UNVS 15A COURSE SYLLABUS
SAN JOSÉ STATE UNIVERSITY / FALL 2012

COURSE: UNVS 15A  DAYS: M - Th
SECTION / TIME / ROOM:  Sec. 1 / 10:30am – 11:45am / CL 225*
INSTRUCTOR: Stephanie Vergara  WEBSITE: www.sjsu.edu/people/stephanie.vergara/
EMAIL: stephanie.vergara@sjsu.edu – or – steph_sjsu@hotmail.com (both point to the same inbox)
OFFICE LOCATION: DH 209  OFFICE HOURS: M/W, 1:30pm – 4:00pm

COMPUTER LAB:
*We will occasionally meet in Dudley Moorhead Hall, Room 339, which is a computer lab.

REQUIRED TEXT:
A course reader for UNVS 15A is available at the Associated Students Print Shop (adjacent to Hoover Hall) and is required for the class. The Print Shop can be reached at 408-924-6291. The first course reader should cost $7.45; cash, credit cards and checks are accepted forms of payment. You will need to purchase other course readers later in the semester as well. The course reader should be brought to class each day.

COURSE DESCRIPTION:
Concepts and methods of statistics with an emphasis on data analysis. Topics include methods for collecting data, graphical and numerical descriptive statistics, correlation, simple linear regression, basic concepts of probability, confidence intervals and hypothesis tests for means and proportions, and chi-square tests. UNVS 15A is a 5-unit lecture course with CR/NC grading. UNVS 15A is the first semester of a two-semester course sequence. A grade of CR is required to enroll in UNVS 15B and UNVS 15C, which are the remaining courses of this sequence.
Note: No credit for graduation; no degree credit.

PREREQUISITE:
A score below 50 on the ELM Exam and a score of 142 or above on the EPT Exam

TECHNOLOGY:
• Each student will need to have access to a computer for this course. You are also required to have a TI83+/84+ to use during class as well as for homework, quizzes, and exams.
• If you do not currently have access to a computer, options include rentals from the associated students computer services center (http://as.sjsu.edu/ascsc/index.jsp) and use of computers in the Math department computer lab for a fee of $25 for the semester or by registering for math 110L (see the math office at http://www.sjsu.edu/math/). You major department and Peer Connections (http://peerconnections.sjsu.edu) may also have a computer lab for students. Computers for student use are also available in the Academic Success Center located on the 1st floor of Clark Hall, on the 2nd floor of the Student Union, and in the Martin Luther King Library. TI83+/84+ calculators can be rented online, but the rental cost for 10 months is usually the same or more than the cost of buying a calculator.

HOMEWORK:
• No late homework will be accepted.
• Homework will consist of two parts: written (Take it Home) and online (MyStatway).
• The lowest HW score from each category will be dropped.

IN-CLASS PARTICPATION:
• Bring your Course Reader and calculator to class every day to complete in-class work.
• Attend every class, listen to lectures, and participate in group work. See Participation Roles and information in the Course Reader.

QUIZZES AND EXAMS:
• There will be no make-up quizzes or exams; missed quizzes or exams will count as a zero.
• There will be six quizzes (one for each module); however, the lowest quiz score will be dropped.
• There will be three midterms (each covering 2 modules).
• There will be a comprehensive final exam – see the calendar on my website (at the top of the page) for the date.
GRADING POLICY:

- Homework: 16%  
  - ["Take It Home" = 5%, MyStatway work = 11%]
- In-class participation: 10%  
  - This is evaluated by instructor as well as fellow students
- Quizzes: 15%  
  - Five quizzes = 3% per quiz  
  - There are 6 quizzes, but the lowest quiz score is dropped
- Midterms: 39%  
  - Three Midterms = 13% per midterm
- Final Exam: 20%

IMPORTANT NOTES REGARDING GRADES:

Grades will be totaled and weighted according the percentages given above. An overall score of 70% or higher will result in a grade of “CR” (which will allow you to take UNVS 15B&C in the Spring), while a score below 70% will result in a grade of “NC” in the class.

NOTE WELL: Having received an unsatisfactory score on the ELM, each student in this class is subject to Executive Order (EO) 665 (https://sites.google.com/site/developmentalstudiesatsjsu/). Passing UNVS 15A, 15B, and 15C satisfies the requirements for developmental mathematics AND the area B4 GE requirement in a nine month time period (students with equivalent ELM scores not taking these courses take Math 3A and 3B, completing remediation in one year, but then take an area B4 course in a subsequent year). Note that EO 665 requires you to complete remediation within one year, else be disenrolled from SJSU (usually to complete remediation at a community college). In order for a student (who receives a “NC” in this course) to complete remediation and not be disenrolled from the university for the 2013 - 14 school year, a student would have to complete remediation elsewhere before the beginning of the 2013 - 14 school year.

CLASSROOM PROTOCOL:

- You are to remain in the classroom the entire class period. Wandering in and out is not appropriate.
- Computers and cell phones should be turned off and put away before class, except when computers are explicitly being used in class, and are not to be used for any social media, etc.
- Any electronic equipment (other than when computers are explicitly being used) brought in to the classroom is subject to confiscation, and may be returned to you at the conclusion of the semester.
- It is strongly preferred that you try to eat before or after class. Plan well for your meals; learning is challenging enough without being hungry as well. If back-to-back classes make it necessary to bring food or drink, please bring only portable food that is not pungent, loud or distracting to others or yourself. Drinks with lids only.
- Seek help when you are struggling. Don’t fall behind. It is hard to keep up, but it is harder to catch up.
- No collaboration on quizzes or exams. Cheating will not be tolerated. Anyone who willingly allows his/her work to be copied will also be considered to be cheating.
- I will help you as best I can; however the responsibility for learning the material is yours. Read the course reader, do the written and online homework, and ask questions. Maintain consistent study habits.
- Changes to this syllabus may occur; if they do occur, they will be announced in class.

Where to get extra help, if needed?

SJSU Writing Center (http://www.sjsu.edu/writingcenter/)
The SJSU Writing Center is located in Room 126 in Clark Hall. It is staffed by professional instructors and upper-division or graduate-level writing specialists from each of the seven SJSU colleges. The writing specialists have met a rigorous GPA requirement, and they are well trained to assist all students at all levels within all disciplines to become better writers.

Student Academic Success Services: Peer Connections (http://peerconnections.sjsu.edu/)
Peer Connections provides a variety of academic support through its mentoring, tutoring and workshops. Programs provided focus on holistic student development as well as content knowledge acquisition. Peer Connections serves all undergraduate students with priority emphasis on transitional students. Peer educators can be found in three locations: SSC 600, Main Lobby in Clark Hall, and in Living Learning Center (LLC) Campus Village B.
**Academic Success Center: Peer Mentor Center**

The Peer Mentor Center is located on the 1st floor of Clark Hall in the Academic Success Center. The Peer Mentor Program was designed to help ease the transition to SJSU by empowering students to help each other and themselves. The Peer Mentor Center is staffed with Peer Mentors who excel in helping students manage university life, tackling problems that range from academic challenges to interpersonal struggles. Peer Mentors know how to refer students to appropriate campus resources in order to navigate more easily through the university system. Peer Mentors work with individual instructors/departments to develop smaller communities within SJSU that more actively involve and engage students in their college experience. Peer Mentor services are free and available on a drop-in basis.

You are lucky to have a peer mentor assigned to this section of Statway! Her name is Lindsey Glovin and she’ll be in class with us on Mondays and Wednesdays. She also has drop-in office hours at the Student Services Center (SSC) 600 on Mondays (12:30-2pm), Wednesdays (12:30-3:30pm), and Fridays (12-1:30pm).

**SJSU Campus Map** ([http://www.sjsu.edu/map/](http://www.sjsu.edu/map/))

**STATWAY COURSE OUTLINE**

*There are six modules in this course. We will go through the course reader in the order presented here, occasionally inserting other material to help with the mathematical and statistical understanding.*

1. Statistical Studies and Overview of Data Analysis
   - Data analysis process
   - Types of statistical studies—Observational studies and experiments
   - Simple random sampling; simple comparative experiments
   - Interpreting and ordering integers and decimals

2. Summarizing Data Graphically and Numerically
   - Graphical displays, including bar charts, dot plots, histograms, and box plots
   - Numerical measures of center and variability
   - Comparing distributions graphically and numerically
   - Ordering and comparing fractions, proportions, and percentages
   - Estimating and rounding; using absolute and relative difference
   - Interpreting units and using units to compare

3. Reasoning about Bivariate Data
   - Scatterplots; correlation; simple linear regression
   - Interpreting slope and intercepts
   - Using and interpreting inequalities
   - Evaluating linear expressions
   - Comparing and ordering signed rational numbers
   - Using multiple representations of linear functions (e.g., tables, graphs, symbolic form)

4. Modeling Nonlinear Relationships
   - Exponential growth and decay
   - Interpreting the parameters of the function
   - Use multiple representations of exponential and quadratic functions (e.g., tables, graphs, symbolic form)
   - Compare linear, quadratic, and exponential functions

5. Reasoning about Bivariate Categorical Data and Introduction to Probability
   - Two-way tables; joint and marginal relative frequencies
   - Conditional probability
   - Independence

6. Formalizing Probability and Probability Distributions
   - Discrete and continuous probability distributions
   - Normal distributions
University Policies

Academic integrity
Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The University’s Academic Integrity policy, located at http://www.sjsu.edu/senate/S07-2.htm, requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sa.sjsu.edu/judicial_affairs/index.html. Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person’s ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your assignment or any material you have submitted, or plan to submit for another class, please note that SJSU’s Academic Policy S07-2 requires approval of instructors.

Campus Policy in Compliance with the American Disabilities Act
If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the Disability Resource Center (DRC) at http://www.drc.sjsu.edu/ to establish a record of their disability.

Time Allocation for Studying and Course-Related Work (http://www.sjsu.edu/senate/S12-3.htm)
Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of forty-five hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to internships, labs, clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Goals and Student Learning Outcomes (SLOs)
Consistent with the American Statistical Association’s Guidelines for Assessment and Instruction in Statistics Education (GAISE), the course learning outcomes center around providing students with a firm conceptual understanding that enables them to use statistical tools intelligently and to be sophisticated consumers of information from studies whose conclusions are based on data. Students who complete the course will understand that data analysis is a process that begins with the formulation of a question that can be addressed with appropriate data and then progresses to the development of a thoughtful plan for identifying and collecting the necessary data. Students will know how data can be displayed and summarized in informative ways, and they will understand how the data can be used to draw conclusions in the presence of uncertainty.

Integration of Developmental Mathematics
Statway is designed to foster a conceptual understanding of statistics, and those developmental mathematics concepts that serve as a foundation for statistical understanding are integrated throughout Statway. These mathematics concepts are presented in a context that is relevant and meaningful to students. Technology is used to aid computation so that time can be focused on deepening students’ conceptual understanding of the mathematical topics. Suggested external resources for further exploration of mathematics topics and assistance in procedural fluency are provided.

S.1. Data Analysis Goal: Students will understand the data analysis process and the characteristics of well-designed statistical studies.

Learning Outcomes for Goal S.1
Students will be able to:

• S.1.1 Develop a plan for a statistical study.
  a. Given a real-world problem, formulate a question that can be addressed by data.
  b. Identify appropriate data that can be used to address the question.
  c. Select an appropriate data collection strategy to address a question of interest.
• S.1.2 Know the type and scope of conclusions that can be drawn from different types of statistical studies (e.g., surveys, other observational studies, experiments).
• S.1.3 Know the characteristics of good sampling plans (e.g., representative of larger population, minimize sources of bias and variability), well-designed experiments (e.g., random assignment, replication, control, blocking), and well-designed observational studies (e.g., recognizing potential sources of bias).

• S.1.4 Critically evaluate all aspects of a study.

S.2. Distributional Thinking Goal: Students will demonstrate the use of distributional thinking to reason about the data in order to describe and summarize distributions of data, identify trends and patterns, judge the fit of a model to a distribution, and describe similarities and differences in comparing distributions. Distributional thinking involves the ability to consider a collection of individual observations as an entity (instead of focusing on individual observations) and to consider characteristics of the distribution to reason about the data.

Learning Outcomes for Goal S.2
Students will be able to:

• S.2.1 Given a data set of a particular type (i.e., numerical, categorical, bivariate numerical, bivariate categorical, or time series),
  a. Display the data using appropriate graphical displays.
  b. Summarize the data using appropriate numerical summaries.
  c. Describe the data distribution in context.
  d. Viewing data as a model plus error, assess the appropriateness of potential models (e.g., normal distribution as a model for numerical data, the least squares regression line as a fit to bivariate numerical data, independence as a model for bivariate categorical data, linear or exponential growth as a model for time series data).

• S.2.2 Recognize different representations of the same data distribution (e.g., dotplot, boxplot, histogram) and understand how numerical summaries are related to characteristics of the data distribution (e.g., extreme left skew tends to have mean < median; the effect of outliers and influential observations).

• S.2.3 Make meaningful and appropriate comparisons of distributions of data collected from two or more different groups.

S.3. Statistical Evidence Goal: Students will demonstrate an ability to use appropriate statistical evidence to reason about population characteristics and about experimental treatment effects.

Learning Outcomes for Goal S.3
Students will be able to:

• S.3.1 Demonstrate a basic understanding of probability.
  a. Interpret a probability.
  b. Estimate probabilities (including conditional probabilities) empirically and using simulation.
  c. Understand how a probability distribution models the behavior of a variable.
  d. Understand how sampling distributions model the behavior of a sample statistic (e.g., a sample mean or sample proportion).

• S.3.2 Understand how sampling distributions and probability support drawing conclusions based on data and assessing the associated risks.

• S.3.3 Understand the logic and reasoning used to interpret results from different types of statistical studies, including surveys, other observational studies, and experiments.

• S.3.4 Determine what statistical methods are appropriate in a given situation based on the goal of the analysis and the data available, and know and assess the conditions required for appropriate use of a given statistical method.

• S.3.5 Critically evaluate whether conclusions based on data are reasonable.

• S.3.6 Compute confidence interval estimates and interpret confidence intervals, confidence level, and margin of error in context.

• S.3.7 In a given context, determine appropriate null and alternative hypotheses and understand what conclusions reasonably follow from a decision to reject the null hypothesis and from a decision not to reject the null hypothesis.

• S.3.8 Understand the concept of statistical significance, including significance levels and P-values.

• S.3.9 Carry out hypothesis tests to reach a conclusion and communicate the conclusion in context.
M.1. Numeracy Goal: Students will develop and apply the concepts of numeracy to investigate and describe quantitative relationships and solve problems in a variety of contexts.

Learning Outcomes for Goal M.1
Students will deepen their ability to reason and use numbers and be able to:

- M.1.1 Demonstrate number sense.
- M.1.2 Display proficiency in making calculations with rational numbers; know how and when to estimate results and round results.
- M.1.3 Create multiple representations of rational numbers and be able to recognize which representation is most useful for addressing a problem or conveying quantitative information.

M.2. Proportional Reasoning Goal: Students will represent proportional relationships and solve problems that require an understanding of ratios, rates, proportions, and scaling.

Learning Outcomes for Goal M.2
Students will be able to:

- M.2.1 Compare proportional relationships that may be represented in different ways and understand the role and function of $k$ in the relationship $y = kx$.
- M.2.2 Distinguish between absolute difference and relative difference, and use percentages to describe changes in a quantity or the error of an estimate given the exact value of the quantity.
- M.2.3 Apply quantitative reasoning strategies to proportional relationships in real-world problems using units effectively and precisely.

M.3. Algebraic Reasoning Goal: Students will reason using the language and structure of algebra to investigate, represent, and solve problems.

Learning Outcomes for Goal M.3
Students will be able to:

- M.3.1 Use variables, evaluate expressions, and solve for unknown quantities and for quantities that may vary.
- M.3.2 Represent real-world and quantitative situations with equations, inequalities, expressions, tables, verbal descriptions, symbols, and graphs.
- M.3.3 Solve equations and inequalities and explain how results relate to the original context.

M.4. Functions and Modeling Goal: Students will understand functions as a way of modeling a correspondence between two variables. Students will be able to represent functions in various ways: verbally, algebraically, and graphically.

Learning Outcomes for Goal M.4
Students will be able to:

- M.4.1 Represent a function algebraically and compute values of a function.
- M.4.2 Describe a function verbally, algebraically, graphically, and in a table of values, and make connections among representations.
- M.4.3 Make conjectures about the behavior of a function given several values of the function and a given context.
- M.4.4 Model situations with linear, quadratic, and exponential functions, inequalities, and equations.
- M.4.5 Investigate graphically and numerically (with technology) the effect of changing a parameter within a model.

- M.4.6 Students will be able to:
  a. Use linear functions to model situations involving constant rates of change.
  b. Describe the constant of proportionality, slope, as the rate of change of the function using appropriate units.
  c. Given the graph, an equation, or two or more points on a line, determine and interpret the intercept(s) and slope.
  d. Given a set of points that exhibit a linear trend, determine the line of best fit.
  e. Compute and interpret the errors or deviation from a line of best fit that is used to model a data set with a linear trend.
• M4.7 Students will be able to:
  a. Identify and quantify exponential growth or decay in formulas, graphs, tables, and applications.
  b. Characterize and describe exponential models and compare them to other models.
  c. Use exponential functions to represent relationships between variables in involving exponential growth and decay.
  d. Describe transformations of the graphs of exponential functions.

GE/SJSU Studies Learning Outcomes (SLOs) for Area B4 are satisfied by completion of UNVS 15B & 15C, the remaining courses in this two-semester sequence

Upon successful completion of UNVS 15A/15B/15C, students will be able to:
• use mathematical methods to solve quantitative problems, including those presented in verbal form;
• use mathematics to solve real life problems; and
• arrive at conclusions based on numerical and graphical data

Additional GE Content Objectives for UNVS 15A/15B/15C:
• Diversity. Issues of diversity may be incorporated in an appropriate manner for quantitative analysis.
• Writing. The minimum writing requirement is 500 words in a language and style appropriate to quantitative analysis. Writing shall be assessed for grammar, clarity, conciseness and coherence.
Our classroom: CL 225
Computer lab: DMH 339
Professor Vergara’s Office: DH 209
Print shop: “ASP”
Computers: Clark Hall, Student Union, MLKJ Library
Writing Center: CL 126
Peer Connections: SSC 600, Main Lobby Clark Hall, LLC in Campus Village B