SAS, Minitab, and SPSS software that students might need in STP courses is provided through MyApps. But, if in the future other specialized Statistics software is needed for some classes, course fees will be requested for courses that use this software and the software will be installed in the lab.

## Major Map: Statistics - Bachelor of Science (B. S.)

**Critical Requirements:** Students who follow the 2010-2011 catalog year and are entering ASU as either a first-time freshman or transfer from any Arizona public university or Arizona community college must complete critical requirements.

**School or College, Campus:** New College, West campus

**Catalog Year:** 2010-2011

Course Subject and Title	Critical Course	Hrs.	Completed ATP: ___ Yes ___ No			Completed AGEC: ___ Yes ___ No
			Upper Division	Transfer Course/Grade	Minimum Grade if Required	Additional Critical Requirements and/or Notes
<b>TERM ONE: 0-15 CREDIT HOURS</b>						
ASU 101 The ASU Experience	<input type="checkbox"/>	1	<input type="checkbox"/>			
MAT 270 Calculus w/Analytical Geometry I (MA)	<input type="checkbox"/>	4	<input type="checkbox"/>		Grade of C	
ACO 101 Intro to Computer Science (CS)	<input checked="" type="checkbox"/>	3	<input type="checkbox"/>		Grade of C	
ENG 101 or 102 First Year Composition OR ENG 105 Advanced First Year Composition OR ENG 107 or 108 English for Foreign Students	<input type="checkbox"/>	3	<input type="checkbox"/>			
Humanities, Fine Arts & Design (HU)	<input type="checkbox"/>	3	<input type="checkbox"/>			
<b>TERM TWO: 16-30 CREDIT HOURS</b>						
MAT 271 Calculus w/Analytical Geometry II	<input type="checkbox"/>	4	<input type="checkbox"/>		Grade of C	
STP 280 Probability & Statistics for Researchers	<input checked="" type="checkbox"/>	3	<input type="checkbox"/>		Grade of C	
ENG 101 or 102 First Year Composition OR ENG 105 Advanced First Year Composition OR ENG 107 or 108 English for Foreign Students	<input type="checkbox"/>	3	<input type="checkbox"/>			
Social & Behavioral Science (SB)	<input type="checkbox"/>	3	<input type="checkbox"/>			
Language & Cultures: Global Awareness (G)	<input type="checkbox"/>	3	<input type="checkbox"/>			or ACO 102
<b>TERM THREE: 31-45 CREDIT HOURS</b>						
MAT 272 Calculus w/Analytical Geometry III	<input type="checkbox"/>	4	<input type="checkbox"/>		Grade of C	
STP 281 Statistical Analysis for Researchers	<input checked="" type="checkbox"/>	3	<input type="checkbox"/>		Grade of C	
Natural Science - Quantitative (SQ)	<input type="checkbox"/>	4	<input type="checkbox"/>			
Humanities, Fine Arts & Design (HU)	<input type="checkbox"/>	3	<input type="checkbox"/>			
Social & Behavioral Science (SB)	<input type="checkbox"/>	3	<input type="checkbox"/>			
<b>TERM FOUR: 46-60 CREDIT HOURS</b>						
MAT 343 Applied Linear Algebra	<input type="checkbox"/>	3	<input checked="" type="checkbox"/>		Grade of C	
STP 3XX Design & Analysis of Experiments	<input checked="" type="checkbox"/>	3	<input checked="" type="checkbox"/>		Grade of C	
Natural Science - Quantitative (SQ) or General (SG)	<input type="checkbox"/>	4	<input type="checkbox"/>			
Language & Cultures: Global Awareness (G)	<input type="checkbox"/>	3	<input type="checkbox"/>			
Historical Awareness (H)	<input type="checkbox"/>	3	<input type="checkbox"/>			
<b>TERM FIVE: 61-75 CREDIT HOURS</b>						
STP 3XX Statistical Computing	<input type="checkbox"/>	3	<input checked="" type="checkbox"/>		Grade of C	
STP 421 Probability	<input type="checkbox"/>	3	<input checked="" type="checkbox"/>		Grade of C	
Language & Cultures: Cultural Diversity (C)	<input type="checkbox"/>	3	<input type="checkbox"/>			or Elective
Literacy and Critical Inquiry	<input type="checkbox"/>	3	<input type="checkbox"/>			
Social & Behavioral Science (SB) or Humanities (HU)	<input type="checkbox"/>	3	<input checked="" type="checkbox"/>			

TERM SIX: 76-90 CREDIT HOURS						
STP 3XX Applied Regression Analysis and Time Series	<input type="checkbox"/>	3	<input checked="" type="checkbox"/>		Grade of C	
STP 427 Mathematical Statistics	<input type="checkbox"/>	3	<input checked="" type="checkbox"/>		Grade of C	
Focus Course	<input type="checkbox"/>	3	<input type="checkbox"/>		Grade of C	
Language & Cultures: Global Awareness (G) OR Cultural Diversity (C) OR ACO 102	<input type="checkbox"/>	3	<input checked="" type="checkbox"/>			or Elective
Literacy and Critical Inquiry	<input type="checkbox"/>	3	<input checked="" type="checkbox"/>			
TERM SEVEN: 91-105 CREDIT HOURS						
STP 4XX Senior Capstone	<input type="checkbox"/>	3	<input checked="" type="checkbox"/>		Grade of C	
Statistics Elective	<input type="checkbox"/>	3	<input checked="" type="checkbox"/>		Grade of C	
Focus Course	<input type="checkbox"/>	3	<input type="checkbox"/>		Grade of C	
Elective	<input type="checkbox"/>	3	<input type="checkbox"/>			
Upper Division Elective	<input type="checkbox"/>	3	<input checked="" type="checkbox"/>			
	<input type="checkbox"/>		<input type="checkbox"/>			
	<input type="checkbox"/>		<input type="checkbox"/>			
TERM EIGHT: 106-120 CREDIT HOURS						
Statistics Elective	<input type="checkbox"/>	3	<input checked="" type="checkbox"/>		Grade of C	
Focus Course	<input type="checkbox"/>	3	<input type="checkbox"/>		Grade of C	
Upper Division Elective	<input type="checkbox"/>	3	<input checked="" type="checkbox"/>			
Upper Division Elective	<input type="checkbox"/>	3	<input checked="" type="checkbox"/>			
	<input type="checkbox"/>		<input type="checkbox"/>			
	<input type="checkbox"/>		<input type="checkbox"/>			
	<input type="checkbox"/>		<input type="checkbox"/>			

**Graduation Requirements Summary:**

Total Hours (120 minimum)	Total Hrs at ASU (30 hour minimum)	Hrs Resident Credit required for Academic Recognition (56)	Major GPA (2.000 minimum)	Total UD Hrs (45 minimum)	Total Community College Hrs. (64 maximum)
120					

**General University Requirements: Legend**

- General Studies Core Requirements:
  - Literacy and Critical Inquiry (L)
  - Mathematical Studies (MA)
  - Computer/Statistics/Quantitative applications (CS)
  - Humanities, Fine Arts, and Design (HU)
  - Social and Behavioral Sciences (SB)
  - Natural Science-Quantitative (SQ)
  - Natural Science-General (SG)
- General Studies Awareness Requirements
  - Cultural Diversity in the US (C)
  - Global Awareness (G)
  - Historical Awareness (H)
- First Year Composition

**Additional Notes:**

- There is room in this map to add a concurrent degree, minor, or certificate

**APPENDIX**  
**OPERATIONAL INFORMATION FOR UNDERGRADUATE PROGRAMS**  
(This information is used to populate the [Degree Search](#) /catalog website.)

**1. Contact and Support Information**

Office Location (Building & Room): CLCC 217

Campus Telephone Number: 602-543-6050

Program email address: mns@asu.edu

Program website address: <http://newcollege.asu.edu/mns/>

**2. Additional Program Description Information**

A. Additional program fee required for this program? Yes  No

B. Does this program have a second language requirement? Yes  No

**3. Career Opportunities & Concentrations** Provide a brief description of career opportunities available for this degree program. If program will have concentrations, provide a brief description for each concentration.

Statisticians are in demand in many areas of industry, government, and academia. Some areas with particularly high demand include pharmaceutical, medical, manufacturing, and financial jobs.

**4. Additional Admission Requirements** If applicable list any admission requirements (freshman and/or transfer) that are higher than and/or in addition to the university minimum undergraduate admission requirements.)

**5. Keywords** List all keywords used to search for this program. Keywords should be specific to the proposed program.  
statistics, statistician, biostatistics, biostatistician, analyst, data, mathematics, mathematical science

**6. Area(s) of Interest**

A. Select one (1) primary Area of Interest from the list below that applies to this program.

- |   |  |
|---|--|
| <input type="checkbox"/> Architecture, Construction & Design    | <input type="checkbox"/> Engineering & Technology            |
| <input type="checkbox"/> Artistic Expression & Performance      | <input type="checkbox"/> Environmental Issues & Physical Sci |
| <input type="checkbox"/> Biological Sciences, Health & Wellness | <input type="checkbox"/> Interdisciplinary Studies           |
| <input type="checkbox"/> Business, Management & Economics       | <input type="checkbox"/> Languages & Cultures                |
| <input type="checkbox"/> Communication & Media                  | <input type="checkbox"/> Law & Justice                       |
| <input checked="" type="checkbox"/> Computing & Mathematics     | <input type="checkbox"/> Social Science, Policies & Issues   |
| <input type="checkbox"/> Education & Teaching                   |  |

B. Select any additional Areas of Interest that apply to this program from the list below.

- |  |   |
|--|---|
| <input type="checkbox"/> Architecture, Construction & Design               | <input type="checkbox"/> Education & Teaching                           |
| <input type="checkbox"/> Artistic Expression & Performance                 | <input checked="" type="checkbox"/> Environmental Issues & Physical Sci |
| <input checked="" type="checkbox"/> Biological Sciences, Health & Wellness | <input checked="" type="checkbox"/> Engineering & Technology            |
| <input checked="" type="checkbox"/> Business, Management & Economics       | <input checked="" type="checkbox"/> Interdisciplinary Studies           |
| <input type="checkbox"/> Communication & Media                             | <input type="checkbox"/> Languages & Cultures                           |
| <input type="checkbox"/> Computing & Mathematics                           | <input type="checkbox"/> Law & Justice                                  |

Social Science, Policies & Issues

CIP Code: \_\_\_\_\_  
(To be determined by the Office of the Executive Vice President  
and the Provost of the University)

COVER SHEET



## **Impact Statements about Proposed BS in Statistics**

Following are statements from:

Dennis Young, co-Chair of Committee on Statistics

Wayne Raskind, Director of School of Mathematical and Statistical Sciences

Carlos Castillo-Chavez, Director of program in Applied Mathematics in the Life and Social Sciences in the School of Human Evolution and Social Change

## Roger Berger

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**From:** Dennis Young [dennis.young@asu.edu]  
**Sent:** Tuesday, March 02, 2010 12:53 PM  
**To:** Roger Berger  
**Cc:** Dennis Young  
**Subject:** Re: BS in Statistics

Roger:

I want to offer my support and the support of the members of the Committee on Statistics for your proposal for a BS in Statistics. The proposed program would be a strong one and would be in line with undergraduate programs in statistics being offered at other universities across the country. Of special note is the proposal that students have a cognate area and that all students complete a senior capstone project. This program will prepare students for a position in business, industry or government, or for future studies at the graduate level in statistics or another field in which statistics plays a vital role. We look forward to having these students in our classes and to having them consider participating in our graduate statistics programs in the future.

Dennis

At 2/19/2010 03:19 PM, you wrote:

>Dennis

>

>Attached is our request for permission to implement a new BS degree  
>program in Statistics. As you know, we have been working on this  
>for a few years. Finally I think we are close to completion.

>

>This degree may provide some good candidates for MS and PhD programs  
>in Statistics. As Director of the COS, please send me your comments  
>(and hopefully support) for this new degree. These comments will be  
>included with our final submission.

>

>As you know, this would be the first BS in Statistics in Arizona.

>

>Thanks.

>

>Roger

>

>

>

Dennis L. Young, Co-Director  
Graduate Statistics Programs  
Committee on Statistics  
School of Mathematical and Statistical Sciences  
Arizona State University  
Tempe, AZ 85287-1804

=====

Office: (480)-965-5003

FAX: (480)-965-8119

Personal WWW: <http://mathstat.asu.edu/~young/young.html>

MS Program: (480)-965-2671

MS Program WWW: <http://www.asu.edu/graduate/statistics/>

Ph.D. Program: (480)-965-3953

Ph.D. Program WWW: <http://math.asu.edu/grad/grad-prog.html>

## Roger Berger

---

**From:** Wayne Raskind  
**Sent:** Thursday, March 11, 2010 10:18 AM  
**To:** Roger Berger  
**Subject:** RE: BS in Statistics

Roger,

Thanks for your message and sorry for the delay in response. I discussed it with Sharon and Dennis and thought I had responded, but see that I did not. We are pleased to support this degree with no reservations.

Best wishes,  
Wayne

-----Original Message-----

**From:** Roger Berger  
**Sent:** Thursday, March 11, 2010 8:54 AM  
**To:** Wayne Raskind  
**Cc:** Roger Berger  
**Subject:** FW: BS in Statistics

Wayne

A few weeks ago I requested your comments (and hopefully support) for a new BS degree in Statistics that we are proposing (see attached). Please let me know if you will be able to send comments in the near future. I did receive a nice email of support from Dennis Young on behalf of the Committee on Statistics

Thank you.

Roger

-----Original Message-----

**From:** Roger Berger  
**Sent:** Friday, February 19, 2010 3:25 PM  
**To:** Wayne Raskind  
**Cc:** Roger Berger  
**Subject:** BS in Statistics

Wayne

Attached is our request for permission to implement a new BS degree program in Statistics. As you know, we have been working on this for a few years. Finally I think we are close to completion.

This degree may provide some good candidates for MS and PhD programs in Statistics. It may impact SoMSS in other lesser ways. As Director of SoMSS, please send me your comments (and hopefully support) for this new degree. These comments will be included with our final submission.

As you know, this would be the first BS in Statistics in Arizona.

Thanks.

Roger

## Roger Berger

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**From:** chavez@math.asu.edu  
**Sent:** Thursday, March 11, 2010 11:34 AM  
**To:** Roger Berger  
**Cc:** Carlos Castillo-Chavez  
**Subject:** Re: BS in Statistics

Sorry sorry I have been lobbying in DC. I am good and love your efforts  
Sent from my Verizon Wireless BlackBerry

-----Original Message-----

From: Roger Berger <Roger.Berger@asu.edu>  
Date: Thu, 11 Mar 2010 08:51:57  
To: <chavez@math.asu.edu>  
Subject: FW: BS in Statistics

Carlos

A few weeks ago I requested your comments (and hopefully support) for a new BS degree in Statistics that we are proposing (see attached). Please let me know if you will be able to send comments in the near future,

Thank you.

Roger

-----Original Message-----

From: Roger Berger  
Sent: Friday, February 19, 2010 3:23 PM  
To: Carlos Castillo-Chavez  
Cc: Roger Berger  
Subject: BS in Statistics

Carlos

Attached is our request for permission to implement a new BS degree program in Statistics. As you know, we have been working on this for a few years. Finally I think we are close to completion.

This degree may provide some good candidates for the PhD programs in AMLSS. As Director of AMLSS, please send me your comments (and hopefully support) for this new degree. These comments will be included with our final submission.

As you know, this would be the first BS in Statistics in Arizona.

Thanks.

Roger