Fayetteville State University
College of Arts and Sciences
Department of Mathematics and Computer Science
STAT 301-01 Introduction to Probability
Fall 2011

I. Locator Information:
Instructor: **Dr. Yufang Bao**
Course # and Name: **STAT 301-01 Introduction to Probability** Office Location: **LSB 127**
Semester Credit Hours: **3**
Office hours:
T 12:30 pm –4:30 pm LSB 127, W 2:00 pm –4:00 pm at SBE 214, F 12:00pm-2:00pm LSB127
or by appointment

Other Hours by Appointment
Day, Time and Room Class Meets: Office Phone: **(910) 672 2437**
Total Contact Hours for Class: **37.5**
Email address: **ybao@uncfsu.edu**

FSU Policy on Electronic Mail: Fayetteville State University provides to each student, free of charge, an electronic mail account (username@uncfsu.edu) that is easily accessible via the Internet. The university has established FSU email as the primary mode of correspondence between university officials and enrolled students. Inquiries and requests from students pertaining to academic records, grades, bills, financial aid, and other matters of a confidential nature must be submitted via FSU email. Inquiries or requests from personal email accounts are not assured a response. The university maintains open-use computer laboratories throughout the campus that can be used to access electronic mail.
Rules and regulations governing the use of FSU email may be found at
http://www.uncfsu.edu/PDFs/EmailPolicyFinal.pdf

II. Course Description: An introduction to the mathematical theory of probability, including such topics as random variables, distributions (normal, binomial, Poisson, and related ones), moment-generating functions, and applications of probability theory. *Prerequisite: MATH 241.*

III. Disabled Student Services: In accordance with Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act (ACA) of 1990, if you have a disability or think you have a disability to please contact the Center for Personal Development in the Spaulding Building, Room 155 (1st Floor); 910-672-1203.

IV. Textbook: Hogg, R.V., & Tanis, E.A., Probability and Statistical Inference, 8th edition, Prentice Hall, 2009.
SOCR: Statistics Online Computational Resource tools, http://www.socr.ucla.edu/

V. Student Learning Outcomes - Upon completion of this course, students will be able to:

- Understand the basic concepts of probability theory.
- Calculate elementary probabilities.
- Apply the Bayes' rule.
- Compute probabilities related to discrete and continuous random variables.
- Calculate expected values, variances and covariances.
- Use experimental and theoretical probabilities as appropriate for the formulation and solving of applied problems.

VI. NCDPI and NCATE Standards

Standards Used in this Course	NCDPI Standards for Mathematics Teacher Candidates	NCATE Standard(s)	Assessment(s)
✓	1. Mathematics teacher candidates possess the mathematical knowledge needed to enable students to understand numbers, ways of representing numbers, and relationships among numbers and number systems and to enable students to understand meanings of operations and how they relate to one another. Candidates enable students to develop computational fluency and to make reasonable estimates. At the middle and secondary grade levels, teacher candidates need the mathematical knowledge to enable students to transfer their understanding of numbers and number operations to symbolic expressions involving variables. **Number sense, numeration, numerical operation, and algebraic thinking**	Content Knowledge	Homework and tests
	2. Mathematics teacher candidates possess the mathematical knowledge needed to enable students to analyze the characteristics and properties of 2- and 3-dimensional geometric shapes; to develop mathematical arguments about geometric relationships; to understand units, processes of measure, and measurable attributes of objects; and to apply appropriate techniques, tools, and formulas to determine measurements. They enable students to develop the visualization, spatial reasoning, and geometric modeling to solve problems. Teacher candidates particularly at middle and secondary grade levels need the mathematical knowledge to enable students to use coordinate geometry in solving problems, to understand concepts of symmetry, and to apply transformations. **Spatial sense, measurement and geometry**		
✓	3. Mathematics teacher candidates possess the mathematical knowledge needed to enable students to understand patterns, relations, and functions. This includes the use of algebraic symbols to represent and analyze mathematical situations, the use of mathematical models to represent and understand quantitative relationships, and the analysis of "change" in various contexts. **Patterns, relationships, and functions**	Content Knowledge	Homework, tests
✓	4. Mathematics teacher candidates possess the mathematical knowledge needed to enable students to formulate questions that can be addressed with data, along with the necessary skills to collect, organize, and display relevant data to answer those questions. They enable students to select and use appropriate statistical methods to analyze data, to understand and apply basic concepts of probability, and to develop and evaluate inferences and predictions that are based on data. **Data analysis, probability and statistics**	Content Knowledge	Homework, tests
✓	5. Mathematics teacher candidates possess the mathematical knowledge needed to enable students to develop skills in problem solving, making connections between various branches of mathematics, reasoning and proof, and communication and representation of	Content Knowledge	Homework, tests

	mathematical ideas. **Mathematical process skills**		
✓	6. Mathematics teacher candidates must be versed in the appropriate use of mathematical tools and manipulatives. **Mathematical tools**	Knowledge and Content, Technological Competence, Pedagogical Content Knowledge	Homework, project

VII. Course Requirements and Evaluation Criteria

The following is a list of the assessment tools, and their respective weights, that will be used in determining the course grade.

Homework (8 highest homework scores out of 9 homeworks, each with weight of **2.5**%) _____ **20%**
Tests (3 highest test scores out of 4 tests, each with weight of **20%**) _____ **60%**
Final Exam_____ **20%**

Final grade will be established on the basis of the grading scale below:

A	90-100%
B	80- 89%
C	70 - 79%
D	60 - 69%
F	Below 60%
FN	Failing due to non-attendance (Student registered, but never attended.)

Some of the homework assignments will involve performing probability experiments and reporting their results using SOCR: Statistics Online Computational Resource tools, http://www.socr.ucla.edu/

Please note: If these evaluation criteria must be revised because of extraordinary circumstances, the instructor will distribute a written amendment to the syllabus.

Requirements

1. Pre-requisite: MATH 241.

2. The student is expected to read the topics to be considered in class in advance (see the class outline bellow). The student is expected to complete all assignments and to spend adequate time on class work to insure that the course outcomes are met. At least two hours of home study is expected for each class hour.

3. It is the responsibility of the student to avail himself/herself at all class meetings, and obtain individual help from the instructor. Student whose class absences exceed 10% of the total contact hours (i.e. 3.75 hours = 3 classes) will be assigned an interim grade "EA".

4. Since the lowest test will be dropped there will be no **makeup tests** unless under extenuating circumstances..

5. The student is expected to submit her/his homework on time. Late homework assignments will not be accepted unless under extenuating circumstances.

6. Students are expected to enter the classroom on time and remain until the class ends. Late arrivals and early departures without appropriate excuses will not be tolerated.

7. Each student is encouraged to participate in class discussions for a clearer understanding and meet with the instructor when additional assistance is needed.

8. All class discussions should be done in a soberly, orderly, and respectful manner.

9. **Dishonesty on graded assignments will not be tolerated**. Students must neither give nor receive help on any work to be graded. The University policy on cheating will be applied to any violations. The **minimum** penalty will be a grade of **zero** on the assignment.

10. No usage of cellular and other electronic devices (except a calculator) is permitted during class!

11. **Withdrawal from Class**
    Withdraw from Class means you are withdrawing from 1 or 2 classes that you will not be attending and you have other classes on your schedule that you will attend. Effective Fall 2009, students will be allowed only 5 withdrawals from class for the remainder of your college career. The 6th W will be calculated as "F" (http://www.uncfsu.edu/registrar/withdrawals.htm)

VIII. Academic Support Resources

- **Blackboard System**

http://blackboard.uncfsu.edu/
All class documents (syllabus, instructors' locator card etc.); resources (slides, lecture notes, handouts and reviews for tests) and homework will also be posted on the Blackboard system.

- **Smarthinking**

Information is available here
http://www.uncfsu.edu/fsuretention/Smarthinkingresources.htm

IX. Course Outline and Assignment Schedule

Date	Section / Topic	Assignment due
08.18.11	Discussion about the syllabus. 1.1 Basic Concepts	
	1.2 Properties of Probability	
08.23.11	1.3 Methods of Enumeration	
08.25.11	1.4 Conditional Probability	Homework 1 due
	1.5 Independent Events	
08.30.11	1.6 Bayes's Theorem	
09.1.11	Review for Test 1	Homework 2 due
09.6.11	**Test 1**	
09.8.11	2.1 Random Variables of the Discrete Type	
	2.2 Mathematical Expectation	
09.13.11	2.3 The Mean, Variance, and Standard Deviation	
	2.4 Bernoulli Trials and the Binomial Distribution	Homework 3 due
09.15.11	Review for Test 2	
09.20.11 09.22.11	**Test 2** 2.5 The Moment Generating Function	
09.27.11	2.5 The Moment Generating Function	Homework 4 due
09.29.11	2.6 The Poisson Distribution	
10.04.11	3.1 Continuous Type Data 3.2 Exploratory Data Analysis	
10.06.11		
10.11.11	3.3 Random Variables of the Continuous Type	Homework 5 due
10.13.11		
	3.3 Random Variables of the Continuous Type Review	
10.18.11	**Test 3**	Homework 6 due
10.20.11	3.4 The Uniform and Exponential Distributions 3.5 The Gamma and Chi-Square Distributions	
10.25.11		
10.27.11	3.6 The Normal Distribution 4.1 Distributions of Two Random Variables	Homework 7 due
11.01.11		
11.03.11	4.2 The Correlation Coefficient\	
11.08.11	4.3 Conditional Distributions	
	4.4 The Bivariate Normal Distribution	Homework 8 due
11.10.11	Review for Test 4	
11.15.11	**Test 4**	
11.17.11	5.1 Functions of a Random Variable	Homework 9 due
11.22.11	5.2 Transformations of Two Random Variables	
	5.3 Several Independent Random Variables	
11.29.11 12.01.11	***Review for the Final Exam***	Homework 10 due
	5.4 The Moment-Generating Function Technique ***5.5 Random Functions Associated with Normal Distributions*** ***5.6 The Central Limit Theorem*** *5.7 Approximations for Discrete Distributions*	
TBA	Final Exam	

Note: This is schedule

tentative! It might be changed for the benefit of the class.
Note: In case FSU must close for an emergency during the semester, instruction will continue using Blackboard.

X. Teaching Strategies Stat 301 is a lecture-based course designed to present the basic theories of probability. Each lecture will contain a summary of the most important concepts from each chapter. The graphics calculator and/or computer (SOCR: Statistic Computational Resource Online) will be utilized to bring clarity and understanding to each concept or theory discussed. Questions will be posed to class to measure comprehension. Therefore, there will be lectures, class discussions, student presentations and cooperative group learning activities.

XI. Bibliography

DeGroot, M. H., and Schervish, M.J. Probability and Statistics, 3ed, Boston, Adison & Wesley 2002
Dudewicz, J. E., and Mishra, S. N., Modern Mathematical Statistics, New York, John Wiley 1988
Feller, W., Vols. I and II, Introduction to Probability Theory and Applications, New York,, John Wiley 1971
Hoel, Paul G., Port, Sidney C., and Stone, Charles J., Introduction to Probability Theory, Boston, Houghton Mifflin 1971
Kreyszig Erwin, Advanced Engineering Mathematics, New York, John Wiley 1993
Larsen, R. J., and Marx, M.L., An Introduction to Mathematical Statistics and Its Applications, 3ed, Upper Saddle River, NJ, Prentice Hall 2001
Mendenhall, W, Schemer, R. L, & Wickedly, D. D. Mathematical Statistics with Applications, Boston, Duxbury 1988
Mood, A. M., Graybill, F. A., and Boes, D. C., Introduction to the Theory of Statistics, New York, McGraw-Hill 1974
Ramachandran, K.M., Tsokos, C. P., Mathematical Statistics with Applications, Academic Press, 2009
Rice, J. A., Mathematical Statistics and Data Analysis, 3 ed, Duxbury, 2007
Roussas, G., Introduction to Probability, Academic Press, 2007