MTH 220 (Online): Introduction to Probability & Statistics
Department of Mathematics and Statistics
Section 501 Fall 2019

Instructor: Mrs. Michelle Cook
Class Times & Place: This is an online course with two face-to-face exams
Office: 335 Mathematics Building
Email: mmcook@sfasu.edu
Office Phone: 936-468-1586

Office Hours: MFW: 10:00 - 10:50 am
TR: 8:45 am – 9:30 am

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. A graphing calculator is permitted but not required. Please make sure that you are comfortable with the calculator that you select.

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

Exam Calendar:

<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</td>
<td>Wednesday, October 16th</td>
<td>Kennedy Auditorium or 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, December 11th</td>
<td>Kennedy Auditorium or 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 in Kennedy Auditorium from 4pm to 8pm to allow flexibility with your schedule. All exams must be turned in by 8pm.

Grading Policy:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawkes Lessons [CO: 1,2,3]</td>
<td>15%</td>
</tr>
<tr>
<td>WebTest 1 [CO: 1,2,3]</td>
<td>10%</td>
</tr>
<tr>
<td>WebTest 2 [CO: 1,2,3]</td>
<td>10%</td>
</tr>
<tr>
<td>Midterm Exam [CO: 1,2,3]</td>
<td>30%</td>
</tr>
<tr>
<td>Comprehensive Final Exam [CO: 1,2,3]</td>
<td>30%</td>
</tr>
<tr>
<td>D2L Discussions [CO: 1,2,3]</td>
<td>5%</td>
</tr>
</tbody>
</table>

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

Course Requirements/Assignments:

- **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 at the end of the syllabus. [CO 1, 2, 3]
- **Midterm Exam**— The midterm exam is October 17th [CO 1, 2, 3]
- **Comprehensive Final Exam**—The final exam is December 12th [CO 1, 2, 3]
- **D2L Discussions**—There will be two D2L discussions at the end of the semester
- **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.
**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 section. 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. 1 day late: 10% penalty (This means that the highest grade for that lesson is now a 90%)
2. 2 days late: 20% penalty
3. 3 days late: 30% penalty
4. 4 days late: 40% penalty
5. 5 days late: 50% penalty
6. 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 December 8th will not count.

You will have online exams (WebTests 1 and 2) and 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.

**Exams:**

Both the midterm and final exam are face-to-face 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. Both the midterm and final exam will be similar to the WebTests. 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.

**Miscellaneous:**

- It is your responsibility to keep up with all due dates for the course.
- It is your responsibility to check D2L ([https://d2l.sfasu.edu/](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.

The course ID needed for Hawkes is SFASUSTAT

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 mmcook@sfasu.edu

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

WebTest 1:
- WebTest 1 is to be completed online through Hawkes
- WebTest 1 covers chapters 1-4 (see schedule)
- WebTest 1 is due September 29th at 11:59 pm
- WebTest 1 will open on September 13th and it will close on September 29th at 11:59 pm
- You have one attempt at WebTest 1
- Check the d2l newsfeed for detailed WebTest instructions on September 13th

Midterm Exam:
- The midterm is a face to face exam that will take place on Wednesday, October 16th in Kennedy Auditorium (4 pm – 8 pm)
- 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)
- WebTest 2 is due December 6th at 11:59 pm
- WebTest 2 will open on November 15th and it will close on December 6th at 11:59 pm
- I highly recommend not waiting until the due date to complete this WebTest. You will have d2l discussions due and it is the last day to work on Hawkes. Please plan accordingly.
- You have one attempt at WebTest 2
- Check the d2l newsfeed for detailed WebTest instructions on November 15th

Final Exam:
- The final exam is a face to face exam that will take place on Wednesday, December 11th in Kennedy Auditorium (4 pm – 8 pm)
- 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.
<table>
<thead>
<tr>
<th>Assignment Name</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 - 1.3 Getting Started</td>
<td>8/28/2019</td>
</tr>
<tr>
<td>2.1 - 2.4 The Reality of Conducting a Study</td>
<td>8/30/2019</td>
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<tr>
<td>2.5 - 2.6 Levels of Measurement</td>
<td>8/30/2019</td>
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<tr>
<td>Ch 3a Frequency Distributions</td>
<td>9/6/2019</td>
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<tr>
<td>Ch 3b Graphical Displays of Data: Pie Charts and Bar Graphs</td>
<td>9/6/2019</td>
</tr>
<tr>
<td>Ch 3c Graphical Displays of Data: Histograms, Polygons, Stem and Leaf Plots</td>
<td>9/6/2019</td>
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<tr>
<td>Ch 3d Analyzing Graphs</td>
<td>9/6/2019</td>
</tr>
<tr>
<td>4.1 - 4.3a Measures of Location</td>
<td>9/13/2019</td>
</tr>
<tr>
<td>4.1 - 4.3b Measures of Dispersion</td>
<td>9/13/2019</td>
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<tr>
<td>4.4 Measures of Relative Position</td>
<td>9/13/2019</td>
</tr>
<tr>
<td>6.1 - 6.4 Classical Probability</td>
<td>9/20/2019</td>
</tr>
<tr>
<td>6.5 - 6.9 Probability Rules: Properties, the Complement, and Addition Rules</td>
<td>9/20/2019</td>
</tr>
<tr>
<td>7.1 - 7.4 Discrete Random Variables</td>
<td>10/4/2019</td>
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<tr>
<td>7.7 The Binomial Distribution</td>
<td>10/4/2019</td>
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<tr>
<td>8.3a Introduction to the Normal Curve</td>
<td>10/11/2019</td>
</tr>
<tr>
<td>8.3b Reading a Normal Curve Table</td>
<td>10/11/2019</td>
</tr>
<tr>
<td>8.4a The Normal Distribution</td>
<td>10/18/2019</td>
</tr>
<tr>
<td>8.4b z - Transformations</td>
<td>10/25/2019</td>
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<tr>
<td>9.6-9.7 The Distribution of the Sample Mean and the CLT</td>
<td>10/25/2019</td>
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<tr>
<td>9.8 the Distribution of the Sample Proportion</td>
<td>11/1/2019</td>
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<tr>
<td>10.1 - 10.4 Interval Estimation of the Population Mean</td>
<td>11/1/2019</td>
</tr>
<tr>
<td>10.5a Student's t-Distribution</td>
<td>11/8/2019</td>
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<tr>
<td>10.5b Interval Estimation of the Population Mean for a Normal Population Mean</td>
<td>11/8/2019</td>
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<tr>
<td>11.1 - 11.3 Developing a Hypothesis and Reaching a Conclusion</td>
<td>11/8/2019</td>
</tr>
<tr>
<td>11.4a Hypothesis Testing Means (P Value)</td>
<td>11/15/2019</td>
</tr>
<tr>
<td>11.4b Hypothesis Testing Means (z Value)</td>
<td>11/15/2019</td>
</tr>
<tr>
<td>11.4c Hypothesis Testing Means (t Value)</td>
<td>11/15/2019</td>
</tr>
<tr>
<td>12.1a Hypothesis Testing Proportions (P Value)</td>
<td>11/22/2019</td>
</tr>
<tr>
<td>12.1b Hypothesis Testing Proportions (z Value)</td>
<td>11/22/2019</td>
</tr>
<tr>
<td>5.2 - 5.5 Scatter Plots and Correlation</td>
<td>12/6/2019</td>
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<tr>
<td>5.6 - 5.9 Fitting a Linear Model</td>
<td>12/6/2019</td>
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</tbody>
</table>
General Education Core Curriculum:
This course has been selected to be part of Stephen F. Austin State University’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.

By enrolling in Math 220 you are also enrolling in a Core Curriculum Course that fulfills the Critical Thinking Skills, Communication Skills, or Empirical and Quantitative Skills requirement. You will see this course on your D2L list. At one point during the semester, you will receive an assignment that fulfills both the requirements of this course and the needs of Stephen F. Austin State University’s Core Curriculum Assessment Plan with the Texas Higher Education Coordinating Board. When you complete this one assignment, you need to upload the assignment to both your standard course dropbox determined by your Instructor and the “Core Curriculum” dropbox. The Core Curriculum dropbox will be identified by the Objective for which work is being collected. (Examples: Critical Thinking, Teamwork, Social Responsibility Empirical & Quantitative Skills, Personal Responsibility, Communication Skills-Written, Communication Skills-Written & Visual, and Communication Skills- Oral & Visual.) Please note that this only applies to the approved assignment. All other assignments should be submitted according to regular class operations.

When you complete the assignment mentioned above, you will upload the assignment to both the Math 220 dropbox and the Critical Thinking Skills, Communication Skills, or Empirical and Quantitative Skills dropbox.

Please note that this only applies to the specific assignment listed in the matrix below. All other assignments should be submitted according to regular class operations.

If you have any questions, please see your instructor, or contact the at Office of Student Learning and Institutional Assessment at (936) 468-1130.

The chart below indicates the core objectives addressed by this course, the assignment(s) that will be used to assess the objectives in this course and uploaded to the D2L Critical Thinking Skills, Communication Skills, or Empirical and Quantitative Skills dropbox this semester, and the date the assignment(s) should be uploaded to the D2L Critical Thinking Skills, Communication Skills, or Empirical and Quantitative Skills dropbox. Not every assignment will be submitted for core assessment every semester. Your instructor will notify you which assignment(s) must be submitted for assessment in the D2L Critical Thinking Skills, Communication Skills, or Empirical and Quantitative Skills dropbox.

Include only the core objectives taught in this course and indicate which objectives are being formally assessed in this semester.

<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>Hypothesis Testing Write up</td>
<td>11/22/2019</td>
</tr>
<tr>
<td>Communication Skills</td>
<td>To include effective development, interpretation and expression of ideas though written, oral, and visual communication.</td>
<td>Hypothesis Testing Write up</td>
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</tr>
<tr>
<td>Empirical and Quantitative Skills</td>
<td>To include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.</td>
<td>Hypothesis Testing Write up</td>
<td>11/22/2019</td>
</tr>
</tbody>
</table>

Per SFA policy 5.4, this schedule reflects that there is (1) an amount of student work per credit hour that reasonably approximates not less than one hour of class or direct faculty instruction and two hours of out-of-class student work per week for fifteen weeks over a long semester, 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.
Course Calendar / Outline:

- **Descriptive Statistics [CO 1, 2, 3]**
  - Graphical Display of Data
  - Measures of Location
  - Measures of Dispersion
  
- **Probability [CO 1, 2, 3]**
  - Classical Probability
  - Probability Laws (Rules)
  - Counting Techniques

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

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

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

- **Linear Regression [CO 1, 2, 3]**

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.

<table>
<thead>
<tr>
<th>Approximate time spent</th>
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<tbody>
<tr>
<td>10%</td>
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<td>5%</td>
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</table>

**Academic Integrity (Policy 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. 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**

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](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.

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 D-34.1 http://www.sfasu.edu/policies/student_conduct_code.asp). 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.

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]