

Applied Statistics for Management and Economics

Course Number:
BUS 2340; ECN 2340
4 Credits

Course Time:
MF 11:45 p.m. – 1:25 p.m. (Sect 01)
MW 6:30 p.m. – 8:10 p.m. (Sect 02)
Office Hours: MW 3:00 p.m.—5:30 p.m. and
by appointment

Instructor: Julio Rivera, Ph.D.
Office: Clausen 218
Office Phone: 262-551-5846
e-mail: julio@carthage.edu
WWW: <http://juliorivera.net>

Course Approach

The analysis of data and information is a noble and important pursuit. This is a research course that asks you to analyze and report on data to reduce uncertainty in decision making.

The purpose of this course is to learn statistical concepts and processes involved in using creating and analyzing data using personal computers and web applications. This process will take two separate and parallel methods.

- The lecture/discussion portion of the class is designed to increase your knowledge of data science, statistical methods, data visualization, data handling and the theoretical and research base that surrounds these concepts and technologies. The lecture/discussion is designed to stimulate thought about data, data visualization, and statistical assertions using spatial and non-spatial databases. We will use these techniques to explore and explain ideas in our world.
- The research portion of the course is designed to help you learn and integrate basic statistical knowledge and skills, handle and analyze data, apply elements of visualization design and enhance your computer skills to produce statistical statements and visualizations. Students will be expected to develop knowledge and expertise in data selection, compilation, display, design, graphic skills, and desktop mapping production techniques. Students will have the opportunity to critique each other's work. Students are expected to attend all class and lab sessions.
- This class is not about "learning how to use SPSS and Excel." Rather it is about learning the concepts behind analyzing data. There are other types of software on the market—using the same statistical concepts, but with different commands and algorithms. When you complete this course you should be able to think about statistical concepts and apply them to a variety of software packages.

Statistics the science of learning from data and using statistical information to reduce (but not eliminate) uncertainty in decision making. It rare that you will have a data set without errors and there is no uncertainty. Part of statistics is dealing with uncertainty. Statistical analysis and data visualization is an essential element of Business analytics as well as a variety of other disciplines (Environmental Science, History, Political Science, Geography, Economics, Biology, and many more). If the projects in this course coincide with your own research and course work, it is possible to make some of the assignments complement your other academic work. Consult the instructor for approval if your project that falls outside the written course requirements.

Learning Outcomes from this Course

1. Students will determine descriptive measures of central tendency and dispersion for data sets and explain what they mean.
2. Students will demonstrate understanding of the concept of probability by defining and explaining what a p-value is and what it means when applied to a statistical test of significance.
3. Students will set up and execute statistical tests for differences, similarities, correlations, and the general linear model and explain what they mean (parametric and non-parametric).
4. Students will determine whether their data set requires a parametric or non-parametric statistical test.
5. Students will explain the concepts of estimation and confidence intervals and use them to determine whether the sample size of their data sets is adequate to measure a statistical outcome.
6. Students will apply sampling techniques through the extraction of data subset from a large database for analysis.
7. Students will use data visualization techniques to explain their findings.
8. Students will demonstrate mastery of the hardware and software required to complete the course.

Course Material

Required Material:

- Salkind, N. J. 2014. *Statistics for People Who (Think They) Hate Statistics*. 5th Edition with SPSS software.
You may purchase the book without software and use the public computers on campus. This will be cheaper, but less convenient.
- A Windows® version of Excel® (2010 or higher). Although you can use other versions of Excel to complete the coursework, there are variations between versions which may make the work more difficult for you. Like SPSS, a version of Excel is available for free on (nearly) all public computers on campus. You may also get a one-year license for office 365 through the Library computer center. See <https://www.carthage.edu/live/news/4252-get-ms-office-365-for-free> and contact Carol Sabbar for the license.
- On occasion additional books and readings may be assigned and left on reserve or on e-Learning.

Recommended (Optional) Material:

- Occasionally students have found these items useful. They are not necessary for success in the course, but they have proven valuable to some students.
- “After market” manuals that give additional “tips” on using software. Local bookstores will stock after-market manuals for most of the other software we will use in this course.
- Online videos and tutorials
- A thumb/jump/usb storage cartridge or drive

Evaluation and Assignments

- **Grades:** Course grades are based on the following assignment/exam values in the table below. Incomplete grades are given on rare occasions based on illness or uncontrollable factors, and need instructor approval. Grading standards are based on the grading system listed in the *Carthage College Catalog* (<http://www.carthage.edu/live/files/1339-2014-2015-college-catalogpdf>). Students are expected to conform and adhere to the College's code of academic conduct that can be found at: <http://www.carthage.edu/campus-life/code/academic-concerns/>.

Graded Categories	Percentage
Lab and Case Problems	30%
Scheduled Quizzes	20%
Semester Paper and Large Format Poster Project	20%
Digital Professional Portfolio	10%
Check-in quizzes	10%
Class Participation	10%
<i>Total</i>	100%

- **Lab and Case Problems**—The lab and case problems ask you to integrate the lectures, assigned reading, and other material. These problems provide the practical experience to enhance your theoretical understanding of statistics. All lab and case assignments are due at the specific time assigned or at the beginning of the class or lab period assigned. Late assignments will be docked according to the late work policy. Graded exercises are generally returned to students as soon as possible following their due date. Late exercises will be graded at the convenience of the instructor (warning—sometimes this can be a long time). It is in your best interest to begin assignments early (this comes as advice from others who have taken this course from me).
- **Semester Paper and Large Format Poster Project**—You will build a statistical research problem and outcome as your semester project. You will write this up as a paper. You will also construct a large-format poster describing your project in words, maps, graphs, and photographs, that form a “visual essay.” The poster will be submitted digitally, but should be a format that could be printed at a professional printing outlet. You will present the poster at the end of the semester. A formal assignment sheet will be distributed later.
- **Digital Professional Portfolio**—During the semester you should be compiling your work into a digital portfolio. This is not designed to be an onerous task. The portfolio will not require you to make any new material; rather this is a “gathering reflective exercise.” This is to be a document that you use as a resource later on for employment interviews. It will allow you to demonstrate to potential employers and internship sites what you know and what you can do. It should not simply be a collection of “stuff” but a description of what you have learned and the skills you have acquired because of the work you have completed. The best advice in preparing your portfolio is to place a separate “clean copy” of your each of your assignments in a master document. Each assignment should also include a short description of the project and the skills you gained in the process. There should also be a cover sheet explaining your skills and abilities. A formal assignment sheet will be distributed later.
- **Late work and Assignments**—all assignments are due on the day stated in the assignment. If no specific time of day is specified—it may be turned in at any time during the 24 hour time period for that day. Late work is still accepted by the instructor—if turned

in within 2 weeks, only a half grade penalty is assessed. If an assignment is more than 2 weeks late a full grade penalty is assessed. No additional penalties are assessed after 2 weeks and the work will still be accepted late—however you should come in to talk to the instructor about difficulties you are having with the work.

Notes on Technology

Our class is fortunate to have access to quality hardware, software, and internet applications. These applications allow the course to be taught very differently than it was just a few years ago. The following are notes which need to be made explicit:

- I do not expect that you begin this class with significant computer skills. You were not born speaking R or C nor do I expect you are writing Java and Python scripts. I do expect that when you will finish the class, you will have a variety of skills that you can apply and refine in the future. I expect you will confront the technology and work with it. **I expect you to ask me questions.** No question is a silly question including: “How do I turn this on?”
- It is o.k. and a COMMON EXPERIENCE to feel overwhelmed early on in the semester in this course. **I know that.** I know that you need a lot of technical support early on. I will provide that for you. Please keep in touch via e-mail, phone, text, or just drop by my office!
- Students’ major error in this course is worrying if they are asking questions that are too simple. If it is a question about the material—it does not matter how simple it is, it only matters that you have a question and that it gets answered.
- **Previous students said that they only got brave enough to ask questions about in the 10th or 12th week of class. They said they should have been asking questions early in the semester and things would have gone much smoother at the end.**
- Previous students have told me that I should emphasize how important an early start on the projects is. Although I have always told students to start their projects right away, this has seldom happened.
- The College has invested in a Course Management System (CMS) called e-learning. E-learning helps us create course site that better serves our needs. Your instructor has used web pages in courses for several years, but e-learning offers some unique features that will explore in the coming weeks. You will log onto the course through the College portal.
- The exercises and problems assigned in this course assume that you are using a Windows 7 or later interface along with updated web browsers. There is no prohibition in using Linux, Unix, or Apple interfaces—however since I don’t work with them regularly, my ability to provide tech support may be limited.
- Although technology solves many problems, it can also create them. Your instructor **expects** problems to occur. It is your responsibility to ask questions and seek solutions. No question is too basic or too simple. **It is not out of bounds to call the instructor at his home before 9:00 p.m.**

Other Expectations

- Your excellent attendance is assumed. The absent student has the same responsibilities as those who were present. It is assumed that if you are away, there is an adult reason and that you will let me know.
- Your instructor assumes that not every word that drops from his mouth is crystal-clear—questions in class are expected and welcome. Visits to his office to clarify materials and assignments are encouraged.

- The instructor reserves the right to alter the course schedule and syllabus. These updates will appear as announcements in e-learning or general e-mails to the class.
- The instructor reserves the right correct clerical errors on the assignments, syllabus, or the e-learning system
- The instructor assumes you are using your Carthage e-mail as your primary academic e-mail address. If this is not the case, it is your responsibility that messages sent through e-learning to your Carthage e-mail is properly forwarded to your primary academic e-mail account. In other words: not using your Carthage e-mail account is not an excuse for a missed assignment or update.
- If you use a non-Carthage e-mail to contact me you run the risk of being caught in the College's spam filter—this is your problem and not mine. It may be two or three weeks before I check the spam filter—students have had messages languish there for weeks or be auto-deleted.
- Although it is fine to text and email the instructor with questions, some questions are too complex to effectively answer by text or email. If my response to you is “call me” you should contact me on my cell phone. If you receive a text response of “160” it means the question is too complex for texting and you should call me directly.
- All wireless and electronic devices must be shut down or in silent mode during the class period unless prior arrangements have been made with the instructor. We will use your wireless devices in class—so bring them with you.
- Please address any special needs or accommodations with the instructor at the beginning of the semester. You will also need to have documentation on file with Diane Schowalter in the Advising Center (x5802.) This information will be kept confidential.