



**ARIZONA STATE UNIVERSITY  
GENERAL STUDIES COURSE PROPOSAL COVER FORM**

**Course information:**

Copy and paste **current** course information from Class Search/Course Catalog.

Academic Unit College of Letters and Sciences Department Sciences and Mathematics

Subject ABS Number 350 Title Applied Statistics Units: 3

Is this a cross-listed course? No  
If yes, please identify course(s) \_\_\_\_\_

Is this a shared course? No If so, list all academic units offering this course \_\_\_\_\_

Course description:  
Statistical methods with applications in the biological sciences and natural resource management. Uses computers and the Internet.

**Requested designation:** Mathematical Studies-CS

Note- a **separate** proposal is required for each designation requested

**Eligibility:**

Permanent numbered courses must have completed the university's review and approval process.  
For the rules governing approval of omnibus courses, contact [Phyllis.Lucie@asu.edu](mailto:Phyllis.Lucie@asu.edu) or [Lauren.Leo@asu.edu](mailto:Lauren.Leo@asu.edu).

**Submission deadlines dates are as follow:**

For Fall 2015 Effective Date: October 9, 2014

For Spring 2016 Effective Date: March 19, 2015

**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.

**Checklists for general studies designations:**

Complete and attach the appropriate checklist

- Literacy and Critical Inquiry core courses (L)
- Mathematics core courses (MA)
- Computer/statistics/quantitative applications core courses (CS)
- Humanities, Arts and Design core courses (HU)
- Social-Behavioral Sciences core courses (SB)
- Natural Sciences core courses (SO/SG)
- Cultural Diversity in the United States courses (C)
- Global Awareness courses (G)
- Historical Awareness courses (H)

**A complete proposal should include:**

- Signed General Studies Program Course Proposal Cover Form
- Criteria Checklist for the area
- Course Catalog description
- Course Syllabus
- Copy of Table of Contents from the textbook and list of required readings/books **No Text**

**Respectfully request that proposals are submitted electronically with all files compiled into one PDF. If necessary, a hard copy of the proposal will be accepted.**

**Contact information:**

Name Chris Martin Phone 7-1247

Mail code 2780 E-mail: Chris.Martin@asu.edu

**Department Chair/Director approval: (Required)**

Chair/Director name (Typed): Chris Martin Date: February 9, 2015

Chair/Director (Signature): 

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 Pre-calculus; or demonstrate a higher level of skill by completing a mathematics course for which a course in the above three categories is 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/or mathematics.\* Computer usage is encouraged but not required in statistics and quantitative applications courses. At a minimum, such courses should include multiple demonstrations of how computers can be used to perform the analyses more efficiently.

\*CS does *not* stand for computer science in this context; the “S” stands for statistics. Courses in computer science must meet the criteria stated for CS courses.

Revised April 2014

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

<b>ASU--[CS] CRITERIA</b>			
<b>A COMPUTER/STATISTICS/QUANTITATIVE APPLICATIONS [CS] COURSE MUST SATISFY ONE OF THE FOLLOWING CRITERIA: 1, 2, OR 3</b>			
YES	NO		Identify Documentation Submitted
		<b>1. Computer applications*:</b> courses must satisfy both a and b:	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	a. Course involves the use of computer programming languages or software programs for quantitative analysis, algorithmic design, modeling, simulation, animation, or statistics.	See Syllabus
		<b>b. Course requires students to analyze and implement procedures that are applicable to at least one of the following problem domains (check those applicable):</b>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	i. Spreadsheet analysis, systems analysis and design, and decision support systems.	See Syllabus
<input type="checkbox"/>	<input type="checkbox"/>	ii. Graphic/artistic design using computers.	
<input type="checkbox"/>	<input type="checkbox"/>	iii. Music design using computer software.	
<input type="checkbox"/>	<input type="checkbox"/>	iv. Modeling, making extensive use of computer simulation.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	v. Statistics studies stressing the use of computer software.	See Syllabus
<input type="checkbox"/>	<input type="checkbox"/>	vi. Algorithmic design and computational thinking.	
<p>*The <b>computer applications</b> requirement <b>cannot</b> be satisfied by a course, the content of which is restricted primarily to word processing or report preparation skills, the study of the social impact of computers, or methodologies to select software packages for specific applications. Courses that emphasize the use of a computer software package are acceptable only if 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. Courses that involve the learning of a computer programming language are acceptable only if they also include a substantial introduction to applications to one of the listed problem domains.</p>			

YES	NO		Identify Documentation Submitted
		<b>2. Statistical applications: courses must satisfy a, b, and c.</b>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>a. Course has a minimum mathematical prerequisite of College Mathematics, College Algebra, or Pre-calculus, or a course already approved as satisfying the MA requirement.</p>	See Course description
		<p>b. The course must be focused principally on developing knowledge in statistical inference and include coverage of all of the following:</p>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	i. Design of a statistical study.	See Syllabus
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ii. Summarization and interpretation of data.	See Syllabus
<input checked="" type="checkbox"/>	<input type="checkbox"/>	iii. Methods of sampling.	See Syllabus
<input checked="" type="checkbox"/>	<input type="checkbox"/>	iv. Standard probability models.	See Syllabus
<input checked="" type="checkbox"/>	<input type="checkbox"/>	v. Statistical estimation	See Syllabus
<input checked="" type="checkbox"/>	<input type="checkbox"/>	vi. Hypothesis testing.	See Syllabus
<input checked="" type="checkbox"/>	<input type="checkbox"/>	vii. Regression or correlation analysis.	See Syllabus
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>c. The course must include multiple demonstrations of how computers can be used to perform statistical analysis more efficiently, if use of computers to carry out the analysis is not required.</p>	See Syllabus

YES	NO		Identify Documentation Submitted
		<b>3. Quantitative applications:</b> courses must satisfy <b>a, b, and c:</b>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<b>a.</b> Course has a minimum mathematical prerequisite of College Mathematics, College Algebra, or Pre-calculus, or a course already approved as satisfying the MA requirement.	
		<b>b.</b> The course must be focused principally on the use of mathematical models in quantitative analysis and decision making. Examples of such models are:	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	i. Linear programming.	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ii. Goal programming.	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	iii. Integer programming.	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	iv. Inventory models.	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	v. Decision theory.	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	vi. Simulation and Monte Carlo methods.	
<input type="checkbox"/>	<input type="checkbox"/>	vii. Other (explanation must be attached).	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>c.</b> The course must include multiple demonstrations of how computers can be used to perform the above applications more efficiently, if use of computers is not required by students.	

Course Prefix	Number	Title	General Studies Designation
AABS	350	Applied Statistics	

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 checklist)	How course meets spirit (contextualize specific examples in next column)	Please provide detailed evidence of how course meets criteria (i.e., where in syllabus)
I	A. This course uses software programs for statistical analysis B. Both spreadsheets and computer software are used and required.	A. See course description B. See Required materials page 1 of Syllabus
11	A. Minimum mathematical prerequisite is ASC315, MAT117 or MAT 142 B. Topics covered include statistical design, summarizing and interpreting data, methods of sampling, probability, statistical estimation, hypothesis testing and simple regression and correlation analysis C. Assignments and problems illustrate multiple ways of performing statistical analysis with or without computers	A. See course description B. See Lesson Topics Sequencing C. See Course assignment schedule



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Jean Stutz

- my class schedule
- class search
- add
- drop/withdraw
- swap
- edit
- schedule planner

**New! The Schedule Planner.**  
Easily generate a class schedule based on your criteria.

### course catalog & class search

Click on the title of the course for more details. Each column can be sorted by clicking on the column header. Courses found: 1

[Collapse](#)

ABS - Applied Biological Sciences		Units	GeneralStudies
Term	Spring 2015	3	CS
Search	Course catalog		
Subject	ABS Num 350		
Level			
Gen Studies			
Keywords			
Offerings	In-person & iCourse		
<p><b>ABS 350 Applied Statistics</b>            Statistical methods with applications in the biological sciences and natural resource management. Uses computers and the Internet.  <b>Allow multiple enrollments:</b> No    <b>Primary course component:</b> Lecture  <b>Repeatable for credit:</b> No    <b>Grading method:</b> Student Option  <b>Offered by:</b> College of Letters and Sciences -- College of Letters and Sciences  <b>Pre-requisites:</b> ASC 315, MAT 117, 142 or other course meeting General Studies MA requirement with C or better</p>			

**Search**  
Clear  
Advanced Search

Feedback

## **ABS350v2: Applied Statistics<sup>i</sup>: SP15**

Jon W. Ulrich, MA, PhD

HSigma@asu.edu

- Section:** §21931: Mondays & Wednesdays: 1500-1615 hours
- Location:** PRLTA 239 classroom augmented via Blackboard
- Prerequisites:** ASC315, MAT117, MAT142, or other courses meeting the General Studies MA requirement with a grade of C or higher.
- Required:** Ready access (e.g., home, work, school, library, etc.) to MS-Excel™ & -Word™  
PC: v2007<sup>ii</sup> or newer (NOTE: **NO** OPEN OFFICE **NOR** GOOGLE APPS)  
MAC: v2008 or newer (NOTE: **NO** NUMBERS™ **NOR** OPEN OFFICE **NOR** GOOGLE APPS)  
NOTE: .doc and .xls files will not be accepted for grading!
- Materials:** ABS350v2\_Schedule\_SP15.pdf  
PnP\_SP15\_JWUlrich.pdf  
ABS350v2\_TeamProject\_SP15.pdf
- Telephony:** 480/727-5008 (Office)  
480/727-1236 (Departmental facsimile)
- Office Hours:** Wanner 301E: MW 1630-1730 hours  
I am frequently accessible via e-mail (above), including late at night throughout the week and weekends. Meanwhile, my SP15 schedule requires me to be on campus on MW, but I can be on campus otherwise if prearranged. So, if you need to meet me in person, we can set up a time for me to be in my office to accommodate you.

### **Course Overview**

This course is designed to facilitate your learning of the subject matter within this environment. This is being accommodated via a combination of lecture notes, handouts, learning activities (both instructional & demonstrative uses of Excel), and individual/team graded assignments.

### **Course Home**

This course is offered by the College of Letters and Sciences (CLS). For more information about CLS, please visit our website: <https://cls.asu.edu/>. If you have any questions or concerns, please send your inquiry to [cls@asu.edu](mailto:cls@asu.edu).

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<sup>i</sup> Geared towards biology and the life sciences

<sup>ii</sup> Honestly, if you have Office 2003 for PC or 2004 for MAC, get real! You are a **decade** out of date and I will not support you with any software issues you encounter!



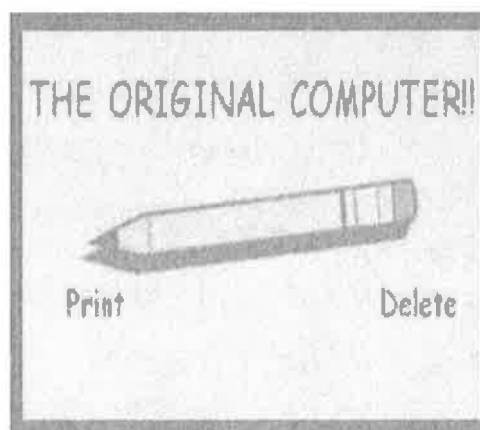
### Course Description

Statistical methods with applications to the biological and life sciences, as well as natural resource management. Use of computers, computer applications, and the Internet is required.

### Course Lexicon

Following are abbreviations that I use for each of my course's documents and otherwise:

- **BL** = Bonusland (extra credit)
- **CP** = Class Point
- **EX** = Examination
- **H2** = How-To (video)
- **HO** = Handout
- **HW** = Homework (assignment)
- **LA** = Learning Activity
- **LN** = Lesson Notes
- **MOD** = Module
- **PR** = (team) Project
- **QZ** = Quiz



### Grades & Assignments

%Score	Grade
96-100	A
90-95	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
70-76	C
60-69	D
0-59	E

Assignment	Max Pts
Homework (9×)	27
Quizzes (6×)	18
Exam I (Lessons 1-4)	10
Exam II (Lessons 1-7)	10
Exam III (Lessons 1-11)	10
Exam IV (Lessons 1-15)	10
Team Term Projects	15
<b>Total</b>	<b>100</b>

## **Assignments Defined**

### **HOMEWORK**

It is anticipated that there will be a total of 9 HW assignments, each being worth 2-4 CPs. The amount of work that will be required of you from assignment to assignment will vary.

These will be made available to you Tuesday of any applicable week (see Schedule). You will typically have until the date (typically Saturday) specified at the time of the posting to complete the HW, which must be uploaded to its assignment link by 2359 hours.

The HW assignments are partly based on their associated LNs and LAs; in turn, each LA will define what new Excel skills you need to know in order to satisfactorily complete the HW. Hence, if you do not know how to perform some activity, refer to the applicable LA set. Regardless, you **must** follow **my** conventions.

The HW assignments are designed to reinforce key concepts presented in the course readings. Likewise EX problems are based on the applicable HW assignments.

It is unlikely that I will grade all HW assignments; these are really for your benefit, so that you will be able to correctly perform the work needed on each EX. That is, **IF** you simply upload a document each week without putting in the time needed to be successful and you believe that using my solutions as a key will enable to satisfactorily perform what is needed on each EX, You **WILL** fail the course.

### **QUIZZES**

There are a total of 6 QZs, each being worth 3 CPs. These will typically be made available circa Wednesday, and be due, like HW, the subsequent Saturday (2359 hours). You will generally have access to QZs anytime during a 4-day window; these are not timed tests.

The QZs are based primarily on their applicable LN, although material from earlier LNs and HW assignments may also be included. **Currently, all QZs will be available via Blackboard, from which you will download, fill out, save, rename, and then upload your file at its appropriate uplink site.** Answer keys will be made available for each quiz.

Unlike HW assignments (see *PnP* document), all QZs will be graded. Their sequencing (see Schedule document) supports you having time to compare your submissions against my posted answer keys prior to the administration of an associated EX. My intentions are to have your submissions evaluated with scores posted prior to each EX so that you will be able to be aware of any possible disconnects between what you submitted and the correct answers.

### **EXAMINATIONS**

View EXs as being waypoints to gauge your understanding of the material as of the date of each test. The structure of this course's material is necessarily cumulative, so you must build a solid foundation of earlier material in order to have any reasonable expectation of success in the course. Each EX is worth 10 CPs.

### **TEAM PROJECTS**

This is worth 15 CPs – More information will be provided in a separate document.

### **TIME MANAGEMENT & COURSE WORKLOAD**

This is really quite simple, if you want to do well in any course (online, F2F, Hybrid), you will invest the time necessary to perform well in it. While I have designed this course's assignments such that missing one or two will not prove to be disastrous to your final grade, if staying current in your materials and assignments is going to be an issue for you, then I suggest that you take this course at another time or from another instructor.

ABOR--the governing board for ASU, NAU, and the UofA—has established a policy for how much time students should invest in their courses: "At least 15 contact hours of recitation, lecture, discussion, testing or evaluation, seminar, or colloquium, as well as a minimum of 30 hours of student homework is required for each unit of credit."

Therefore, in a 3-credit course, students should expect to invest 45 hours in class meetings (or the online equivalent), as well as 90 hours doing homework and assignments—a total of 135 hours in any given session (A, B, C). In this course and in other courses in your degree program, your faculty are committed to this standard because it promotes the breadth and depth of learning required in a first-rate university education. As you register for courses, keep this 135-hour standard in mind because during some semesters your work and/or family commitments may prevent you from taking a full load of classes.

### **STAY ON TOP OF ALL OF YOUR MATERIALS AND ASSIGNMENTS!**

This course is available to you 24-7 each week; consequently, there is no valid justification for not performing your tasks in the course. This is particularly true for when you are on travel. Even then, if you find that you do not have adequate coverage in some area in which you are traveling, then I suggest you find a local library, Kinko's, or similar.

ABS350v2: Course & Assignment Points Schedules: SP15

**GENERIC WEEK'S DOCUMENT AVAILABILITY (INCLUDES WEEKENDS)**

	<i>SU M TU W TH F SA</i>							
Document ↓	Day # →	1	2	3	4	5	6	7
Lesson Notes (LN)	← Start →	_____						
Handouts (HO)	← Start →	_____						
Learning Activity (LA) How-To (H2) video(s)	← Start →	_____						
Homework (HW)		Start _____ Stop						
Quiz (QZ) <i>or</i> Examination (EX)		Start _____ Stop						

## **TENTATIVE LESSON TOPICS SEQUENCING: SP15 TERM**

MODULE#	PRIMARY TOPICS
1 <sup>i</sup> (3 WEEKS)	Formatting & Statistics Terminology Data Types Sampling & Data Gathering Methods Measures of Centrality & Variability Effects of Data Shifts & Scales
2 (3 WEEKS)	EX1 Probability 101 Contingency Tables Decision Trees Bayes Theorem
3 <sup>ii</sup> (4 WEEKS)	EX2 Frequency → Probability Distributions → Histograms Discrete Distributions The Binomial Distribution The Poisson Distribution The Hypergeometric Distribution Continuous Distributions The Exponential Distribution The Normal Distribution The Population Correction Factor
4 (5 WEEKS)	EX3 Hypotheses, Errors, CLT Sample Sizes & Confidence Intervals One- & Two-Sample Tests One-Way ANOVA Simple Regression & Correlation  EX4  Team Project PPTs

<sup>i</sup> School is closed on Monday, 01/19/15 in observance of Rev. Martin Luther King.

<sup>ii</sup> Spring Break (between Weeks 8 & 9) takes place during this module.

## ANTICIPATED ASSIGNMENTS SEQUENCING

<u>Homework</u>	<u>Class Points</u>	<u>Test</u>	<u>Class Points</u>
<b>Module 1: Formatting, Sampling, &amp; Descriptive Statistics</b>			
GEN101_HW1.1	2	QZ1.1	3 <sup>iii</sup>
---	---	QZ1.2	3
HW1.3	3	---	---
<b>Module 2: Probability &amp; Applications</b>			
---	---	EX1	10
HW2.2	3	---	---
HW2.3	3	QZ2.2	3
<b>Module 3: Probability Distributions</b>			
---	---	EX2	10
HW3.2	3	---	---
---	---	QZ3.3	3
HW3.4	3	---	---
<b>Module 4: Inferential Statistics</b>			
---	---	EX3	10
HW4.2	3	QZ4.2	3
HW4.3	3	---	---
HW4.4	4	QZ4.4	3
		EX4	10 <sup>iv</sup>
		<b>Team Projects</b>	<b>15<sup>v</sup></b>

<sup>iii</sup> This is the only quiz for which you can receive negative points; if you do not turn it in, you will lose 3 CPs; it is thereby better for you to turn in a blank document and receive zero points than to miss it altogether.

<sup>iv</sup> It is anticipated that, if all goes well, your last examination will be completed the last week of the term.

<sup>v</sup> Scores are cumulative across the term; the final deliverable is an in-class PPT presentation on 05/06/14.