

STA 4321, Section U01, Class Ref # 18201, Spring C 2022

(Introduction to Mathematical Statistics I

(Days: Mo & Wed; Time: 12:30 PM - 1:45 PM; Room: GC 280; Credit Hours: 3)

Modality: in Person (F2F)

### Short Syllabus Outlines & Course Policies

**Prerequisite:** Calculus II (MAC 2312 or any equivalence) & Basic Knowledge of Using Internet

**Instructor:** Dr. H. Zahedi

Office: DM 405,  
Phone: (305)348-2927  
Fax: (305)348-6895  
Email: [zahedih@fiu.edu](mailto:zahedih@fiu.edu),  
Webpage: <http://faculty.fiu.edu/~zahedih> ,  
Canvas login: [http://online.fiu.edu/login\\_uts.html](http://online.fiu.edu/login_uts.html)

**Formal Office hours:**

Mondays and Wednesdays: 3:30 PM - 4:4:30 PM (no appointments required for these hours)

Other Times and Days: By appointments subject to availability

Feel free to consult with me as often as you need and whenever problems arise.

***Important Comments About the Course:***

1. This is *fac to face* course offered on MMC and requires that students attend classes regularly. There will be no simultaneous Zoom classes or recording of the lectures. You should take this course only if you intend and are able to attend classes in person. However, the modality may change if the University will cancel classes due to new Covid-19 emergencies.

2. If a student misses a quiz or an exam due to Covid-19, that student will be given the opportunity to make up for the missed exam or quiz. However, the student must inform the professor ahead of exam time and submit the necessary documentation from a medical doctor or clinic (similar to procedures used for any for other illnesses).

**Text Book:**

*"Mathematical Statistics with Applications" by Wackerly, Mendenhall, and Scheaffer, 7th edition, Duxbury.*

**References:** 1. Mathematical Statistics by Freund. 2. Introduction to Mathematical Statistics by Hoel.  
3. Probability and Statistics by DeGroot. (If needed for further references consult the instructor.)

**Coverage & Objectives:**

**Most of the topics in chapters 1-7, plus some additional related topics in form of class notes.** This is the first of the two most fundamental undergraduate, calculus based, courses in probability theory and mathematical statistics which are required for all our undergraduate Statistics Majors. The emphasis of this course is on basic probability and distribution theory, which are the foundation of mathematical statistics. This includes the following topics: introduction to statistics, sample space and probability, discrete random variables and their probability distributions, continuous random variables, and their distributions, multivariate (mainly bivariate) probability distributions, functions of random variables and probability integral transformation, sampling distributions and the central limit theorem. **(See the course syllabus on the second page for details.)**

**Assignments:**

Weekly Homework (about 8 to 12 problems each). (See the list of the suggested problems.)

## Tentative Exams:

**Exam I:**            Wednesday, February 9

**Exam II:** Wednesday, March 23

**Final Exam:**    TBA (See your my.fiu.edu)

\* You should not register for courses that have a final examination conflict with this course.

## Grading:

**30%** Assignments & Possible Quizzes, **20%** Exam I; **20%** Exam II; **30%** Final Exam.

## **Approximate Grade Scaling for those who have taken both Midterm and the Final Exams:**

[93 - 100] A	[90 - 93) A-	[85 - 90) B+	[80 - 85) B	[75 - 80) B-
[70 - 75) C+	[60 - 70) C	[50 - 60) D	[0 - 50) F	

**Note: Anyone who does not take the final exam could receive an F for the course**

## **Course Policies & Remarks:**

1. All FIU students enrolled in the class must have a valid FIU (picture) ID card and be ready to show the ID on professor's request, for example, when taking the exams.

2. This is a Web Assisted Course using Canvas, any student enrolled in this course are expected to have a valid FIU Email Account and be familiar with basics of internet use. Note that this is neither an online nor a remote teaching course, the purpose of web-based materials in this course is to enhance and compliment the in-person class lectures and textbook, to post review notes and formulas and to do web-based review quizzes on Canvas environments to facilitate and enhance teaching and learning. Note that Canvas materials **are not intended to substitute the classroom lectures and students are expected to attend the in-class sessions regularly.**

3. Exams are based on all the materials covered and discussed in lectures, homework, review quizzes, assignments, and any possible web-based projects. So, students are strongly advised to attend all the lectures and to be on time. No late Assignments will be accepted.

4. Anyone who misses any exam/ or review quiz will receive an F (score of 0) for that exam/ or quiz.

5. A makeup exam will be given only if the student misses an exam due to those emergency cases which meet all the University's requirements, such as the student illness. See the FIU students' handbook for details

6. Note that, failure to hand in any possible project assignment on time may result in the reduction of points from the overall grade. Failure to complete and submit any web-based graded Review Quiz or graded Assignment Withing the Given Deadline Would Result in an F (score of 0) grade for that review quiz or assignment.

**7. No active Beepers, Cellular phones or any other Smart Medias are allowed during exams.**

8. Any failing student who has missed more than 60% of the classes may receive F0 instead of F.

**9. Academic Misconduct:** Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly to demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook. **The Following Statement is Required by the University:** Plagiarism and cheating are serious offensive punishable by expulsion from the university.

## **Student Honesty Statement:**

FIU defines academic misconduct in the Student Conduct and Honor Code (Code) as, "any act or omission by a student, which violates the concept of academic integrity and undermines the academic mission of University in violation of the Code." Code violations include, but are not limited to academic dishonesty, bribery, cheating, commercial use, complicity, falsification, and plagiarism. The codes is available here:

<https://studentaffairs.fiu.edu/get-support/student-conduct-and-academic-integrity/student-conduct-and-honor-code/index.php>.

## **Some Important Dates:**

**January 10 Monday: Classes Begin**

**January 17 Monday:** Martin Luther King Holiday (University Closed).

**January 18 Tuesday:** Last day to add courses; last day to Add/Drop courses or withdraw from the University without incurring a financial liability for Tuition & Fees.

**February 4 Friday: Last day to withdraw from All Courses with a 25% refund of tuition for Spring C Semester.**

**February 29 - March 5:** Spring Break. (University Open, No classes)

**March 21 Monday:** Last day to drop a course with a DR grade and/or Withdraw from the University with a WI grade.

**April 25 - April 30:** Finals week - modified class schedule: (Final Exams and other course assessment activities are scheduled during this week.)

**May 5, Thursday:** Grade Post (available at my.fiu.edu)

For further information and other important dates please visit the Florida International University's Home Page at <http://www.fiu.edu>.

**Note:** The course outline is subject to possible changes. *In case of any possible changes, you will be notified in advance.*

# **STA 4321 INTRODUCTION TO MATHEMATICAL STATISTICS (I) COURSE SYLLABUS**

## **Prerequisites:**

MAC 2313 (Calculus III)

## **Text:**

"Mathematical Statistics with Applications" by Wackerly, Mendenhall, and Scheaffer, 7th edition, 2008, Brooks/Cole, Cengage Learning

## **1. What is statistics**

Introduction, Characterizing A set of Measurements: Graphical and Numerical Methods, How Inference are Made, Theory and Reality, Summary

## **2. Probability**

Introduction, Probability and Inference, Review of Set Notations, A Probability Model for an Experiment (Discrete Case), Calculating the Prob ability of an Event (The Sample Point Method), Tools for Counting Sample Points (Some Combinatorial Rules), Conditional Probability and the Independence of Events, Two Laws of Probability, Calculating the Probability of an Event: the Event-Composition Method, Inclusion-Exclusion Law, The Law of Total Probability and Bayes ' Rule, Numerical Events and Random Variables, Random sampling Summary.

## **3. Discrete Random variables and Their Probability distributions**

Basic Definition, The Probability Distribution for a Discrete Random Variable, The Expected Value of a Random Variable or a function of a Random Variable, The Bernoulli, Binomial, Geometric, Negative Binomial, Hypergeometric and Poisson Probability Distributions, Moments and Moment generating Functions, Probability Generating Function (Optional), Tchebysheff's Theorem, Summary

#### **4. Continuous random variables and Their Probability Distributions**

Introduction, The Probability Distribution for a Continuous Random Variable, Expected Values for continuous Random Variables, The Uniform, Normal, Gamma & Gamma Related (Exponential, Chi-Squared, Weibull), and Beta Probability Distribution Functions, Some General Comments, (The Moments and Moment Generating Function for a Continuous Random Variable), Other Expected Values, Tchebysheff's theorem, Expectations of Discontinuous and Mixed Probability Distributions (Optional).

#### **5. Multivariate Probability Distributions (Main Emphasis on Bivariate Case)**

Introduction, Bivariate and Multivariate Probability Distributions, Marginal and Conditional Probability Distributions, Independent Random Variables, the Expected Value of a Function of Random Variables, Special Theorems, The Covariance and Correlation of Two Random Variables, The Expected Value and Variance of a Linear Functions of Random Variables, The Multinomial Probability Distribution, The Bivariate Normal Distribution (Optional), Conditional Expectations, Summary.

#### **6. Functions of Random Variables**

Introduction, Finding the Probability Distribution of a Function of Random Variables, The Method of Distribution Functions, The Method of Transformations, The Method of Moment Generating Functions, Multivariable Transformations Using Jacobians (Optional), Order Statistics, Summary

#### **7. Sampling Distributions and the Central Limit Theorem**

Introduction, Sampling Distributions Related to the Normal Distribution, The Central Limit Theorem, A Proof of the Central Limit Theorem, The Normal Approximation to the Binomial Distribution, (Some Comments), Summary.

#### **Suggested Homework Problems From the Text Book:**

TBA