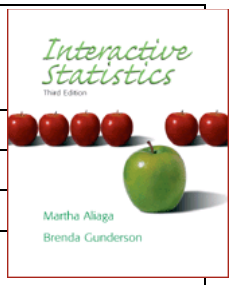
Syllabus for: (name of class)

Math 15-E1899 (031899) ***Elementary Statistics***



Semester & Year:	Fall 2012
Course ID and Section Number:	Math 15-E1899 (031899)
Number of Credits/Units:	4 units
Day/Time: **Location:**	MW 6:05-8:10 pm, Eureka Campus, PS Room 120
Instructor's Name:	Teresa ("Tami") Matsumoto
Contact Information:	Office location and hours: PS 102 Phone: (707)476-4543 Email: tami-matsumoto@redwoods.edu

Course Description (catalog description as described in course outline):

MATH-15 Elementary Statistics - (4 units lecture) The study of statistical methods as applied to descriptive statistics and inferential statistics. An emphasis on the meaning and use of statistical significance will be central to the course. Students will use frequency distributions, graphs, measures of relative standing, measures of central tendency, measures of variability, correlation, and linear regression to explore descriptive statistics. Students will use the laws of probability and statistical tests (t-tests, chi-square, ANOVA, and regression analysis) to make decisions via hypothesis testing and estimate parameters using confidence intervals.
Note: A TI-83 or TI-84 graphing calculator is required.
Prerequisite: MATH-120 or Math 194 Intermediate Algebra

Student Learning Outcomes (as described in course outline) :

What should the student be able to do as a result of taking this course?

Some objectives in terms of specific, measurable student accomplishments are:

1. Accurately communicate statistical ideas using correct statistical notation, graphs, and vocabulary.
2. Use descriptive and inferential statistics to solve real-world problems.
3. Demonstrate appropriate use of technology in making decisions based upon real-world data.
4. Read and interpret information that contains statistical analysis and be able to communicate these results.
5. Judge the validity of research reported in the mass media and peer reviewed journals.

Refer to http://msenux.redwoods.edu/mathdept/outlines/current/math15.php

Special accommodations: College of the Redwoods complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. Please present your written accommodation request at least one week before the first test so that necessary arrangements can be made. No last-minute arrangements or post-test adjustments will be made. If you have a disability or believe you might benefit from disability related services and may need accommodations, please see me or contact Disabled Students Programs and Services. Students may make requests for alternative media by contacting DSPS.

Academic Misconduct: Cheating, plagiarism, collusion, abuse of resource materials, computer misuse, fabrication or falsification, multiple submissions, complicity in academic misconduct, and/ or bearing false witness will not be tolerated. Violations will be dealt with according to the procedures and sanctions proscribed by the College of the Redwoods. Students caught plagiarizing or cheating on exams will receive an "F" in the course.

The student code of conduct is available on the College of the Redwoods website at: http://www.redwoods.edu/District/Board/New/Chapter5/Ap5500.pdf

College of the Redwoods is committed to equal opportunity in employment, admission to the college, and in the conduct of all of its programs and activities.

About Learning Statistics

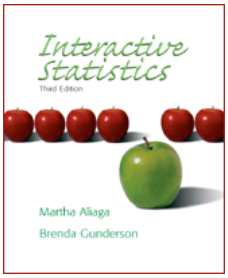
To learn statistics, you must learn a lot of new terminology (including "old" vocabulary with new meanings), special symbols, formulas, relationships, and concepts. And that's not all! You also must learn how and when to apply which formulas, and how to interpret your statistical results. It isn't enough to just know how to do the algebraic manipulations, or how to find things on your calculator. You will need to learn which are the correct formulas (or statistical tests), that are appropriate to use in the given situation. Also, unlike the majority of your previous math experience, there often is not just one "right" answer. You will need to understand the assumptions behind the different answers and how to assess which you feel is best for that particular case.

Some statistics students feel like the whole class is full of word problems and sometimes even students with excellent algebraic skills struggle with the statistical concepts and interpretations. On the other hand, some people who have had bad prior experiences with math classes really enjoy the way statistics is much more real and meaningful and applicable to the real world.

You will need to learn (a la Bloom):

- Knowledge
    - Definitions
    - Types of Graphs
    - What the Different Formulas are
    - Main Ideas
- Comprehension
    - How related things compare (similarities, differences)
    - What different things mean or tell us
    - How to interpret summary information
    - How to make predictions based on limited information
- Application
    - How to apply what you know to new situations
    - How to use information (statistics or data, for instance)
    - How to solve problems, using what you have learned
- Analysis
    - How to make inferences from analysis of complex information
    - Recognizing importance and significance of component parts
- Synthesis
    - How to understand a situation and pull together all that you have learned, to construct an appropriate statistical test and make valid conclusions and inferences
- Evaluation
    - How to look back and assess what was done (by you or others) and compare and evaluate the results

College of the Redwoods ~ Fall 2012
Math 15-E1899 (031899) Elementary Statistics (4 units)
8/27/2012 – 12/14/2012
MW 6:05-8:10 pm ~ Eureka Campus, PS Room 120



Instructor: Teresa ("Tami") Matsumoto

Contact information:

Office: **PS 102**
Office Phone: **476-4543**
email: tami-matsumoto@redwoods.edu [Put "**Math 15**" in Subject line of email messages along with a useful word or phrase]
Mailbox: You can drop off papers by sliding them under my office door (PS 102), or deliver them to the Division office in PS 101. Make sure they are clearly marked with my name on it (and yours, too).
Phone number for cancelled class announcements: 476-4210 #5 (This is only for Math & Science classes in Eureka)

Office Hours: Generally **MW 3-3:45pm**. Additional time is also be available by appointment. About one Wednesday a month, I will be unable to have my Office Hour due to committee meetings.

Course Description: (from catalog)

MATH-15 Elementary Statistics - (4 units lecture) The study of statistical methods as applied to descriptive statistics and inferential statistics. An emphasis on the meaning and use of statistical significance will be central to the course. Students will use frequency distributions, graphs, measures of relative standing, measures of central tendency, measures of variability, correlation, and linear regression to explore descriptive statistics. Students will use the laws of probability and statistical tests (t-tests, chi-square, ANOVA, and regression analysis) to make decisions via hypothesis testing and estimate parameters using confidence intervals. Note: A TI-83 or TI-84 graphing calculator is required. *Prerequisite: MATH-120 or Math 194 Intermediate Algebra*

Recommendation: Sign up for The Math Lab (**Math 52**) for free drop-in tutoring throughout the semester. Register for either the 0.5 unit or the 1.0 unit section. You can attend any time during Math Lab Open Hours: M-Th 9:30-5:00 and Fri 9:30-2:30

Note There is also ***FREE online tutoring*** available online 24 hours a day, 7 days a week. You get to it through the "myCR" course management system.

Math 15 Course Learning Outcomes:

What should the student be able to do as a result of taking this course?
Some objectives in terms of specific, measurable student accomplishments are:

1. Accurately communicate statistical ideas using correct statistical notation, graphs, and vocabulary.
2. Use descriptive and inferential statistics to solve real-world problems.
3. Demonstrate appropriate use of technology in making decisions based upon real-world data.
4. Read and interpret information that contains statistical analysis and be able to communicate these results.
5. Judge the validity of research reported in the mass media and peer reviewed journals.

Refer to http://msenux.redwoods.edu/mathdept/outlines/current/math15.php

Materials you will need:

- **Required Text**: *Interactive Statistics*, 3rd Edition, by Aliaga & Gunderson. Published by Prentice Hall. 2006. Either the standard wire-bound version or the custom-published paperback version is fine.

- **Graphing Calculator**: A Graphing Calculator, such as a TI-83 Plus, TI-84, or TI-89. A limited number are available **for rent** – from the Division office PS101.

- **Bound Notebook with Grid Paper**: Roaring Spring #77475 or Ampad #26-251 (about $2 - $6), for example. Just check to make sure it is **bound** and has **graph paper** in it. You will use this throughout the course to build yourself a reference book (see the "Reference Book Information" handout also).

- **Supplemental Handouts**. I will provide lots of handouts – some in class, and some via "myCR". It is your responsibility to make sure that you get a copy of all supplemental material, even if you miss class.

- **Time. Lots!!** In your own weekly schedule please make sure that you have blocked out at least 15 hours *(possibly as much as 20 hours)*, per week, to devote to this class.

- **Paper**: Homework Paper and scratch paper, lots of it! It is fine with me if you RE-USE paper. Paper that's only been used on one side is still fine (in general) on the other side. You will also need some graph paper. Get it in a pad or a package of loose-leaf sheets (rather than stuck in a notebook), or print it from the web. Many people find it helpful to get graph paper with heavier lines on every fifth line to make counting easier.
- **Pencils**: Lots. Math problems should be done in pencil in this class (as in math classes in general). If you like softer lead (I find it writes darker easier) then you might like "2B" mechanical pencil lead (I prefer "2B" to "HB" which I find not as easy to work with).
- **Erasers**: At least one.
- **A ruler**: Important for drawing tables and graphs carefully and correctly.

- **Computer Access** for:
  - **Email:** I expect you to have access to a computer and expect to be able to contact you easily. The College uses your "mycr.redwoods.edu" email address to communicate with you so it is important that you receive those email messages; you can set it up to autoforward those emails to another email address if you prefer.
  - **"myCR" course materials**. We will have some course materials available using the "myCR" course system. (This is a separate thing from your email but you need access to a computer for this also.)

Course Requirements (subject to change with fair notice):

Participation in Class Activities: Attendance and participation are essential to the learning process. In addition, everyone benefits from your input and participation, and some work we do will be in groups! One important aspect of this course is the incorporation of active learning in class; this requires everyone's participation, particularly during in-class activities. Also, the best way to insure having a successful experience in any course is to come to every class meeting and keep up with the assignments. There will often be handouts during class to be turned in at the end of class. If you miss more than four class sessions, you may be dropped from the course.

I realize that sometimes things come up and getting to class is impossible. In those cases, just communicate with me as soon as you possibly can. This is especially important if you are missing class on a day we are scheduled to have an exam!

Note that ALL students remain responsible for ALL assignments given and that those assignments are expected to be turned in ON TIME. If you miss a class, the assumption is that you will get the necessary information to complete the assignment by the due date and be prepared to continue in the normal flow of the course.

CAUTION: the material builds from one week to the next and so
IT IS STRONGLY URGED THAT ALL STUDENTS ATTEND ALL CLASSES.

Problem Sets, assigned from the textbook: Problems will be assigned every class. There will be "Basic" problems and "Advanced" problems (see grading information). Show your work, and work neatly and legibly. There will not be time for every problem to be graded carefully, so it is even more important that you check your own work before turning it in, and ask questions if you want to make sure you are on the right track.

Pop Quizzes: Pop quizzes may be given during the course of the semester. You should always bring a pencil with you to class each day to be ready for a quiz.

Other assignments: There will be some assignments other than problems from the book. Some will be explained on handouts, some will be writing assignments, and some will be done in class. Also you will build your own Statistics Reference Book throughout the course.

Reference Book: Each student is required create his/her own personal Statistics Reference Book throughout the term. It should be made in a bound notebook. It should have a title page at the front, followed by a table of contents. The contents should include material learned in the course. For the most part, it is up to you to decide exactly what to include, though there will be a few items I will direct you to be sure to include. Each page should be its own separate topic.

Exams: There will be an exam after each learning unit and a Final Exam during Finals Week. Each of the tests amid the term will cover material since the previous test. The Final Exam will be comprehensive and will be given in parts: For one part you will be able to refer to your own Reference Book which you will be making throughout the semester. About a week before each test you will be provided with a study guide for the exam. You do not need a scantron for any of these tests. You should always bring pencils, erasers, and your Reference Book (for grading) on test days.

Final exam date and time: Monday December 10, 5:30 – 7:30 PM is the officially designated 2-hour block for our class, as required by CR's Final Exam Schedule.

HELP?! If you have questions, please get help! It is ***your*** responsibility to seek help if you need it. I will answer some questions in class, but unfortunately, we will not have enough time to answer all of everyone's questions.

Special accommodations: College of the Redwoods complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. Please present your written accommodation request at least one week **before** the first test so that necessary arrangements can be made. No last-minute arrangements or post-test adjustments will be made. If you have a disability or believe you might benefit from disability related services and may need accommodations, please see me or contact Disabled Student Programs and Services.

Academic Misconduct: Cheating, plagiarism, collusion, abuse of resource materials, computer misuse, fabrication or falsification, multiple submissions, complicity in academic misconduct, and/ or bearing false witness will not be tolerated. Violations will be dealt with according to the procedures and sanctions proscribed by the College of the Redwoods. Students caught plagiarizing or cheating on exams will receive an "F" in the course. The student code of conduct is available on the College of the Redwoods website at: http://www.redwoods.edu/District/Board/New/Chapter5/Ap5500.pdf

DUE DATES and LATE WORK: Caveat on "due dates": While we are, by necessity, confined within a certain time framework, it is important to me that you understand the material – given that, if you have made progress on an assignment but are having trouble completing it by the due date, communicate with me to make appropriate arrangements.

Schedule:
The class meets every MW 6:05-8:10pm, starting Monday, August 27. The last regular class meeting is Wednesday, December 5, followed by the Final Exam during Finals Week. There will be no class meetings on the following dates:

- **Monday, Sept. 3 (Labor Day Holiday)**
- **Monday, Nov. 12 (Holiday for Veterans Day)**

N.B.: Thursday-Friday, November 22-23 are the CR Holiday days for Thanksgiving weekend – CR Closed both Thurs and Fri that week

NOTE: There would be 30 class sessions if we met twice weekly, but because of holidays, we have 28 actual class meetings.

Math 15 Learning Units — *What material will we cover?*

The course material is organized into six Learning Units. Each Unit includes more than one Chapter. At the end of each Unit, there will be a Unit Exam.

Unit	Chapters and Data Collection Assignment
1	Chapter 1: How to Make Decisions with Statistics (pp 1-52, 62-66) Chapter 4: Summarizing Data Graphically (pp 211-284) Chapter 5: Summarizing Data Numerically (pp 299-333, 344-5) Data Assignment #1: Quantitative Data, 1 variable from 2 related populations; turn in graphs for comparisons and summary statistics for comparisons (will use same data again later in Unit 4) Unit 1 Exam: Wednesday September 12 (60 minutes)
2	Chapter 6: Using Models to Make Decisions (pp 357-397) Chapter 7: Probability (pp 409-439, 454-470, 478-489) Chapter 2: Sampling Designs (pp 83-135) Data Assignment #2: *Proportion*: Binomial data, 1 categorical variable from 1 population Unit 2 Exam: Monday October 1
3	Chapter 8: Sampling Distributions (pp 499-545, 555-7) Chapter 9: Making Decisions About Population Proportions (pp 563-594, 602-7) Chapter 10: Making Decisions About Population Means (pp 613-33, 639-53, 657-8) Data Assignment #3: Bivariate Quantitative Data, 2 variables from 1 Population Unit 3 Exam: Wednesday October 17
4	Chapter 3: Observational Studies & Experiments (pp 145-196) Chapter 11: Comparing Two Treatments (pp 669-727) Chapter 12: Comparing Many Treatments (pp 743-761, 791-3) Data Assignment #4: Use same data from Data Assignment #1; use T-Test and Confidence Intervals to compare Unit 4 Exam: Wednesday October 31
5	Chapter 13: Regression Analysis (pp 807-901) Data Assignment #5: Use bivariate data set from previous data collection Unit 5 Exam: Wednesday November 21
6	Chapter 14: Analysis of Count Data (pp 921-966) Chapter 15: Nonparametric Statistics (pp 977-1002) Data Assignment #6: Multinomial Data (Categorical), 1 categorical variable from 1 population Unit 6 Exam: Monday December 3

Note: Comprehensive Final Exam on Units 1-6 on Monday December 10

Math 15 ASSIGNMENTS — *What exactly do you have to do?*

The course material is organized into six Learning Units. Each Unit includes more than one Chapter. At the end of each Unit, there will be a Unit Exam.

1. **In-class work** — The entire semester course is jammed into ***15*** weeks. It is extremely important that you attend each and every class session and participate and keep up.
   We cover 15 chapters in 26 days* and it's about 700 pages! Do the math!
2. **Textbook**
   - **Reading** — Read instructions for each Learning Unit carefully — This will tell you which pages to read. This class covers a LOT of information and since we only meet twice a week each session covers a lot; it is extremely important that you keep up. There will be a few parts of the textbook that we will skip, but we will cover about 50 pages each week.
   - **Homework Exercises** — Read instructions for each assignment carefully — This will tell you which problems are assigned. Doing homework exercises is an important part of the process by which you learn the material. It is recommended that you also work through the examples as you read, and work additional problems besides those assigned. Try to finish the homework before the following class, but if have questions, you will be allowed to turn in your homework two class meetings after it was assigned. Homework exercises will be designated as "Basic" or "Advanced." In order to pass the class, you must do the "Basic" problems but you only need to do "Advanced" problems if you want a grade of "A" or "B" (or A- or B+ or B-) for the course.
3. **Statistics Reference Book** — You will be constructing your own personal "Statistics Reference Book" throughout the course (see "Bound Notebook with Grid Paper" under "Materials you will need"). Please read the separate handout with instructions. There will be some specific directions prescribing some of the contents, and you will also have freedom to include other pertinent information, definitions, examples, notes, that you think will be helpful for you as reference material. ***Create a Reference Book that helps You!***
4. **Quizzes and Exams**
   - **Short Quizzes** — We will have short quizzes often. Some will be online and some will be in class. These quizzes are important for letting us know how you are doing and what needs further work (important for both you and me to know). Some quizzes will be "Reference Book Quizzes" – ones where you will be allowed to use your Reference Book (but NOT your text or other notes) to help you with the quiz.
   - **Unit Exams** — There will be six Unit Exams, each approximately 60 minutes, each of which will focus on the material from that Unit. These Unit Exams are tentatively scheduled for dates listed in the Unit Descriptions.
   - **Final Exam** — There will also be a comprehensive Final Exam during Finals Week.
5. **Data Projects** — There will be several short assignments for you to do that involve analyzing data, and turning in written assignments. Details will be provided separately.
6. **Other Assignments** — Some of these other assignments will pertain to reading statistical results in newspaper or magazine articles and interpreting them, or analyzing data given to you, and asking you to think critically. One of the main goals of this course is for you to learn to think critically and analyze statistical claims on a more educated level, so we will practice doing that throughout the course.

*Meeting 2 days/week for 15 weeks should be 30 days, but we have 2 holidays, plus I am hoping the last week has Unit 6 exam and then review for the cumulative Final Exam, which really leaves 26 days to cover the material.

Math 15 GRADING CRITERIA — *What do you have to do to earn an "A" (or just to pass the class)?*

To pass the class (i.e., not get an "F"), all the following requirements must be met:

- Homework Exercises assigned from the textbook:
  - complete a majority of the "basic" exercises assigned, in a legible, satisfactory way
- Create your own Statistics Reference Book
- Quizzes and Exams –at least 60% correct
- Data Projects – complete a majority of assignments
- Other Assignments – complete a majority of assignments

To get at least a "C-" you must do all of the following:

- Homework Exercises assigned from the textbook:
  - complete at least 80% of the "basic" exercises assigned, in a legible, satisfactory way
- Create your own Statistics Reference Book with at least basic content from the course
- Quizzes and Exams –at least 65% correct
- Data Projects – at least two-thirds
- Other Assignments – at least two-thirds

To get at least a "B-" you must do all of the following:

- Homework Exercises assigned from the textbook:
  - complete all the "basic" exercises assigned, in a legible, satisfactory way
  - work on at least one-fourth of the "advanced" exercises
- Create your own Statistics Reference Book with a Title Page, Table of Contents, and (more than minimal) definitions of terms from each Learning Unit
- Quizzes and Exams –at least 75% correct
- Data Projects – at least 80%
- Other Assignments – at least 80%

To get at least an "A-" you must do all of the following:

- Homework Exercises assigned from the textbook:
  - complete all the "basic" exercises assigned, in a legible, satisfactory way
  - work on more than half of the "advanced" exercises
- Create your own excellent Statistics Reference Book with a Title Page, and Table of Contents, including up-to-date definitions of terms from each Learning Unit, with color, accompanied by graphs and examples.
- Quizzes and Exams –at least 85% correct
- Data Projects – at least 90%
- Other Assignments – at least 90%

CAVEAT:	The above procedures are subject to change.