School of Applied Arts and Sciences
ARIZONA STATE UNIVERSITY

Social and Behavioral Sciences
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October 29, 2008

TO: The General Studies Council

FROM: Nicholas Alozie
Head, Social and Behavioral Sciences

RE: STS Courses Submitted for General Studies Review

Earlier this year the ABOR approved the B.S. degree program in Science, Technology, and Society for the Polytechnic campus (see attached memorandum from Provost Capaldi). Science, Technology, and Society (STS) is a social science discipline that investigates the interrelationship of science/technology and human systems. Typically, issues concerning the impact of science/technology on globalization, reproductive technology and human values, information technology and human relations, and science/technology and public policy and governance all come under the general domain of studies in STS. All of the STS courses included in this review are *required* to support this new degree program. These courses have all gone through the ACRES process and have received final approval (see attached front sheet from ACRES).

ARIZONA STATE UNIVERSITY

March 28, 2008

TO: David Schwalm, Dean
School of Applied Arts and Sciences

FROM: Elizabeth D. Capaldi
Executive Vice President and Provost of the University

SUBJECT: B.S. in Science, Technology, and Society

This is to notify you that on March 25, 2008, the Academic Affairs Committee of the Board of Regents approved the request for authorization to implement the B.S. in Science, Technology, and Society.

You may proceed to implement the proposal effective immediately. The following plan code has been established in OASIS, effective fall 2008: ECSTSBS

XC: Maria Allison
Bridgot Allcott
Jill Andrews
Nancy Dickson
Melinda Gebel
Jennifer Glawson
Heather Hoffart
Cecilia Hook
Glenn Irvin
Nancy Kiernan
Phyllis Lucie
Linda Pedersen
Julie Ramsden
Adrian Sannier
Gini Sater
David Young
Nicholas Alozie
Lisa Frank

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New Course Curriculum Form

Arizona State University

E STS 401 Statistics in Science and Technology Studies 3.0 - Spring 2009 | CL: None

Originator: Silvia Llamas-Flores **Status:** Approved **Department:** Social and Behavioral Sciences (Polytechnic)

Date Created: 05/08/2008 **Submitted:** 05/14/2008 **Completed:** 10/21/2008 **To ACETS:**

Campus: E

College: Applied Arts and Sciences

Subject: STS

Number: 401

Title: Statistics in Science and Technology Studies

Abbreviated title: Stat in Sci and Tech Studies

Semester hours: 3.0

Effective semester: - Spring

Summer justification: N/A

Effective year: 2009

Catalog description: Introduces statistical techniques for the social sciences, including the role and rationale of statistics, descriptive measures, associational measures and inferential statistics.

Primary component: Lecture

Graded component: *Same as primary component

Additional component(s):

Optional component(s):

Cross-listing: | CL: None

Cross-listed course (s):

Enrollment Requirements?: Yes

Prerequisite(s): STS 301 or instructor approval

Conditional prerequisite(s):

Corequisite(s):

Pre-/corequisite(s):

Repeat for credit: No

Total hours allowed:

Total completions allowed:

ARIZONA STATE UNIVERSITY EAST/TEMPE CAMPUS

GENERAL STUDIES PROGRAM COURSE PROPOSAL COVER FORM

Courses submitted to the GSC between 2/1 and 4/30 if approved, will be effective the following Spring.

Courses submitted between 5/1 and 1/31 if approved, will be effective the following Fall.

(SUBMISSION VIA ADOBE.PDF FILES IS PREFERRED)

DATE 10/31/2008

1. ACADEMIC UNIT: ASUP SOCIAL AND BEHAVIORAL SCIENCES

2. COURSE PROPOSED: STS 401 Statistics in Science and Technology Studies (3)
(prefix) (number) (title) (semester hours)

3. CONTACT PERSON: Name: Sherrie Loomis Phone: 480/727-1984
Mail Code: 0180 E-Mail: sherrie.loomis@asu.edu

4. ELIGIBILITY: New courses must be approved by the Tempe Campus Curriculum Subcommittee and must have a regular course number. For the rules governing approval of omnibus courses, contact the General Studies Program Office at 965–0739.

5. AREA(S) PROPOSED COURSE WILL SERVE. A single course may be proposed for more than one core or awareness area. A course may satisfy a core area requirement and more than one awareness area requirements concurrently, but may not satisfy requirements in two core areas simultaneously, even if approved for those areas. With departmental consent, an approved General Studies course may be counted toward both the General Studies requirement and the major program of study.

Core Areas

Literacy and Critical Inquiry–L ☐
Mathematical Studies–MA ☐ CS ☒
Humanities and Fine Arts–HU ☐
Social and Behavioral Sciences–SB ☐
Natural Sciences–SQ ☐ SG ☐

Awareness Areas

Global Awareness–G ☐
Historical Awareness–H ☐
Cultural Diversity in the United States–C ☐
(Note: **one course per form**)

6. DOCUMENTATION REQUIRED.
(1) Course Description
(2) Course Syllabus
(3) Criteria Checklist for the area
(4) Table of Contents from the textbook used, if available

7. ***In the space provided below (or on a separate sheet), please also provide a description of how the course meets the specific criteria in the area for which the course is being proposed.***

CROSS-LISTED COURSES: ☒ No ☐ Yes; Please identify courses: _____

Is this a multisection course?: ☒ No ☐ Yes; Is it governed by a common syllabus? _____

NICHOLAS ALOZIE
Chair/Director (Print or Type)

Chair/Director (Signature)

Date: 10/29/2008

Rev. 1/94, 4/95, 7/98, 4/00, 1/02

Syllabus

Arizona State University Polytechnic Campus
School of Applied Arts and Sciences
Social and Behavioral Sciences

STS 401 Statistics in Science and Technology Studies

Fall, 2008
Schedule Line Number:

Satisfies General Studies:

Venue: Santa Catalina Hall 133
Time: 2:00PM – 3:15PM
Days: Monday and Wednesday
Meeting Dates: 8/25/2008 – 12/9/2008
Class Format: Lecture/Discussion

Professor: Dr. Nicholas Alozie
Office: Santa Catalina (SANCA) 252M
Tel.: (480) 727-1395
E-Mail: Alozie@asu.edu

Office Hours: Mondays & Wednesdays
12:00pm-1:30pm, and by appointment.

Course Description:

This course presents statistical techniques for the social sciences, including the role and rationale of statistics, descriptive measures, associational measures and inferential statistics. It is designed to provide junior/senior-level students with a working set of basic statistical tools. The curriculum contains three main components: (1) descriptive statistics; (2) inferential statistics; and (3) applied statistical techniques. Descriptive statistics allow students to summarize and describe quantitative data using concepts such as central tendency and dispersion. Inferential statistics allow students to make estimates about a population based on a smaller subset of the population (a sample) by applying the basic rules of probability. Applied statistical techniques assist students to create, understand, and interpret analytic tools such as contingency tables, correlations, and regressions. These techniques are applied in undergraduate classes, graduate programs, and professional practice.

The following topics will be treated in the course: How We Reason; Levels of Measurement and Forms of Data; Defining Variables; Measuring Central Tendency; Measuring Dispersion; Constructing and Interpreting; Contingency Tables; Statistical Inference and Tests of Significance; Probability Distributions and One-Sample *z* and *t* Tests; Two-Sample *t* Tests; One-Way Analysis of Variance (ANOVA); Measuring Association in Contingency Tables; The Chi-Square Test; Correlation; and Regression Analysis.

Course Learning Goals:

- Development of a strong conceptual understanding of basic descriptive and inferential statistical techniques

- Ability to compute descriptive statistical measures using a calculator
- Knowledge of the measurement criteria associated with use of different statistical measures
- Ability to properly interpret statistical results

Required Materials:

R. Mark Sirkin (2006), *Statistics for the Social Sciences* (*3rd edition*), Thousand Oaks: Sage.

Access to a statistical analysis software package. Recommended packages are SPSS, Excel, or SAS. The course and text will include references to SPSS and Excel.

A relatively simple calculator. You will benefit from having a calculator available to you. Although the sophisticated computer programs listed above are available to assist with extensive calculations, you are expected to master basic skills that require some computation.

Grading:

Quiz (weekly) = Variable points each.

Final = 150 points.

Participation (extra-credit enrichment) = 5 points each.

Assuming 10 quizzes worth an average of 20 points each, grades will be allocated in accordance with the schedule below:

A+=98-100%=348-355 points
A=93-97%=330-344 points
A-=90-92%=320-327 points
B+=88-89%=312-316 points
B=83-87%=295-309 points
B-=80-82%=284-291 points
C+=78-79%=277-280 points
C=70-77%=249-273 points
D=60-69%=213-245 points
E=59% or less=209 points or less

The instructor will exercise discretion in grading only in cases where the point total falls within the "gap" between grading categories. As always, the benefit of any doubt will be given to those who participate and consistently seek to achieve the goals of the course.

Criteria for Grading:

An "A" grade means that a student is doing outstanding or excellent work. The student hands-in all of the course assignments on time and demonstrates a thorough grasp of the material. To receive an "A" grade a student must go well above and beyond the basic expectations for the course.

A "B" grade means that a student is doing above average work. The student hands-in all of the course assignments and demonstrates a strong grasp of the material.

A "C" grade means that a student is doing at least satisfactory work, and is meeting the minimum requirements for the course. The student hands-in all of the course assignments and demonstrates a basic level of understanding of the course concepts.

A "D" or "E" grade means that a student is doing unacceptable work, demonstrating a lack of understanding of course concepts.

The Course will be graded using "+" and "-."

Grades demonstrate that you have mastered the material. If you are having problems in statistics, please do not let them slide until the end of class. Frequent practice applying statistical concepts is helpful in understanding them.

Topical Outline:
Unit 1: How We Reason
Unit 2: Levels of Measurement and Forms of Data
Unit 3: Defining Variables
Unit 4: Measuring Central Tendency
Unit 5: Measuring Dispersion
Unit 6: Constructing and Interpreting Contingency Tables
Unit 7: Statistical Inference and Tests of Significance
Unit 8: Probability Distributions and One-Sample *z* and *t* Tests
Unit 9: Two-Sample *t* Tests
Unit 10: One-Way Analysis of Variance (ANOVA)
Unit 11: Measuring Association in Contingency Tables
Unit 12: The Chi-Square Test
Unit 13: Correlation
Unit 14: Regression Analysis
Unit 15: Review
Unit 16: Reading Day

ADA Statement:
The Americans with Disabilities Act (ADA) is a federal antidiscrimination statute that provides comprehensive civil rights protection for persons with disabilities. One element of this legislation requires that all qualified students with documented disabilities be guaranteed a learning environment that provides reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation please contact the Disability Resource Center at ASU Polytechnic located in Student Affairs Quad #4 or call 480-727-1039/TTY 480-

727-1009. Eligibility and documentation policies online at http://www.asu.edu/studentaffairs/ed/drc

Student Academic Integrity: Students are required to adhere to the policy on student conduct identified in the ASU Student Academic Integrity Policy (http://www.asu.edu/studentaffairs/studentlife/judicial/academic_integrity.htm) and the Arizona Board of Regents Policy Manual (http://www.abor.asu.edu/1_the_regents/policymanual/chap5/chapter_v.htm#C.%20CODE%20)

Arizona State University Criteria Checklist for

MATHEMATICAL STUDIES [CS]

Rationale and Objectives

The **Mathematical Studies** requirement is intended to ensure that students have skill in basic mathematics, can use mathematical analysis in their chosen fields, and can understand how computers can make mathematical analysis more powerful and efficient. The **Mathematical Studies** requirement is completed by satisfying both the **Mathematics [MA]** requirement and the **Computer/Statistics/Quantitative Applications [CS]** requirement explained below.

The **Mathematics [MA]** requirement, which ensures the acquisition of essential skill in basic mathematics, requires the student to complete a course in College Mathematics, College Algebra, or Precalculus, or demonstrate a higher level of skill by completing a mathematics course for which any of the first three courses in a prerequisite.

The **Computer/Statistics/Quantitative Applications [CS]** requirement, which ensures skill in real world problem solving and analysis, requires the student to complete a course that uses some combination of computers, statistics, and mathematics.

Approved: Feb. 2000

Proposer: Please complete the following section and attach appropriate documentation.

ASU--[CS] CRITERIA

A COMPUTER/STATISTICS/QUANTITATIVE APPLICATIONS [CS] COURSE MUST SATISFY ONE OF THE FOLLOWING CRITERIA: 1, 2, OR 3

YES	NO		Identify Documentation Submitted
		1. Computer applications*: courses must satisfy both **a** and **b**:	
X		**a.** Course involves the use of computer programming languages or software programs for quantitative analysis, modeling, simulation, animation, or statistics.	Syllabus
		b. Course requires students to analyze and implement procedures that are applicable to at least one of the following problem domains **(check those applicable)**:	
X	☐	**i.** Spreadsheet analysis, systems analysis and design, and decision support systems.	Syllabus
X	☐	**ii.** Graphic/artistic design using computers.	Syllabus
☐	☐	**iii.** Music design using computer software.	
X	☐	**iv.** Modeling, making extensive use of computer simulation.	Syllabus
X	☐	**v.** Statistics studies stressing the use of computer software.	Syllabus

*The **computer applications** requirement **cannot** be satisfied by a course, the content of which is restricted primarily to word processing or report preparation skills; learning a computer language or a computer software package; or the study of the social impact of computers. Courses that emphasize the use of a computer software package or the learning of a computer programming language are acceptable, provided that students are required to understand, at an appropriate level, **the theoretical principles embodied in the operation of the software and are required to construct, test, and implement procedures that use the software to accomplish tasks in the applicable problem domains.**

		2. Statistical applications: courses must satisfy both **a** and **b**.	
X	☐	**a.** Course has a minimum mathematical prerequisite of College Mathematics, College Algebra, or Precalculus, or a course already approved as satisfying the MA requirement.	Syllabus
		b. The course must be focused principally on developing knowledge in statistical inference and include coverage of all of the following:	

ASU--[CS] CRITERIA			
YES	**NO**		**Identify Documentation Submitted**
X	☐	**i.** Design of a statistical study.	Syllabus
X	☐	**ii.** Summarization and interpretation of data.	Syllabus
X	☐	**iii.** Methods of sampling.	Syllabus
X	☐	**iv.** Standard probability models.	Syllabus
X	☐	**v.** Statistical estimation	Syllabus
X	☐	**vi.** Hypothesis testing.	Syllabus
X	☐	**vii.** Regression or correlation analysis.	Syllabus
		3. Quantitative applications: courses must satisfy both **a** and **b.**	
X	☐	**a.** Course has a minimum mathematical prerequisite of College Mathematics, College Algebra, or Precalculus, or a course already approved as satisfying the MA requirement.	Syllabus
		b. The course must be focused principally on the use of mathematical models in quantitative analysis and design making. Examples of such models are:	
X	☐	**i.** Linear programming.	Syllabus
☐	☐	**ii.** Goal programming.	
☐	☐	**iii.** Integer programming.	

ASU--[CS] CRITERIA			
YES	**NO**		**Identify Documentation Submitted**
X	☐	**iv.** Inventory models.	Syllabus
X	☐	**v.** Decision theory.	Syllabus
X	☐	**vi.** Simulation and Monte Carlo methods.	Syllabus
☐	☐	**vii.** Other (explanation must be attached)	

Course Prefix	Number	Title	Designation
STS	401	STATISTICS IN SCIENCE AND TECHNOLOGY STUDIES	**CS**

Explain in detail which student activities correspond to the specific designation criteria. Please use the following organizer to explain how the criteria are being met.

Criteria (from checksheet)	How course meets spirit (contextualize specific examples in next column)	Please provide detailed evidence of how course meets criteria (i.e., where in syllabus)
1a,b (i, ii, iv, v)	This course presents statistical techniques for the social sciences, including the role and rationale of statistics, descriptive measures, associational measures and inferential statistics. It is designed to provide junior/senior-level students with a working set of basic statistical tools. The curriculum contains three main components: (1) descriptive statistics; (2) inferential statistics; and (3) applied statistical techniques. Descriptive statistics allow students to summarize and describe quantitative data using concepts such as central tendency and dispersion. Inferential statistics allow students to make estimates about a population based on a smaller subset of the population (a sample) by applying the basic rules of probability. Applied statistical techniques assist students to create, understand, and interpret analytic tools such as contingency tables, correlations, and regressions. These techniques are applied in undergraduate classes, graduate programs, and professional practice. **The following topics will be treated in the course:** How We Reason; Levels of Measurement and Forms of Data; Defining Variables; Measuring Central Tendency; Measuring Dispersion; Constructing and Interpreting; Contingency Tables; Statistical Inference and Tests of Significance;	As the syllabus indicates, this course involves the use of computer to create spreadsheets, and write programs that allow students to create data sets and analyze those date sets with a view to reaching decisions about the phenomena represented by the data. The computer software included in the course is listed on page 2 of the syllabus. They include: SPSS, SAS, and Excel. These spreadsheets not only allow students to design and analyze decisions support systems, they also allow graphic articulation, modeling and simulation, and other design systems using the computer as a platform. This, of course, requires extensive training of the students in the theoretical principles embodied in the operation of these software with regard to construction, testing and implementation procedures that are required to accomplish tasks that allow for these domains.

	Probability Distributions and One-Sample *z* and *t* Tests; Two-Sample *t* Tests; One-Way Analysis of Variance (ANOVA); Measuring Association in Contingency Tables; The Chi-Square Test; Correlation; and Regression Analysis.	
2a, b (i, ii, iii, iv, v, vi, vii)	**The following learning outcomes are expected in the course:** • Development of a strong conceptual understanding of basic descriptive and inferential statistical techniques • Ability to compute descriptive statistical measures using a calculator • Knowledge of the measurement criteria associated with use of different statistical measures • Ability to properly interpret statistical results These learning outcomes are associated with the topical outlines listed on page 3 of the syllabus.	As the syllabus shows on page 3, students are expected to complete 14 instructional units. These units include all of the criteria listed in this section, including design of statistical studies, summarization and interpretation of data, methods of sampling, standard probability modeling, statistical estimation, hypothesis testing, and regression and correlation analysis. In other words, this is a generic and mainstream social science statistics course.
3a, b (i, iv, v, vi)	This course focuses principally on the use of mathematical models in quantitative analysis and decision-making using the kinds of linear, curve linear, decision theory, and simulation and Monte Carlo methods routinely applied in the social sciences. Of course, these are used primarily in multivariate modeling environments.	As the syllabus shows, these models will include both measures of central tendency and measures of dispersion, ANOVA, regression, t- and Chi-square distributions.