

FOUNDATIONS IN STATISTICS SYLLABUS

COURSE INFORMATION

Course Number: MATH 1102

Course Title: Foundations in Statistics

Term: Fall 2019

Class Schedule:

Section	Day	Time	Location	Instructor
.01	Tuesday	7:00pm – 8:30pm	www.twitch.tv/tsogtv	Dr. Foland

Live streams will be archived for 60 days on Twitch, followed by permanent archival on Youtube. Links to these archives will be documented on TSoG eLearning.

INSTRUCTOR CONTACT INFORMATION

Course Instructor

Steven J. Foland, PhD

Email: stevenfoland@tsogiants.org

Office Hours: Saturday, 10:00am – 12:45pm

Office hours will be held virtually on Twitch.

Use the #stream-chat (text) or #stream-calls (voice) channels on Discord to direct your questions to Dr. Foland during class or office hours.

Please use the #copernicus channel or contact Dr. Foland directly (drfoland#6708) for questions outside these times.

COURSE PRE-REQUISITES, CO-REQUISITES, AND/OR OTHER RESTRICTIONS

Pre-requisites and Co-requisites: MATH 1101 – Foundations in Python

Students must be actively enrolled as TSoG.tv students to receive credit for this course.

PROGRAM EDUCATIONAL OBJECTIVES

The Shoulders of Giants' Mentorship students at all levels should strive to adopt an attitude of lifelong learning, build confidence as valuable members of a technical team, and embrace their responsibilities as good citizens of the scientific community.

In addition to this personal and professional growth, students at the Copernicus level are expected to develop and retain the logical, mathematical, and computational tools for solving practical problems in science and engineering.

STUDENT OUTCOMES

Student Outcomes broadly represent the knowledge and skills that students are expected to attain in order to achieve the Program Educational Objectives at their current level of study. At the Copernicus level, these Student Outcomes are as follows:

- C1. *Knowledge* of mathematical and computational terminology used to describe practical problems and their solutions.
 - C2. *Understand* the tools and techniques used to find numerical solutions of mathematical problems.
 - C3. *Understand* analytical solutions of simple practical problems in science and engineering.
 - C4. *Apply* computational tools and techniques to find approximate numerical solutions to practical problems in science and engineering.
 - C5. *Apply* statistics to quantitatively test a hypothesis using experimental data.
 - C6. *Apply* computational thinking methods to reduce simple tasks into algorithms.
 - C7. *Understand* modern professional communication practices.
-

COURSE LEARNING OBJECTIVES

Course Learning Objectives, followed by their corresponding Copernicus-level Student Outcomes, are listed below:

- 1. Relate experimental data in the language of descriptive statistics. – SO (C1)
 - 2. Produce professional and appropriate graphs to represent data of different types. – SO (C7)
 - 3. Employ Python to handle experimental data and compute experimental outcomes. – SO (C4)
 - 4. Interpret simple, practical experiments and test hypotheses using statistical methods. – SO (C5)
-

REQUIRED MATERIALS AND RESOURCES

Access to TSoG eLearning (<http://elearning.tsogiants.org>) required for completion of this course.

A notebook or well-structured digital note-taking method is required for success in this program.

COURSE DESCRIPTION

An introduction to experimental methods and statistical analysis. Throughout this course, you will learn to describe experimental results statistically, test hypotheses mathematically, and present data professionally. The Python programming language will be used for both data handling and computational analysis to complete several small experimental projects throughout the course.

TENTATIVE CALENDAR

Week Of	Description
September 1 st	Introduction to Experimental Methods
September 8 th	Representing (and Misrepresenting) Data with Graphs
September 15 th	Probability and Statistics
September 22 nd	Confidence Intervals in Real Data
September 29 th	Experimental Hypothesis Testing
October 6 th	Z-tests and T-tests
October 13 th	Modeling an Experiment in Python
October 20 th	Testing a Real-world Hypothesis with Python
October 27 th	Dealing with Outliers in Experimental Data
November 3 rd	Other Hypothesis Tests
November 10 th	Choosing an Appropriate Hypothesis Test
November 17 th	<i>Review and Assessment</i>

COURSE COMPLETION POLICIES

- Students must complete all weekly objectives in eLearning to be eligible for assessment.
 - Eligible students may participate in the course assessment at any time
 - Course assessment will cover materials from all Course Learning Objectives.
 - An overall score of at least 80% on all assessment criteria will be needed to receive credit for the course.
 - Students may retake the assessment at the instructor's discretion if they fail to meet assessment criteria on the first attempt.
-

TSOG POLICIES AND PROCEDURES

The description and timelines contained in this syllabus are subject to change at the discretion of the instructor.

Communications regarding such changes will be handled via Discord and TSoG eLearning.