Course objective: Introduction to probability, with emphasis on results used most often in statistics.
Prerequisites: MA 231 or 242 (multivariable calculus)

SYLLABUS and TENTATIVE SCHEDULE

**Introduction**
Statistics versus probability versus mathematics; Review of calculus.

**Probability**
Interpretation of probability (2.1); Terminology (2.4); Set Theory (2.3); Axiomatic definition of probability (2.4-2.5); Counting rules (2.6); Conditional probability and independence (2.7); Properties of probability (2.8-2.9); Bayes theorem (2.10).

**Univariate Random Variables (r.v.) & their Properties**
Definition of an r.v. (2.11); Cumulative distribution function (c.d.f); Discrete r.v. — p.m.f., c.d.f. (3.1-3.2); Continuous r.v. — p.d.f., c.d.f. (4.1-4.2).
Expectation (3.3, 4.3); Moments and moment generating functions (3.9, 4.9); Chebyshev’s inequality (3.11, 4.10); Percentiles.
Special discrete distributions — Discrete Uniform; Bernoulli, Binomial (3.4); Geometric (3.5); Negative Binomial (3.6); Hypergeometric (3.7); Poisson (3.8).
Special continuous distributions — Uniform (4.4); Normal (4.5); Exponential, Gamma and Chi-square (4.6); Beta (4.7).

**Multivariate Random Variables & their Properties**
Discrete & continuous multivariate r.v.’s and probability calculations (5.1-5.2); Marginal and conditional distributions (5.3); Stochastic independence (5.4).
Variance, covariance, correlation (5.5-5.7); Moments of linear combinations of r.v.’s (5.8); Conditional expectation (5.11).
Special multivariate distributions — Multinomial (5.9), Bivariate normal (5.10).

**Distributions of Functions of Random Variables**
Introduction (6.1-6.2); c.d.f technique (6.3); Transformation technique (6.4); m.g.f. technique (6.5).

**Random Samples & Sampling Distributions** (2.12, Chapter 7)

Homework: Up to three late homework assignments (due in class the following lecture period, or they will not be accepted at all) will be accepted without penalty. All other late assignments will receive 75% of their potential score.

All Examinations are “closed book, closed notes,” and calculators are strongly encouraged. The in-class examinations are cumulative, while the final examination is comprehensive. “Cheat sheets” are allowed as follows: Exam #1 — one 8 1/2 x 11, both sides; Exam #2 — two 8 1/2 x 11, both sides; Exam #3 — three 8 1/2 x 11, both sides; final exam — four 8 1/2 x 11, both sides. The schedule for the examinations is:
Exam #1  1:30–2:20 pm, Friday, 9/18/98
Exam #2  1:30–2:20 pm, Friday, 10/16/98
Exam #3  1:30–2:20 pm, Friday, 11/13/98
Final Exam  1:00–4:00 pm, Wednesday, 12/9/98

No makeup exams will be given. If you miss an exam (actually, you may even take the exam but not turn it in), for whatever reason, your final exam will count that much more. For example, if you miss Exam #1 only, then your final will count 50% of your grade, instead of the usual 30%.

At most two exams may be missed in this fashion. If no in-class exams are taken/turned in, then the final exam will be 70% of your grade and the remaining 20% will be lost.

Assignment of GRADES. Course grades will NOT be assigned on the +/− scale.

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<tr>
<th>Assignment</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
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<tr>
<td>Exam #1</td>
<td>20%</td>
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<td>Exam #2</td>
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<td>Exam #3</td>
<td>20%</td>
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<tr>
<td>Final Exam</td>
<td>30%</td>
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Questions concerning the grading of homeworks and exams must be raised by the class period following their return. Please see me for questions about the exams and see the TA for questions about the homeworks. If concerns about homeworks are not satisfactorily addressed, then feel free to discuss these issues with me.

Solutions to homeworks will be available for two hour check-out in the Reserve Room of the D. H. Hill Library.

Old Exams are available on the World Wide Web at

http://www.stat.ncsu.edu/~hughesol/st421/st421.html

ACADEMIC INTEGRITY POLICY: Please refer to the university policy as described in the Code of Student Conduct handbook. For this course, group working on homework assignments is encouraged. Copying solutions from other students (past or present) is, however, strictly prohibited. All exam solutions should be a result of only your work. If this policy has been found to be violated, no credit will be given for the assignment in question.

References

Introduction to Mathematical Statistics, by Hogg and Craig.