Department of Mathematics and Statistics
MTH 220.500—Introduction to Probability and Statistics (Online)
Spring 2019

Instructor: Mrs. Robin Sullivan
Office: 343 Mathematics Building
Email: SullivanRK@sfasu.edu
Office Hours: Mondays and Wednesdays: 1:30 pm - 3:15 pm
Tuesdays and Thursdays: 10 am – 10:45 am

Class Times & Place: This is an online course with two face-to-face exams.

Course Description: Probability, random variables, mean and variance, binomial distribution, normal distribution, statistical inference and linear regression.

Text and Materials: Discovering Statistics (Bundle) by Hawkes and Marsh, 2nd edition.
Online access to the Hawkes Learning System is required. You can gain access by either using the access code from the bundle or by purchasing access from Hawkes. You will also need a scientific calculator. I will be using the TI-30XS MultiView. A graphing calculator is permitted but not required. Please make sure that you are comfortable with the calculator that you select.

Attendance Policy
This is an online class with two face-to-face exams. You are responsible for all due dates and material. Please use the calendar located at the end of the syllabus to help you stay on track.

Grading Policy:

<table>
<thead>
<tr>
<th>Grading Policy</th>
<th>Percentage</th>
<th>Description</th>
<th>Grading Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawkes Lessons</td>
<td>15%</td>
<td>[CO: 1,2,3]</td>
<td>90% - 100%: A</td>
</tr>
<tr>
<td>WebTest 1</td>
<td>10%</td>
<td>[CO: 1,2,3]</td>
<td>80% - 90%: B</td>
</tr>
<tr>
<td>WebTest 2</td>
<td>10%</td>
<td>[CO: 1,2,3]</td>
<td>70% - 80%: C</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>30%</td>
<td>[CO: 1,2,3]</td>
<td>60% - 70%: D</td>
</tr>
<tr>
<td>Comprehensive Final Exam</td>
<td>30%</td>
<td>[CO: 1,2,3]</td>
<td>Below 60%: F</td>
</tr>
<tr>
<td>D2L Discussions</td>
<td>5%</td>
<td>[CO: 1,2,3]</td>
<td></td>
</tr>
</tbody>
</table>

Grading Scale:
90% - 100%: A
80% - 90%: B
70% - 80%: C
60% - 70%: D
Below 60%: F

Course Requirements
- **Hawkes Lessons**—The lesson schedule is located at the end of the syllabus. [CO 1, 2, 3]
- **Two WebTests**—The WebTests are designed to make sure that you are keeping up with the material. These are online tests through Hawkes. Additional information about the WebTests can be found on pages 4 - 5 of the syllabus. [CO 1, 2, 3]
- **Midterm Exam**—The midterm exam is a written face-to-face exam on March 13th. The midterm exam is not an online exam. [CO 1, 2, 3]
- **Comprehensive Final Exam**—The final exam is a written face-to-face exam on May 15th. The final exam is not an online exam. [CO 1, 2, 3]
- **D2L Discussions**—There will be two D2L discussions at the end of the semester [CO: 1,2,3]
- **Student Responsibility**—It is your responsibility to keep up with all due dates and exam dates. It is your responsibility to check Hawkes and d2l daily.

Exam Calendar and Information:

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
<th>Exam Location</th>
<th>Exam Time*</th>
<th>Exam Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm Exam</td>
<td>Wednesday, March 13th</td>
<td>Math 101</td>
<td>4 pm – 8 pm</td>
<td>All material covered from 1.1 through 8.3b (see schedule for a detailed list of sections)</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Wednesday, May 15th</td>
<td>Math 101</td>
<td>4 pm – 8 pm</td>
<td>All material covered in the course The final exam is comprehensive (see schedule for a detailed list of sections)</td>
</tr>
</tbody>
</table>

*Each exam is roughly a two-hour exam. The exam proctors will be at the exam location from 4pm to 8pm to allow flexibility with your schedule. All exams must be turned in by 8pm. If the location, date or time changes, then I will put that information on D2L.

Both the midterm and final exam are face-to-face exams and not online exams. Department policy requires that you bring and be recognizable from either your SFASU Student ID or another valid photo ID before you are permitted to take each exam. If you are not on campus, email me as soon as possible. You can take your exams at an approved testing location. The testing location must be an actual testing center. Most community colleges and universities have testing centers. Note that the face-to-face exams will be written exams, and not completed on the computer. You will be provided with a formula sheet for both face-to-face exams.
Hawkes Learning System Lessons:

The Hawkes lessons are how you will learn the material for this course. These lessons play the role of lecture and homework in a face-to-face class. There are 31 total lessons to complete on Hawkes as well as two online webtests to complete on Hawkes. Your two lowest Hawkes lessons will be dropped. Each time you work through a lesson, you will work through the lesson in three parts: learn, practice, certify.

1. Part 1: Learn
   The first part of the Hawkes lesson plays the role of the lecture that you would have in a face-to-face course. This part will introduce you to the material covered in that sections. You will see examples completed step by step.

2. Part 2: Practice
   The second part of the lesson allows you to practice with what you just learned. This part allows you to gain confidence in the new material.

3. Part 3: Certify
   The final part is where you get your grade for the lesson. You must certify each lesson in order to get a grade. Once you certify each lesson, your grade for that lesson is 100%. You will see a required mastery for each lesson. This tells you how many questions you need to get correct in order to master the lesson. Once you have mastered the lesson, it is certified and your grade for that lesson is 100%. For example, if it says that the required mastery is 10 out of 13 then once you get 10 questions right, you have certified the lesson.

Note: You can go through any of the three parts as many times as you want

Due dates are posted on the schedule at the end of the syllabus as well as on the Hawkes Learning System. On the scheduled due date, the assignment is due at 11:59 pm. The following is information for the penalty when completing a Hawkes lesson after the stated due date:

- 1 day late: 10% penalty (This means that the highest grade for that lesson is now a 90%)
- 2 days late: 20% penalty
- 3 days late: 30% penalty
- 4 days late: 40% penalty
- 5 days late: 50% penalty
- More than 5 days late: 100% penalty

Note: this penalty structure is only for the Hawkes lessons

You need to figure out blocks of time throughout the week that you plan to work on the lessons. Do NOT wait until the due date to try and complete the lesson or lessons due that day. Any Hawkes work done after May 12th will not count.

You will have two online exams (WebTests 1 and 2) and two written face-to-face exams (the midterm exam and the final exam) throughout the semester. You will always want to make sure to complete the lessons being tested on each exam ahead of time. You will need to allow time to digest the material and study the lessons to do well on these exams.

You should always try to stay at least a lesson ahead of schedule. One lesson might take you longer than another one. Some due dates have multiple lessons due.

AARC Tutoring: The AARC (Academic Assistance and Resource Center) in the Steen Library has free help available. They can be reached at 468 - 4108, or the website http://library.sfasu.edu/aarc/.

- The hours for the STATISTICS walk in table at the AARC:
  - Sundays: 4 pm – 8 pm
  - Mondays: 4 pm – 7 pm
  - Tuesday, Wednesday, Thursdays: 2 pm – 7 pm
Miscellaneous:

- It is your responsibility to keep up with all due dates for the course. It takes dedication and time management to succeed in an online course.

- It is your responsibility to check D2L (https://d2l.sfasu.edu/) on a regular basis. You are responsible for anything posted on D2L or on Hawkes.

- I like to use D2L for storage and communication. I will store course files on D2L like the syllabus, formula sheet, tables, and practice exams. I put announcements on the D2L newsfeed. You will spend most of your time in this course on the Hawkes Learning System.

- Emails should not resemble text messages. You need to make sure to always address the person that you are sending the email to and be complete with your sentences. You need to get into this habit now so that you do not embarrass yourself later.

- Email is the easiest way to get in touch with me. You can call my office during office hours but email is best especially outside of office hours. If you email me during the school week and you do not get a response within 24 hours, resend the email. It is possible that it was sent to junk mail. I want to make sure that I respond to your questions quickly so that you do not get behind. My email address is SullivanRK@sfasu.edu

- If you are retaking this online course, you do not need to buy a new access code.

- The D2L discussions will take place at the end of the semester. They will allow us to reflect on the semester. The D2L discussions will be on D2L. The two discussions will open on April 30th and will be due on May 8th.

The following is an excerpt from SFA Policy 5.4:

"The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:

1. Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time, or;

2. At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.

To this end, all students in courses offered by the Department of Mathematics and Statistics that wish to be successful should plan to spend a minimum of two hours outside of class for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation.

See http://www2.sfasu.edu/math/docs/syllabi/MTH220Syllabus.pdf for elements common to all sections."
Math 220 Exam Dates and Information
Spring 2019

- **WebTest 1:**
  - WebTest 1 is to be completed online through Hawkes
  - WebTest 1 covers chapters 1-4 (see schedule on next page)
  - WebTest 1 is due February 15th at 11:59 pm
  - Once you have finished the lessons on WebTest 1, you will want to do the following:
    - Review the lessons
    - Complete the practice for WebTest 1 on Hawkes (under the test tab)
    - Complete WebTest 1
  - You have one attempt at WebTest 1

- **Midterm Exam:**
  - The midterm is a written face to face exam that will take place on Wednesday, March 13th in Math 101 (4 pm – 8 pm). This is not an online exam.
  - If you have a time conflict that does not allow you to take your exam during the time slot, please let me know in advance so that you can take your exam early.
  - The midterm covers all lessons covered from 1.1 through 8.3b (see schedule)
  - You must bring a picture id (student id or driver’s license)
  - Don’t forget your calculator
  - If you are taking the midterm at a testing center, make sure that I have approved the testing center far in advance.
  - You will have a formula sheet and tables provided to you for the midterm exam. Check d2l to know what the formula sheet and tables will look like.

- **WebTest 2:**
  - WebTest 2 is to be completed online through Hawkes
  - WebTest 2 covers all lessons covered from 8.4a – 11.4c (see schedule on next page)
  - WebTest 2 is due May 3rd at 11:59 pm
  - Once you have finished the lessons on WebTest 2, you will want to do the following:
    - Review the lessons
    - Complete the practice for WebTest 2 on Hawkes (under the test tab)
    - Complete WebTest 2
  - You have one attempt at WebTest 2

- **Final Exam:**
  - The final exam is a written face to face exam that will take place on Wednesday, May 15th in Math 101 (4 pm – 8 pm). This is not an online exam.
  - If you have a time conflict that does not allow you to take your exam during the time slot, please let me know in advance so that you can take your exam early.
  - The final covers all lessons covered in this course (see schedule)
  - The final exam is comprehensive and mandatory
  - You must bring a picture id (student id or driver’s license)
  - Don’t forget your calculator
  - If you are taking the final exam at a testing center, make sure that I have approved the testing center far in advance.
  - You will have a formula sheet and tables provided to you for the midterm exam. Check d2l to know what the formula sheet and tables will look like.
Advice: Try to always stay at least one lesson ahead of schedule.

<table>
<thead>
<tr>
<th>Hawkes Lesson Name</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 - 1.3 Getting Started</td>
<td>1/25</td>
</tr>
<tr>
<td>2.5 - 2.6 Levels of Measurement</td>
<td>1/25</td>
</tr>
<tr>
<td>3a Frequency Distributions</td>
<td>1/29</td>
</tr>
<tr>
<td>3b Graphical Displays of Data: Pie Charts and Bar Graphs</td>
<td>1/29</td>
</tr>
<tr>
<td>3c Graphical Displays of Data: Histograms, Polygons, Stem and Leaf Plots</td>
<td>2/1</td>
</tr>
<tr>
<td>3d Analyzing Graphs</td>
<td>2/1</td>
</tr>
<tr>
<td>4.1 - 4.3a Measures of Location</td>
<td>2/5</td>
</tr>
<tr>
<td>4.1 - 4.3b Measures of Dispersion</td>
<td>2/5</td>
</tr>
<tr>
<td>4.4 Measures of Relative Position</td>
<td>2/8</td>
</tr>
<tr>
<td>6.1 - 6.4 Classical Probability</td>
<td>2/15</td>
</tr>
<tr>
<td>6.5 - 6.9 Probability Rules: Properties, the Complement, and Addition Rules</td>
<td>2/19</td>
</tr>
<tr>
<td>7.1 - 7.4 Discrete Random Variables</td>
<td>2/26</td>
</tr>
<tr>
<td>7.7 The Binomial Distribution</td>
<td>3/1</td>
</tr>
<tr>
<td>8.3a Introduction to the Normal Curve</td>
<td>3/5</td>
</tr>
<tr>
<td>8.3b Reading a Normal Curve Table</td>
<td>3/8</td>
</tr>
<tr>
<td>8.4a The Normal Distribution</td>
<td>3/26</td>
</tr>
<tr>
<td>8.4b z - Transformations</td>
<td>3/26</td>
</tr>
<tr>
<td>9.6-9.7 The Distribution of the Sample Mean</td>
<td>3/29</td>
</tr>
<tr>
<td>9.8 The Distribution of the Sample Proportion</td>
<td>3/29</td>
</tr>
<tr>
<td>10.1 - 10.4 Interval Estimation of the Population Mean</td>
<td>4/2</td>
</tr>
<tr>
<td>10.5a Student's t-Distribution</td>
<td>4/5</td>
</tr>
<tr>
<td>10.5b Interval Estimation of the Population Mean for a Normal Population with Sigma Unknown</td>
<td>4/9</td>
</tr>
<tr>
<td>11.1 - 11.3 Developing a Hypothesis and Reaching a Conclusion</td>
<td>4/12</td>
</tr>
<tr>
<td>11.4a Hypothesis Testing Means (p-Value)</td>
<td>4/16</td>
</tr>
<tr>
<td>11.4b Hypothesis Testing Means (z Value)</td>
<td>4/23</td>
</tr>
<tr>
<td>11.4c Hypothesis Testing Means (t Value)</td>
<td>4/26</td>
</tr>
<tr>
<td>12.1a Hypothesis Testing Proportions (p-Value)</td>
<td>4/30</td>
</tr>
<tr>
<td>12.1b Hypothesis Testing Proportions (z Value)</td>
<td>5/3</td>
</tr>
<tr>
<td>5.2 - 5.5 Scatter Plots and Correlation</td>
<td>5/7</td>
</tr>
<tr>
<td>5.6 - 5.9 Fitting a Linear Model</td>
<td>5/7</td>
</tr>
</tbody>
</table>
Course description: Probability, random variables, mean and variance, binomial distribution, normal distribution, statistical inference and linear regression.

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

Credit hours: 3

The following is an excerpt from SFA Policy 5.4:
The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:

1. Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time, or;

2. At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.

To this end, all students in courses offered by the Department of Mathematics and Statistics that wish to be successful should plan to spend a minimum of two hours outside of class for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation.

Course Prerequisites and Corequisites: See general course prerequisites.

General Education Core Curriculum: This course has been selected to be part of SFA’s core curriculum. The Texas Higher Education Coordinating Board has identified six objectives for all core courses: Critical Thinking Skills, Communication Skills, Empirical and Quantitative Skills, Teamwork, Personal Responsibility, and Social Responsibility. SFA is committed to the improvement of its general education core curriculum by regular assessment of student performance on these six objectives. Assessment of these objectives at SFA will be based on student work from all core curriculum courses. This student work will be collected in D2L, the assessment management system selected by SFA to collect student work for core assessment.

The chart below indicates the core objectives identified by SFA to be assessed in this course. The instructor of each section of the course will provide the assignment(s) that will be used to assess the objectives as well as the date(s) by which the assignments must be completed and uploaded in D2L.

<table>
<thead>
<tr>
<th>Core Objective</th>
<th>Definition</th>
<th>Course Assignment Title</th>
<th>Date Due in D2L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Thinking Skills</td>
<td>To include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.</td>
<td>The instructor of each section will determine the assignment for this assessment.</td>
<td>Only assessed in fall of odd years. (See instructor for due date(s).)</td>
</tr>
</tbody>
</table>
Math 220 – Introduction to Probability and Statistics
Syllabus Continuation

**Course outline:**

- **Descriptive Statistics [CO 1, 2, 3]**
  - Graphical Display of Data
  - Measures of location
  - Measures of Dispersion
  - **10%**

- **Probability [CO 1, 2, 3]**
  - Classical Probability
  - Probability Laws (Rules)
  - Counting Techniques
  - **20%**

- **Probability Distributions [CO 1, 2, 3]**
  - Random Variables
  - Discrete Distributions
    - Binomial Distribution
    - Hypergeometric Distribution
  - Continuous Distributions
    - Uniform Distribution
    - Normal Distribution
  - **20%**

- **Sampling Distributions [CO 1, 2, 3]**
  - Random Samples
  - Central Limit Theorem
  - **10%**

- **Statistical Inference [CO 1, 2, 3]**
  - Estimation
    - Point Estimation
    - Interval Estimation
  - Hypothesis Testing
  - **30%**

- **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%**

**Academic Integrity**

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.

The penalty for a student found cheating on any part of an assignment, quiz, or exam in this class will range from a grade of zero on the work to a grade of F in the course, and may result in additional, more severe disciplinary measures. A student who allows another to copy his work and the student copying the work are both guilty of cheating. Do your own work. Do not show your completed work to others. Do not allow others to copy your work.

**Definition of Academic Dishonesty (SFA policy 4.1):**

Academic dishonesty includes both cheating and plagiarism. Cheating includes, but is not limited to:

- using or attempting to use unauthorized materials on any class assignment or exam;
- falsifying or inventing of any information, including citations, on an assignment;
- helping or attempting to help other student(s) in an act of cheating or plagiarism.
Plagiarism is presenting the words or ideas of another person as if they were one’s own. Examples of plagiarism include, but are not limited to:

- submitting an assignment as one’s own work when it is at least partly the work of another person;
- submitting a work that has been purchased or otherwise obtained from the Internet or another source;
- incorporating the words or ideas of an author into one’s paper or presentation without giving the author credit.

**Withheld Grades Semester Grades (SFA Policy 5.5)**

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](http://www.sfasu.edu/disabilityservices).

**Acceptable Student Behavior**

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 (see the [Student Conduct Code, policy 10.4](http://www.sfasu.edu/studentconduct)). 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 prohibition 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 Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.

**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]

*There are no specific program learning outcomes for this major addressed in this course. It is a general education core curriculum course and/or a service course.*

*Date of document: 01/11/2019*