# CSCI 1462: Introduction to Data Analytics

## Credit Hours

4 credit and contact hours.

## Prerequisites

Eligibility for enrollment in college algebra.

## Catalog Description

Collection, description, and analysis of numerical data. Data presentation, tables, charts and graphs, descriptive statistics, regression analysis, analysis of time series and index numbers, sampling techniques and distributions, estimation, confidence intervals, with applications in quality control and productivity.

## Purpose of Course

To introduce students to the basic concepts of data analytics, including tabular data, data visualization, descriptive statistics, and other fundamental of data analytics.

## Educational Objectives

1. develop quantitative reasoning ability;

2. be better able to select the appropriate statistical tool/methodology to aid in business decision making;

3. be able to use a computer spreadsheet program such as Excel to describe and analyze numerical data;

4. be better able to communicate in the language of applied statistics;

5. be able to manipulate simple statistical formulae to solve non-verbal (numerical) problems;

6. have a much better vision of how analytics are used in decision making;

7. understand more about job/career potential of analytics and the role in society;

## Course Calendar

This course meets for a minimum of 37.5 lecture contact hours during the semester, including the final exam. Students have weekly reading assignments. Students are required to complete periodic homework assignments, and 2-3 periodic exams in addition to the final exam. Students are expected to prepare for any class assignments or quizzes over the material covered in class or in the reading material. Successful completion of these activities requires at eight additional hours of outside of classroom work each week.

## Possible Content

- Data Visualization and Organization
- Descriptive Statistics
- Probability and Randomness
- Discrete Probability Distributions
- Continuous Random Variables

- Samples and Samples Distributions; Outlier Detection
- Estimating Means and Proportions
- Regression and Inference
- Time Series

### References/Possible Books

- Computational and Inferential Thinking: The Foundations of Data Science by Ani Adhikari and John DeNero
- Introduction to Statistics and Data Analysis by Roxy Peck, Chris Olsen, Jay L. Devore
- Discovering Business Statistics by Quinton Nottingham and James Hawkes

## Course Calendar

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|---|---|---|
| Introduction to Data Science | Experiment vs. Observation<br>Data Sampling<br>Sampling Bias | 1 week |
| Introduction to Python | Functions<br>Data Types<br>Loops<br>Tables | 2 weeks |
| Introduction to Pandas | Functions (apply, map)<br>Summary Statistics<br>Grouping<br>Charts/Histogram | 3 weeks |
| Probability | Naïve Definition<br>Binomials and Probability | 1 week |
| Hypothesis Testing | p-value<br>comparing distributions<br>confidence interval<br>normal distribution<br>estimation of bias | 3 weeks |
| Data Cleaning | | 2 weeks |
| Data Visualization | | 2 weeks |
| Modeling | Linear Regression | 1 week |

**Expected Time Requirements for Class:**

Meets 4 hrs/wk for 15 weeks. This is a problem-oriented class with homework problems. The lecture has 4 hours of contact time each week and the work outside of class each week will average 8 hours a week in development, analysis, and validation of codes, understanding the statistical theory undergirding data analytics, reading the required text, and preparing and completing course assessments.

**Disclaimer**: Per SFA policy 5.4, this schedule and chosen exercises reflects that for each credit hour we will have one hour of faculty instruction with at least two hours of out-of-class student work per week. In other words, for an X credit hour class the student should expect X class hours of faculty instruction with 2 time X out-of-class hours of student work per week.

**Academic Integrity (*A-9.1*)**

Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

Definition of Academic Dishonesty

Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at http://www.sfasu.edu/policies/academic_integrity.asp

**Withheld Grades *Semester Grades Policy (A-54)***

Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

**Students with Disabilities**

To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building,

and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

**Student Code of Conduct: Policy 10.4**

Classroom behavior should not interfere with the instructor's ability to conduct the class or the ability of other students to learn from the instructional program. Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This policy--- applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the iCare: Early Alert Program at SFA. Information regarding the iCare program is found at https://www.sfasu.edu/judicial/earlyalert.asp or call the office at 936-468-2703.

**Mental Health Awareness and Resources**

SFASU values students' mental health and the role it plays in academic and overall student success. SFA provides a variety of resources to support students' mental health and wellness. Many of these resources are free, and all of them are confidential.

On-campus Resources:

SFASU Counseling Services

www.sfasu.edu/counselingservices

3rd Floor Rusk Building

936-468-2401

SFASU Human Services Counseling Clinic

www.sfasu.edu/humanservices/139.asp

Human Services Room 202

936-468-1041

Crisis Resources:

Burke 24-hour crisis line 1(800) 392-8343

Suicide Prevention Lifeline  1(800) 273-TALK (8255)

Crisis Text Line:  Text HELLO to 741-741