

## MA 421 Syllabus Summer I 2020 B. Burns-Williams

**Description:** MA 421 is a one-semester course in probability for math majors and students in other majors who want to learn the basic theory of probability as well as some applications of probability.

**Text:** *A First Course in Probability* (9<sup>th</sup> edition) by Sheldon Ross. ISBN: 9780321794772

### Schedule:

**Chapter 1:** Basic Principles of Counting, Permutations, combinations, Multinomial Coefficients

**Chapter 2:** Sample Spaces and Events, Axioms of Probability, Simple Propositions, Sample Spaces having equally likely outcomes, Probability as a continuous Set function

**Chapter 3:** Conditional Probabilities, Bayes's Formula, Independent Events

**Chapter 4:** Random Variables, Discrete Random Variables, Expected Value, Expectation of a function of Random Variables, Variance, The Bernoulli and Binomial Random Variables, The Poisson Random Variable, Discrete Probability Distributions, Expected Value of Sums of Random Variables, Properties of Cumulative Distribution Functions

**Chapter 5:** Continuous Random Variables, Expectation and Variance of CRV, Uniform Random Variable, Normal Random Variables, Exponential Random Variables, Other Continuous Distributions, Distribution of a function of a Random Variable.

**Chapter 6:** Joint Distribution Functions, Independent Random Variables, Sums of Independent Random Variables, Condition Distributions (Discrete and Continuous cases), Joint Probability Distribution of functions of Random Variables,

**Chapter 7:** Expectation of Sums of Random Variable , Moments of the Number of Events that Occur, Covariance, Variance or Sums and Correlations, Conditional Expectation and prediction

**Chapter 8/9** (as time permits): Chebyshev's Inequality and the Weak Law of Large Numbers, The Central Limit Theorem, The Strong Law of Large Numbers, Markov Chains

### TESTS:

Test 1: May 26 (Chapter 1, 2, 3) The test will be available at 12:00 pm in Moodle. The test must be submitted before 8:00 pm.

Test 2: June 8 (Chapter 4, 5, 6) The test will be available at 12:00 pm in Moodle. The test must be submitted before 8:00 pm.

Final Exam: June 18 (Chapter 1, 2, 3, 4, 5, 6, 7) The final exam will be given from 1:00pm – 5:00pm via Moodle.

**Homework:** There will be 8-10 graded homework assignments. The graded homework assignments are to be submitted in Moodle.

Practice problems will be listed for each section in the text. You do not have to turn in the practice problems to me. They are not graded. The practice problems are for you to try on your own or with peers to get extra practice working these types of problems. In general, test questions will be similar to the practice problems.

**Grading policy:** Each hour exam is worth 25%, homework counts 20% and the final exam counts 30%. If you have to miss an exam for reasons of illness or some other excused absence, please contact me prior to the exam so we can arrange for a makeup. Incomplete grades will be handled on an individual basis.

**Accommodations:** Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 515 7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation (REG02.20.1). If you have a disability, please schedule an appointment with me so we can discuss accommodations that should be made.

**Academic Integrity:**

It is my understanding and expectation that your signature on any exam or assignment means that you have neither given nor received any unauthorized aid. Students may discuss assignments with other students in this section of the class and with me, but no other persons. Students are expected to write up their assignments individually.

**Contact Information:**

Office Hours: 1:00 – 2:00 pm MTWH or by appointment (zoom session, link is available in Moodle)

email: [bdburns@ncsu.edu](mailto:bdburns@ncsu.edu)

## MA 421 Summer 2020 Schedule: Summer I

Day	Date	Exam	Material
W	May 13		Course Introduction; 1.1-1.2
H	May 14		1.3-1.4
F	May 15		1.4, 2.2, 2.3
M	May 18		2.4, 2.5
T	May 19		3.1,3.2
W	May 20		3.3,3.4
H	May 21		4.1
F	May 22		Review
M	May 25		Memorial Day Holiday; no class
<b>T</b>	<b>May 26</b>	<b>Test 1</b>	
W	May 27		4.2,4.3
H	May 28		4.4, 4.5
F	May 29		4.6,4.8
M	June 1		5.1
T	June 2		5.2
W	June 3		6.1, 6.2
H	June 4		6.3, 6.4
F	June 5		6.5
			Review
<b>M</b>	<b>June 8</b>	<b>Test 2</b>	
T	June 9		7.2
W	June 10		7.4, 7.5
H	June 11		7.6
F	June 12		7.7
M	June 15		Review
T	June 16		Review, Last Day of Classes
<b>H</b>	<b>June 18</b>		<b>Final Exam</b>