MTH 220: Introduction to Probability and Statistics

Name: Dr. Becnel
Department: Mathematics and Statistics
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Phone: 936-468-1582
Office: Math 322
Office Hours: Other times by appointment
W 2:15-3:15; R 12:15-1:15; F 10-11

Class meeting time and place: Section.010 MW 1:00-2:15 Room 208

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

Objectives and Outcomes: A complete list of program learning objectives, general education core curriculum objectives/outcomes and other course information can be found using the following link: http://www2.sfasu.edu/math/courses/syllabi/MTH220Syllabus.pdf

Required Materials:
Case Study Packet (on D2L)
Course Notes (on D2L)
Practice Problems (on D2L)
Text (Not Required): Introductory Statistics (custom published) by Neil A. Weiss
Package ISBN: 1269959719

Calculator (Not Required): A scientific calculator may be useful. Graphing calculators are permitted, but not required.
Excel: The University provides access to Microsoft Excel. We use this as a tool to study statistics.

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

Grading Policy:

Grade Breakdown
The final course grade will be computed using the following weights:
Homework Average [CO 1, 2, 3] 50%
Comprehensive Mid Term [CO 1, 2, 3] 25%
Comprehensive Final exam [CO 1, 2, 3] 25%

Daily Work
• Practice problems will be posted on D2L. This is for your benefit and does not count directly towards your grade (but does count indirectly significantly).
• At the beginning of class, you may ask questions on material covered the previous class period.
• You earn your grade by communicating your understanding of the material through the homework and tests. Clearly communicating mathematics will be essential in this course.
• I will send e-mails to the entire class during the semester. Check your SFA e-mail account frequently.
• To contact me, you may call my office, drop by my office, or e-mail me. I will do my best to reply quickly.

• Students are expected to respect the learning environment of their fellow students. Towards this end, use of mobile phones, mp3 players, PDAs, etc., is forbidden during class.

Exams [CO 1, 2, 3]
• You must bring and may be asked to display either your SFASU Student ID or a valid driver’s license before you will be permitted to take each quiz and the final exam. I must be able to recognize you from the photo on the ID.
• Since you have a several weeks to arrange any travel plans, they are no excuses for missing the final or midterm.
• Students are expected to attend every class meeting, arriving on time.
• On in-class graded work, I expect you to only use your brains, pencil, paper, and, sometimes, a calculator.

Mid Term/Final Exam [CO 1, 2, 3]
The midterm/final exam are comprehensive and mandatory.

Attendance Policy: Attendance is expected. You are responsible for any notes and assignments that you miss. If you miss class, do not come to office hours expecting me to repeat the lecture.

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.

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 through LiveText, the assessment management system selected by SFA to collect student work for core assessment. LiveText accounts will be provided to all students enrolled in core courses through the university technology fee. You will be required to register your LiveText account, and you will be notified how to register your account through your SFA e-mail account. If you forward your SFA e-mail to another account and do not receive an e-mail concerning LiveText registration, please be sure to check your junk mail folder and your spam filter for these e-mails. If you have questions about LiveText call Ext. 1267 or e-mail SFALiveText@sfasu.edu.

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

D2L: Course materials will be located on D2L. It is your responsibility to check D2L daily. You will use your MySFA username and password on the website www.D2L.sfasu.edu.
Course Calendar / 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
  - 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 (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.

**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.
<table>
<thead>
<tr>
<th>#</th>
<th>Week of</th>
<th>Topic(s)</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan 15</td>
<td>Syllabus and Introductory Material</td>
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<td>2</td>
<td>Jan 20</td>
<td>Introductory Material</td>
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<td>3</td>
<td>Jan 27</td>
<td>Intro: Hypothesis Testing</td>
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<td>4</td>
<td>Feb 3</td>
<td>Case Study 1A</td>
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<td>5</td>
<td>Feb 10</td>
<td><strong>Case Study 1B</strong></td>
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<td>6</td>
<td>Feb 17</td>
<td>Case Study 1B</td>
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<td>7</td>
<td>Feb 24</td>
<td><strong>Case Study 2A</strong></td>
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<td>8</td>
<td>Mar 2</td>
<td>Case Study 2A</td>
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<td>9</td>
<td>Mar 9</td>
<td>Spring Break</td>
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<td>10</td>
<td>Mar 16</td>
<td>Case Study 2A: Practice Problems</td>
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<td>11</td>
<td>Mar 23</td>
<td>Case Study 2B</td>
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<td>12</td>
<td>Mar 30</td>
<td><strong>Case Study 3</strong></td>
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<td>13</td>
<td>Apr 6</td>
<td><strong>Case Study 4</strong></td>
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<td>14</td>
<td>Apr 13</td>
<td>Case Study 5</td>
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<tr>
<td>15</td>
<td>Apr 20</td>
<td><strong>Case Study 5</strong></td>
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</table>
| 16 | May 4      | **Final Exams** (Comprehensive)**

**Midterm (Comprehensive)**

**Case Study 1A: Conclusion and Summary**

**Case Study 1B: Conclusion and Summary**

**Case Study 2A: Conclusion and Summary**

**Case Study 2B: Conclusion and Summary**

**Case Study 3: Conclusion and Summary**

**Case Study 4: Introduction**

**Case Study 4: Conclusion and Summary**

**Case Study 5**

**Case Study 4**

**Case Study 4: Describing Data**

**Final Exam Overview**

**Final Exams** (Comprehensive)**
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]

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 LiveText this semester, and the date the assignment(s) should be uploaded to LiveText.

<table>
<thead>
<tr>
<th>Core Objective</th>
<th>Definition</th>
<th>Course Assignment Title</th>
<th>Date Due in LiveText</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>MTH 220 Assessment</td>
<td>TBA but not later than Dec 18th</td>
</tr>
<tr>
<td>Communication Skills</td>
<td>To include effective development, interpretation and expression of ideas through written, oral, and visual communication.</td>
<td>Not assessed in Fall 2020</td>
<td>Not applicable</td>
</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>Not assessed in Fall 2020</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>