Course Syllabus

Stat 342: Probability and Mathematical Statistics II

Spring 2022

**Department of Mathematics and Computer Science**

## Claflin University

**Instructor**: Dr.Shrikant Pawar, [Spawar@claflin.edu](mailto:Spawar@claflin.edu)

**TELEPHONE**: (404) 431-0213

**Text Book:** Elementary Statistics by William Navidi and Barry Monk, McGraw Hill,

**Prerequisites: A grade of “C” or better in MATH 201 Calculus I**

# Course Description: Stat 342

**STAT 342: Introduction to Probability and Statistics: Inference I**

Prerequisites: A grade of “C” or better in MATH 201 or its equivalent. Descriptive statistics, sample mean, median, variance, and standard deviation. Elementary probability, conditional probability and independent events, Bayes Theorem. Random variables, discrete and continuous probability distributions, mathematical expectation. Three semester credit hours.

# Rationale

This course is designed to help students grasp basic statistical concepts and techniques, and to present real-life opportunities for applying them to their specific disciplines

1. **Course Overview**:
   * **Major Concepts to be taught**:

Descriptive and Inferential Statistics

Classify, group, organize and represent data.

Descriptive measures

Relationship between two quantitative variables

Fundamentals of probability, basics of discrete random variables and their probability distributions

Normal distributions and its properties

Sampling distribution of the sample mean

Confidence Intervals

Hypothesis Tests

* **Special Vocabulary:**

Students must be able to define the following terms as they relate to statistics in a global society

Mean of data set

Median of data set

Mode of a data set

Sample mean, sample Standard deviation

Range of a data set

Limits

Mean and Standard deviation of a Population

Parameter, Static

Standardized variable, IRQ

Z-Score, Outliers

Bernoulli trials

Binomial coefficients, distribution, probability formula and random variable

Probability, relations

Complement rule, random variable, expected value and events

Venn diagrams and Sampling

Probability distributions and histograms

Normal distribution and normally distributed variables

Standard normal curve, Zα and Z-curve

Central limit theorem and standard error

Sampling error

1. **Learning Outcomes and Assessments**

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| **Outcomes** | **Assessment(s)** |
| Intro. to Statistics and Data Analysis: Be able to classify variables as continues or discrete and choose proper method for describing the variable. Be able to find the center and the spread or variability in a data set for different kind of variables, be able to use graphical diagnostics techniques | Home Work, Test, Computer Analysis |
| Intro. to probability: be able to find the sample space using counting methods, be familiar with the probability notation, be able to find the probability of events, be able to use the rules of probabilities and Baye’s rule. | Home Work, Test |
| Random variables and Prob. Distributions: Be able to classify and define random variables using probability distribution functions. Be able to find the joint distributions and two random variables, be able to compute the marginal and conditional densities from the joint density, be able to use the properties of independent random variables. | Home Work,, Test |
| Mathematical Expectation: Be able calculate the expected value of a random variable and a linear combinations of random variables, be able to calculate the covariance of random variables and describe the joint behavior using the covariance, be able to apply the above knowledge to calculate the variance of a random variable and a linear combination of random variables. Be able to calculate the correlation using the covariance | Home Work, Test, Computer Analysis |
| Some discrete probability distributions: Be familiar with discrete random variables, be able to use the formulas and calculate the probability of certain events, be able to identify Binomial and Poisson distributions and find the probability and cumulative probability of events. Be able to find the mean and variance. | Home Work, Test, |
| Some continuous probability distributions: be able to plot the continuous distributions using the probability density functions, be able to find the mean and variance of the continuous distributions, be able to find the areas under the normal curves using the tables, be able to use uniform, normal, exponential, gamma, chi square and F distributions on real world applications. | Home Work, Test, Computer Analysis |

1. **SPECIAL COURSE REQUIREMENTS:**

Usage of available computer resources such as R

1. **METHOD OF EVALUATION:**

Home Work 15%

Attendance & Participation …... 5%

R ……………..…………...20%

4 Tests 60%

1. **GRADING SCALE:**

90-100 A

85-89 B+

80-84 B

75-79 C+

70-74 C

65-69 D+

60-64 D

0-59 F

1. **Tentative COURSE OUTLINE:**

**Chapter 1 Basic Ideas**

**Chapter 2 Graphical Summaries of Data**

**Use R to Graphical Summaries of sample Data-1/20% ~3-4 days**

**TEST 1**

**Chapter 3 Numerical Summaries of Data**

**Chapter 4 Summarizing Bivariate Data**

**TEST 2**

**Chapter 5 Probability**

**More on Probability**

**TEST 3**

**Chapter 6 Discrete Probability**

**Chapter 7 The Normal Distribution**

**TEST 4**

**CLAFLIN UNIVERSITY EARLY ALERT PROGRAM**

As a part of our renewed focus on engaged learning, Claflin University has enhanced and expanded its current Early Alert Program. This program is designed to assist with your success and will be given a high priority as a strategy for this class.  Should the instructor determine that you might benefit from taking advantage of these support services and campus resources, you will be referred for such additional support as a means to assist with successful completion of this course.  It is further expected that you will comply with the referral and take advantage of the services offered.  Please understand that such referrals are not a form of punishment, rather, they are intended to help you reach and achieve your academic and personal goal.”

**ASSURANCE STATEMENT**

If you need accommodations in this class related to a disability, please make an appointment as soon as possible. My office location and office hours can be found on page one of this syllabus.

In addition, classroom and testing accommodations should be discussed very early in the semester. Student should contact disability services--(**Mrs. Sadie Jarvis Corson Hall Room 121—535-5285 or sjarvis@claflin.edu**) regarding appropriate classroom accommodations.

**STATEMENT OF POLICY CONCERNING ACADEMIC DISHONESTY**

“Code of Honor Policy Statement

Claflin University prohibits all forms of academic or scholarly dishonesty, including written or oral examinations, term and research papers or theses, modes of creative expression, and computer-based work.

Scholarly dishonesty includes lying, cheating, plagiarism, collusion, and the falsification or misrepresentation of experimental data. (For social behavior, see Claflin University Student Handbook: Code of Conduct and Code of Ethics).

Code of Honor Definition of Violations

1. Academic Dishonesty – This includes any other act (not specifically covered in previous provisions) that compromises the integrity of a student or intrudes on, violates, or disturbs the academic environment of the University Community. Examples include attempting or agreeing to commit, or assisting or facilitating the commission of, any scholastic dishonesty, failing to appear or testify without good cause when requested by the Council for the Code of Honor, failing to keep information about cases confidential, supplying false information to the Council for the Code of Honor and accusing a student of a violation of this Code in bad faith.

2. Cheating – This act implies an intent to deceive. It includes all actions, electronic or other devices and deceptions used in the attempt to commit this act. Examples include, but are not limited to, copying answers from another student’s exam and using a cheat sheet or crib notes in an exam.

3. Collusion – This is the act of working together on an academic undertaking for which a student is individually responsible. Examples include, but are not limited to, sharing information in labs that are to be done individually.

4. Plagiarism – Plagiarism is representing the words or ideas of someone else as one’s own. Examples include, but are not limited to, failing to properly cite direct quotes, the false utilization of copyrighted material and the failure to give credit for someone else’s ideas.”

(*2010-2011 Claflin University Catalog*, pg. 39-40)