Texas A&M University Corpus Christi
Department of Computing and Mathematical Sciences
Math 5328: Structure of Probability and Statistics
Fall 2012

I. Course Information
Meeting Time and Place: Tuesdays, 7 to 9:30 pm: CS 107
Instructor: George Tintera, Ph.D.
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Office Hours: TBD

II. Course Description
This course is designed for the professional development of teachers. It centers on the investigation of random patterns and the principles and applications of probability and descriptive and inferential statistics through research guided by problem solving within a life scenario. Content is aligned with local and national standards as mandated by SBEC and NCTM.

III. Prerequisites for the Course
• Graduate Status
• Mathematics content: Up to, but not limited to, Calculus 1

IV. Text and Other Supplies Required
- Class Notes and Materials at Instructor’s Blackboard: TBA
- Calculator and Excel software.
- Note: On campus printer copies are 5 cents for black and white and 85 cents for color prints.

V. Students Learning Outcomes
This course is designed to enable participants to improve their knowledge and skills in the following areas:

Probability and Randomness:
• Basic concepts and principles
• Probability distributions & applications of the Normal distribution
• Applications

Statistics:
• Basic concepts of sampling and experimental design
• Descriptive Statistics
  o Frequency distributions and graphs
  o Central tendency, dispersion and relative position indicators
  o Correlation and contingency
• Inferential Statistics
  o Hypothesis testing with one and two samples
  o Tests of linearity
  o Tests of independence
• Statistical Modeling and Experimental Design

On completion of the course students will be expected to:
1. Recognize and work with random variables, calculate probabilities and work with sampling distributions of such variables.
2. Apply probability concepts and rules to the solution of realistic situations.
3. Design experiments to answer research questions, and calculate and interpret descriptive statistics for research variables.
4. State research hypotheses and conduct statistical computations to test the viability of such hypotheses; of particular importance, those related to the learning scenario.
5. Summarize experimental findings, and synthesize these results in to research reports, make inferences and analyze implications.

VI. Instructional Methods and Activities
The course methodology is a combination of briefings, in-class small and large group discussion, brainstorming and modeling, individual and group research, and individual and group assessments. The instructional methods and assessment models are in alignment with local and national standards as mandated by SBEC and NCTM.

Students will be expected to:
- Participate in lecture and group discussions by contributing knowledge and being receptive of new knowledge. Group discussions will be conducted in class or through threaded discussions using the Blackboard environment.
- Use appropriate resources in the discovery of random patterns and for the solution of various types of problems rising from the scenario.
- Participate in guided laboratory sessions that put the course content into practice
- Conduct individual and group research via posted homework and group projects.

VII. Evaluation and Grade Assignment

Grades: Course grades will be based on the following composite:
- Individual Practice/Participation in (homework) assignments 30%
- Group Assignments/Projects 30%
- Assessments and Final Project Report 40%

A weighted average of:
At least 90% earns an A, 80%-89% earns a B, 70%-79% earns a C, 60%-69% earns a D, and Less than 60% earns an F.

**Individual Practice:** Certain problems and investigations will be assigned for individual work and reflection. All will be collected for grading and will comprise a Research Folder for the research component of the course. Timely completion of assignments is expected in order to keep up with the course content. Preliminary reading before coming to class is expected.

**Projects:** An ongoing course project will serve as an umbrella for discussing the mathematics content. This is mainly a group effort that will be accomplished via threaded discussions in a Blackboard environment. The project will conclude with a presentation of findings and a Research Folder.

**Assessments:** There will be three assessments (tests). The first two assessment will have an in class portion and a take home portion. The in-class portion will consist of conceptual ideas that are to be assessed in a timed setting. The take-home portion will require more thought and research, and is associated to the teaching scenario. Both components are expected to be turned in at the due time. The third assessment is the course post-test and the final group presentation.

VIII. Tentative Course Schedule

- Organizational Meeting, Introduction to the class, August 28.
- Course Framework and Probability, September 4, 11.
- Distributions; Predictions and the Law of Large Numbers, September 28, 25.
- The Probability of Statistics, The GAISE, Sampling, October 1, 8, 15.
- Categorical vs. Numerical Data, October 22, 29.
- Regression, November 6, 13.
- Design of Experiments, November 20, 27.
- Review of Several Studies, December 4.
- Final Assessment. Project Presentation, December 11.

IX. Class Policies

Late Homework: I reserve the right to enforce exact deadlines on particular assignments if I feel it is important.

Help: The best source of help for this course is the people directly involved in this course: your peers. Peer meetings will be conducted mostly through threaded discussions and in-class consultations. Students can also consult with the instructor and staff during class, office hours, through the course page and e-mail.

Attendance: Plan to attend all sessions. Tardiness is not recommended.

Absences: I assume graduate students and teachers to be professional learners, with maturity to understand the importance of being present (both physically and mentally) in the classroom.

Responsibilities: Students are individually responsible for:
- reading the textbook and consulting other resources prior to coming to class; preparing to work on course assignments; and bringing necessary tools to class,
- scheduling tutoring sessions and appointments, visiting the Blackboard page to learn INFORMATION, read MESSAGES, and conduct threaded discussions.

Courtesy: No cell phones or beepers are allowed in class, or during in-class tests.