

Course Information

Term and Year: Fall 2017

Class Location: San Francisco Campus
One Beach Street, San Francisco, CA

Class Meetings Days and Times: Wednesday evenings, 6 – 10:30 PM.
August 30 – October 18, 207.

Instructor Information

Name: Stephan Sorger
Phone: 650.455.4411
Email: stephan.sorger@alliant.edu

Availability: Office Hours:

Wednesdays after class at Alliant San Francisco campus, One Beach Street, San Francisco, CA

Additional per student interest:

Tuesdays at 4:30 PM at UC Berkeley Ext campus, 160 Spear Street, San Francisco, CA

Saturdays at 12:00 PM at UC Berkeley Ext campus, 160 Spear Street, San Francisco, CA

Please email first. Other days and times available by arrangement.

Course materials: To access course content, go to: StephanSorger.com → Courses → Statistics
Request password from instructor.

University Mission Statement

CSML Mission Statement: The mission of California School of Management & Leadership is:

- To prepare individuals for successfully addressing challenges in business and management with a view to advancing internationalism, multiculturalism and sustainability.
- To develop intellectually engaged and culturally sensitive leaders for all sectors of society.
- To provide decision making and problem solving skills for contemporary challenges in business and management.

Program Mission Statement

MSDA:

Program Mission: To provide students with advanced skills for analyzing data for management decision making and to provide practical applied experience for business contexts.

Training Model: The MS Data Analytics program at Alliant's School of Management provides advanced data analysis, management and analytical skills and extensive practical experience applying those skills, especially in business contexts. The program harnesses Alliant's industry and corporate connections in regional as well as international areas and provides networking and professional development opportunities including internships, and practical training.

Program Vision: What will typical graduates do on the job?

- **Making Decisions and Solving Problems** — Analyzing information and evaluating results to choose the best solution and solve problems.
- **Communicating with Supervisors, Peers, or Subordinates** — Providing information to supervisors/co-workers/subordinates by phone, in written form, e-mail, or in person.
- **Getting Information** — Observing, receiving, and otherwise obtaining information from all relevant sources.
- **Communicating with Persons Outside Organization** — Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources.
- **Developing and Building Teams** — Encouraging and building mutual trust, respect, and cooperation among team members.

Program Learning Outcomes: Students who complete the program will be able to:

- Outcome 1: Demonstrate an understanding of techniques for maximizing the value of data in organizations
- Outcome 2: Apply critical thinking skills in the context of problem solving in the business workplace
- Outcome 3: Demonstrate competence in communicating data solutions to organizational audiences
- Outcome 4: Apply knowledge and skills in data science in the context of the organization
- Outcome 5: Be proficient in making socially responsible decisions for data applications in business
- Outcome 6: Leverage teams in the applications of data analytics and information technology

Course Description

This course introduces the basic methods of applied statistics. The course teaches analysis of data with graphs and basic descriptive statistics. Students will also learn concepts of normal distribution, simple probability theory, random samplings from populations, experimental treatments, sampling distributions, concepts of confidence intervals and significance testing, regression analysis and standard analysis of variance.

Program Learning Outcomes

- **PLO1:** Demonstrate an understanding of techniques for maximizing the value of data in organizations
- **PLO2:** Apply critical thinking skills in the context of problem solving in the business workplace
- **PLO3:** Demonstrate competence in communicating data solutions to organizational audiences
- **PLO4:** Apply knowledge and skills in data science in the context of the organization
- **PLO5:** Be proficient in making socially responsible decisions for data applications in business
- **PL06:** Leverage teams in the applications of data analytics and information technology

Course Learning Outcomes

This course covers essential concepts in basic applied statistics

- **CLO1:** Prepare graphs and basic descriptive statistics
- **CLO2:** Understand normal distribution and simple probability theory

- **CLO3:** Establish understanding of random samplings from populations
- **CLO4:** Learn experimental treatments, sampling distributions, and other topics
- **CLO5:** Experience active learning sessions solving problems collaboratively.

Student Expectations

Respectful Speech and Actions

As an institution of higher education, Alliant International University has the obligation to combat racism, sexism, and other forms of bias and to provide an equal educational opportunity.

Professional codes of ethics and the academic code shall be the guiding principles in dealing with speech or actions that, when considered objectively, are abusive and insulting.

Professional Behavior

This program is a graduate-level professional program, and each member of the program, both students and faculty, are expected to engage in professional behavior and conduct. As a student, you should always display empathy, self-control, friendliness, generosity, cooperation, helpfulness, and respect in all of their interactions with other students, staff, and faculty. You are expected to exemplify professional behavior in all aspects of your participation in this program, to be on time in all engagements, to thoughtfully and diligently complete activities and assignments, and to treat all other program members with respect and dignity.

Expected In-class and Preparation Time per Week

Week 1, Week 2, Week 3, Week 4, Week 5, Week 6, Week 7, Week 8:

5.5 hours of class time or equivalent + 10 – 15 hours of preparation time per week

Expected weekly time is calculated per the following formulas:

Class time: $15 * 3 \text{ units} / 8 \text{ weeks}$: 5.5hours per week

Preparation time: $(20 - 30) * 3 \text{ units} / 8 \text{ weeks}$: 7.5 – 15 hours per week

Required Course Materials

Textbook: Required:

Crawley, Michael. "Statistics: An Introduction Using R." 2nd Edition. Wiley. 2014.

ISBN 978-1-118-84109-6

Amazon link:

<https://www.amazon.com/gp/product/1118941098>

Instructor Policies

Late Assignments

Technological issues are not considered valid grounds for late assignment submission. In the event of a server outage, students should submit assignments to the instructor directly through email and when systems are restored, submit those assignments according to syllabus instructions.

Unless an Incomplete/In Progress grade has been granted, assignments submitted after the last day of class will not be accepted.

Engagement and Discussion Requirements

Class engagement and discussion are vital to the course. Engagement requires you to be actively engaged in the weekly classroom activities and discussion. The best contributions reflect excellent preparation, good listening, and interpretative and integrative skills.

Group Work

At times throughout your program you will be expected to work effectively in diverse groups of students to achieve tasks. Group projects are outcome-based, which means that all members in the group will earn the same grade for group projects. However, I reserve the right to report different grades for group members if I see a substantial imbalance in individual contribution. If I do not see you actively participating in your group, then that will adversely affect your personal grade.

It is expected that you will actively participate with your group and contribute to the group discussions by:

- Contributing original work that is accepted and used by the group with proof of originality.
- Participating in the project from assignment organization to a meaningful final review of the team project before submission.
- Ensuring that your contributions are your original work and properly quoted, cited, and referenced.
- If groups are a component of the course they will be assigned by the end of the Week One.

Feedback

I will provide grades/scores and comments on assignments within 1 – 2 weeks after the due date unless I notify you otherwise.

Syllabus/Schedule

This syllabus does not constitute a contract between the instructor and the students in the course. While every effort will be made to present the material as described the instructor retains the right to alter the syllabus for any reason at any time. When such changes are made every effort will be made to provide students with both adequate notification of the changes and to provide them with sufficient time to meet any changes in the course requirements. The weekly schedule for this course may be viewed online.

University Administrative Policies & Student Resources

You are held responsible for understanding and adhering to all policies contained within the University's Catalog located at <http://catalog.alliant.edu>. However, some of those policies have been selected to be highlighted in this document.

Academic Code of Conduct and Ethics

The University is committed to principles of scholastic honesty. Its members are expected to abide by ethical standards both in their conduct and in their exercise of responsibility towards other members of the community. Each student's conduct is expected to be in accordance with

the standards of the University. The complete Academic Code, which covers acts of misconduct including assistance during examination, fabrication of data, plagiarism, unauthorized collaboration, and assisting other students in acts of misconduct, among others, may be found in the University Catalog.

An act of plagiarism (defined in the University catalog as "Any passing off of another's ideas, words, or work as one's own") is considered to be a violation of the *University's Student Code of Conduct and Ethics: Academic* and will be addressed using the Policies and Procedures outlined in the University's Catalog located at <http://catalog.alliant.edu>. The instructor in this course reserves the right to use computerized detection systems to help prevent plagiarism.

Disability Accommodations Request

The University provides reasonable access to facilities and services and to programs for which students are otherwise qualified without unlawful discrimination based upon qualified disability. The University will provide reasonable accommodations to individuals who currently have a disabling condition, either physical or mental, that is severe enough to substantially limit a major life activity.

Students with disabilities may obtain details about applying for services from the Office of Accessibility at each campus. Students must provide documentation from a qualified professional to establish their disability, along with suggested reasonable and necessary accommodations. Students should request accommodations at the start of each semester. For more information, visit the Office of Accessibility Services at your campus or go to <http://www.alliant.edu/about-alliant/consumer-information-heoa/disability-services/index.php>.

Policy on Religious/Cultural/Spiritual Observance by Students, Staff and Faculty

In keeping with the institution's commitment to respect and affirm cultural, religious, and spiritual diversity, the University supports the rights of students, staff, and faculty to observe religious/cultural/spiritual obligations that conflict with the University's schedule. Faculty instructors and staff/administrative supervisory personnel are expected to make reasonable accommodations when a student or an employee is absent from class or work because of religious/cultural/spiritual observance.

Attendance

If you miss more than the allowed absences in a course in consecutive or non-consecutive weeks, you may be withdrawn from the course and not eligible to earn a grade. Sending assignments to me by email, fax, mail or other means does not make up for missed attendance and I cannot excuse absences.

Length of Course	Absences Allowed	Absences Resulting in Drop
1-4 weeks	0	1
5-9 weeks	1	2
10+ weeks	2	3

Note: Academically related activities are used to calculate a student's official last date of attendance with the institution. In order to be in attendance for the week you must attend class.

Note: You must attend exams/ quizzes in person on the day and time those exams/ quizzes are

offered. If you fail to do so, you will receive a 0 for the exam/ quiz.

Technology Requirements and Support

Answers to the most common issues are found in the online learning system help pages, such as the Canvas Guides, which are accessible by clicking Help link located in the top right-hand side of the canvas course Web Page.

For any other Canvas or technical issues please contact the Alliant Help Desk by email at: Helpdesk@alliant.edu or by phone at: 1-844-313-4357.

Grading

Grading is calculated from the components shown below, using the following grading cutoff points:

100 – 94 = A, 93 – 90 = A-, 89 – 87 = B+, 86 – 84 = B, 83 – 70 = B-, 69 – 60 = C

	<u>Percent</u>
Statistics Project	30%
Midterm Exam:	30%
Final Exam:	30%
Attendance/ Participation/ Case Studies	<u>10%</u>
Total	100%

Project Overview

Students apply what they learn in class by forming teams of approximately 5 people each and completing an analytics project.

- The model and its data must be non-confidential.
- Students must create their own original work and not re-purpose an existing work
- Each person will receive their overall team's grade, using the "Project Grading Sheet".

Project Selection

Students will select an industry example that interests them and demonstrates statistical concepts as presented in the course. For example, a team could be interested in the proposed acquisition of the retail grocer Whole Foods by the online commerce giant Amazon.com. We could examine the statistics to determine the viability of such an acquisition.

Statistical Research

We would gather data for the project using secondary and primary research.

Secondary Research: In secondary research, we seek to find information already developed. Cite at least 10 articles in the project. Research sources must be reliable, such as those from the Wall Street Journal, New York Times, Fortune, Forbes, etc. Do not cite unreliable sources such as Wikipedia or social media. For example, conducting a search using online search engine Google for data on the Amazon/ Whole Foods acquisition reveals the following article:

DAT5005: Applied Statistics

Kowitt, Beth. "What We Know About the Amazon and Whole Foods Shopper." Fortune.com. June 28, 2017.
<http://fortune.com/2017/06/28/whole-foods-amazon-shopper-data/>

Primary Research: In primary research, we seek to find information gathered directly from our network. Cite at least 20 qualified respondents.

Outline:

Please follow the outline given in the Project Grading Sheet. Deviations must be approved by the instructor.

Presentation:

Teams will present the project in one of the final class sessions. Provide the instructor with two deliverables:

- Hardcopy: Microsoft PowerPoint presentation or equivalent, printed 2 slides per page.
- Softcopy: Each person in a team must submit their presentation into the electronic learning system before the presentation is given.

Midterm Exam

The midterm examination is closed book and closed notes and emphasizes the material from the beginning of the course until the time the midterm is given. No Internet access is permitted during the exam, except for access to the online learning system for purposes of accessing the online test taking tool. See schedule for details.

Final Exam

The final examination is closed book and closed notes and emphasizes the material from the midterm exam until the end of the course. No Internet access is permitted during the exam, except for access to the online learning system for purposes of accessing the online test taking tool. See schedule for details.

Class Participation

Class participation is made up of two components, attendance (5 points) and discussions based on books you have read during the course (5 points).

Attendance:

Students must attend classes to enjoy the full benefits the course offers. To that end, attendance will be monitored every class session, and points deducted for unexcused absences or tardiness more than 10 minutes. The scoring is calculated as follows (5 points max)

5 points: Attended all classes punctually

4 points: Missed one class, or was late to one class

3 points: Missed two classes or was late to two classes

0 points: Missed more than two classes or late to more than two classes.

In some cases, F-1 Visa eligibility requirements mandate that students comply with the approved number of hours/units in the classroom to maintain visa status. Therefore, daily attendance is required.

Discussions Based on Reading and Case Studies

DAT5005: Applied Statistics

Reading: You MUST read at least one nonfiction book every 4 weeks during this course. The intent of this requirement is to initiate a habit of continual reading, a vital skill that Bill Gates, Warren Buffet, and others attribute to success. Requirements for the book:

- Must be nonfiction
- Must be in English
- Must be at least 100 pages in length
- Must not be a book you already read, or a textbook assigned for a course (such as this one)
- Cannot be an article
- Any format acceptable: Printed; Ebook; Audible; etc.
- Any subject acceptable: For example, Yvon Chouinard applied the principles he learned from surfing to run a very successful business.

Case Studies: In addition to reading, students must perform the in-class case studies. The in-class case studies will be worked on in groups during the classroom session. The intent of the case studies is to give you hands-on work with typical industry problems and practice using programming languages such as R. You will need to bring your computer to every class session to execute the case studies.

Discussions: Students must contribute to discussions during class. Contributions should highlight relevant current events and lessons learned from the nonfiction book you are reading. To that end, discussions will be monitored during every class session, and points calculated as follows (5 points max):

5 points: Leads class in discussions. Helps class come to consensus. Helps others complete in-class case studies. A leader.

4 points: Regular contributor, with relevant examples that demonstrate understanding. Always complete case studies.

3 points: Participates occasionally. Completes most case studies.

2 points: Does not actively contribute to class. Rarely completes case studies.

0 points: Interrupts other students; Not respectful of others; Discusses irrelevant topics

Instructor will select a volunteer to assess attendance and discussion at the start of each class. Volunteer will act as scribe to record attendance and discussion and will report their assessment to the professor in the form of a completed document, to be developed by the professor.

Volunteer scribes will get full participation credit for the class.

Applied Statistics
Project Grading Sheet

Date: _____
Topic: _____
Members: _____

No.	Grading Criterion	Score: 1-5
Deliverables		
1.	Time: 15 min. max; Start: _____; End: _____; _____min	1 2 3 4 5
2.	Softcopy of presentation uploaded to online learning system before presentation Comments: _____	1 2 3 4 5
3.	Hardcopy of presentation, printed two slides per page, delivered before presentation Comments: _____	1 2 3 4 5
4.	Visual quality: Presentation legible, easy to understand and follow; well structured Comments: _____	1 2 3 4 5
5.	Verbal quality: Presentation well executed; shows evidence of much rehearsal Comments: _____	1 2 3 4 5
6.	Title slide and Teamwork: List and present team members; Explain team approach Comments: _____	1 2 3 4 5
7.	Description: Describe company and situation to understand problem in context Comments: _____	1 2 3 4 5
8.	Problem Statement: Describe problem clearly & completely; go/ no go success criteria Comments: _____	1 2 3 4 5
9.	Solution Process: Explained step-by-step process; diagrammed approach Comments: _____	1 2 3 4 5
10.	Secondary Research: Provide summary of secondary research; Roles of each source Comments: _____	1 2 3 4 5
11.	Primary Research Show how respondents were selected and data gathered Comments: _____	1 2 3 4 5
12.	Research Instrument: Summarize research instrument, such as questionnaire samples Comments: _____	1 2 3 4 5
13.	Statistical Analysis Process: Analyze data; Show patterns, trends, present graphs Comments: _____	1 2 3 4 5
14.	Statistical Analysis Code: Show examples of computer code; Highlight best practices Comments: _____	1 2 3 4 5
15.	Findings: Present findings and basic insights; What have you learned? Comments: _____	1 2 3 4 5
16.	Market Comparison: Compare findings with market trends and observations Comments: _____	1 2 3 4 5
17.	Scenarios: Develop at least 3 sample scenarios; Show likely outcome for each Comments: _____	1 2 3 4 5
18.	Interpretation: Interprets findings in context of market situation and 3 scenarios Comments: _____	1 2 3 4 5
19.	Conclusion: Presentation indicates how problem was solved; insights Comments: _____	1 2 3 4 5
20.	Recommendations: 3 – 5 recommendations of what company should do Comments: _____	1 2 3 4 5

Schedule

<u>Meeting 1</u>	<u>Introduction; Fundamentals; Experimental Treatments</u>
• Syllabus	Review syllabus;
• Introductions	Introduce class members
• Project	Discuss sample statistics project
• Break	Set up teams: 4 – 6 people per team
• Chapter 0	<u>Statistics 101: A quick overview of statistics</u>
• Chapter 1	<u>Fundamentals</u>
• Video	Role of statistics in our lives
• Break	
• Case Study 1	Statistics Project topic selection
<u>Meeting 2</u>	<u>Statistics Data Management</u>
• R Essentials	<u>Basic statements and practices using R</u>
• R Cluster Analysis	<u>Segmentation using R-based cluster analysis</u>
• Video	Getting Started with R (16:30)
• Break	
• Chapter 2	<u>Dataframes: Working with data in R</u>
• Case Study 2	Cluster analysis example: Blue Bottle Coffee
<u>Meeting 3</u>	<u>Central Tendency: Descriptive Statistics and Graphs</u>
• Chapter 3	<u>Central Tendency: Mean, Median, Standard Deviation, etc.</u>
• Chapter 3A	<u>Statistics Graphs and Plots</u>
• Video	Statistics: Central Tendency
• Break	
• Case Study	Case Study in R: Central Tendency
• Project	Time in class to work on Statistics Project
<u>Meeting 4</u>	<u>Variance: Confidence Intervals</u>
• Chapter 4	<u>Variance</u>
• Video	Statistics: Variance
• Break	
• Case Study	Case Study in R: Variance
• Project	Time in class to work on Statistics Project
<u>Meeting 5</u>	<u>Sampling; Probability; Distribution</u>
• Chapter 5	<u>Single Samples: Normal Distribution, etc.</u>
• Chapter 6	<u>Two Samples</u>
• Video	Statistics: Sampling and distributions
• Break	
• Case Study	Case Study in R: Single Samples
• Case Study	Case Study in R: Two Samples

<u>Meeting 6</u>	<u>Regression; Significance Testing</u>
• Chapter 7	<u>Regression</u>
• Video	Statistics: Regression
• Case Study	Case Study in R: Regression
• Break	
• Exam	Midterm Exam: Statistics 101, R Essentials, R Cluster Analysis, Chapters 1, 2, 3, 4
	Students may leave classroom when finished
<u>Meeting 7</u>	<u>Analysis of Variance (ANOVA)</u>
• Chapter 8	<u>Analysis of Variance</u>
• Video	Statistics: ANOVA
• Case Study	Case Study in R: ANOVA
• Break	
• Project	Statistic Project Presentations
<u>Meeting 8</u>	<u>Final Session</u>
• Chapter X	<u>Statistics in Industry; Finding employment in data science (not on exam)</u>
• Break	
• Exam	Final Exam: Chapters 5, 6, 7, 8 Students may leave classroom when finished