

College of Sciences & Mathematics Class Syllabus
Semester
MTH 220
Introduction to Probability & Statistics

Name: Dr. Random Sample
Department: Mathematics & Statistics
Email: sample@sfasu.edu
Phone: 468-STAT
Office: 3xx, Math & Nursing
Office Hours: TBD
Class meeting time and place: 2xx, Math Building

Text and Materials:

Required Text: *McWilliams, A First Course In Probability & Statistics*. Topics covered during the semester are included in the first seven chapters of the text.

Materials: A standard calculator (roughly, one that would cost approximately \$20 or less at Wal-Mart) is required. The calculator need not be programmable or be a graphing calculator. The calculator need only perform standard arithmetic calculations along with logarithm, power and exponential functions.

Core Objectives (CO):

1. **Critical Thinking** [CO 1]: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
2. **Communication Skills** [CO 2]: to include effective development, interpretation and expression of ideas through written, oral and visual communication
3. **Empirical and Quantitative Skills** [CO 3]: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

Course Requirements / Exams / Assignments:

Course Goals: To equip students with the skills necessary to use data in order to make better decisions. Specifically, to master basic skills in the sciences of probability and statistics that will empower students when it comes to interpreting data. A major goal of the course is to teach the students that data drives decision making in all facets of life. Learning to organize, summarize and make inference from data will allow us to develop more successful policies in among other disciplines business, education, medicine, engineering, law, and politics.

Specific Topics Covered: Basic Rules of Counting and Probability, Random Variables and their properties, Discrete and Continuous Probability Distributions with a focus on the Binomial, Normal and Exponential Distributions, Descriptive Statistics including histograms, numerical measures of center and spread, Sampling Distribution, Inferential Statistics including topics in both point and interval estimation as well as tests of hypothesis.

Specific Course Policies: No make-up exams are given. Exception to the no make-up policy concerning exams is handled on a case by case basis only if the student provides notification to the instructor before 5:00 on the day that the exam was given.

If a lecture is missed, class notes are the student's responsibility to obtain from a fellow classmate. My lecture notes are not available after the lecture has been given. Upon request, any handout or assignment given on the date of absence will be provided to a student who was not in class.

Exams: There will be four closed notes exams. The in class examinations consist in part of both computational problems which require the student to think critically [CO 2] as well as open response problems which require proficiency in written communication. For the computational part of exams, students must incorporate quantitative reasoning [CO 3] to generate, use or interpret data. For the part of exams focused around written communication, the student must order their responses logically [CO 1] and use explanatory text amidst mathematical notation in a coherent way.

The Final Exam is comprehensive and closed notes. You must take the final at the designated time of 10:30 AM on Tuesday, December 14. You cannot switch times. The final exam consists of problems similar to those practiced in homework, given as examples during lecture, as well as those type problems students will have experienced on prior examinations. Like the midterm examinations, the final will consist of both computational as well as problems requiring an open ended response focused around strong written communication of ideas.

Homework: Problems will be assigned from the text and other sources such as worksheets handed out during class that will cover each major topic in the course calendar/outline. Students must think critically [CO 1] to make a coherent plan for solving homework problems and incorporate quantitative reasoning [CO 3] so that a logically ordered solution containing quality written communication [CO 2] is constructed. Organization is key. Homework must be neat and written in a legible fashion.

Grading Breakdown: Homework: 15%, Final Exam: 25%, Each Regular Exam: 15%.

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.

The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.

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/>.

Course Calendar / Outline:

	<u>Approximate time spent</u>
<ul style="list-style-type: none"> • Descriptive Statistics [CO 1, 2, 3] <ul style="list-style-type: none"> ○ Graphical Display of Data ○ Measures of location ○ Measures of Dispersion 	10%
<ul style="list-style-type: none"> • Probability [CO 1, 2, 3] <ul style="list-style-type: none"> ○ Classical Probability ○ Probability Laws (Rules) ○ Counting Techniques 	20%
<ul style="list-style-type: none"> • Probability Distributions [CO 1, 2, 3] <ul style="list-style-type: none"> ○ Random Variables 	20%

- Discrete Distributions
 - Binomial Distribution
 - Hypergeometric Distribution
- Continuous Distributions
 - Uniform Distribution
 - Normal Distribution
- **Sampling Distributions [CO 1, 2, 3]** 10%
 - Random Samples
 - Central Limit Theorem
- **Statistical Inference [CO 1, 2, 3]** 30%
 - Estimation
 - Point Estimation
 - Interval Estimation
 - Hypothesis Testing
- **Linear Regression [CO 1, 2, 3]** 5%
- Explicit instruction in Critical Thinking, Communication and Empirical and Quantitative Reasoning is in addition to implicit instruction, modeling and practice that occur daily in the discussion of limits and continuity, derivatives and antiderivatives, applications of derivatives and definite integration. This explicit instruction includes explanation of solving mathematical problems by thinking critically, communicating logically ordered solutions with complete and correct notation, and applying empirical or quantitative skills as appropriate to the problem. 5%

Program Learning Outcomes:

This is a general education core curriculum course and no specific program learning outcomes for this major are addressed in this course.

Student Learning Outcomes (SLO): At the end of MTH 220, a student who has studied and learned the material should be able to:

1. Exhibit an understanding of basic probability rules and concepts [CO:1,3]
2. Demonstrate an understanding of different probability models and ways they are used in statistical inference. [CO: 1, 2, 3]
3. Demonstrate an understanding of point estimation of population parameters. [PLO: 1,3]
4. Demonstrate an understanding of interval estimation about population parameters and inference that can be drawn from such techniques. [CO: 1,3]
5. Demonstrate an understanding of hypothesis testing concerning population parameters and inference that can be drawn from such techniques. [CO:1,3]