MATH1004 Finite Probability & Applications  
Summer, 2015 3 Credits

Instructor:  
Office:  
Office Hours:  
Schedule (class times and day(s):  TTh 8:30-11:45  
Telephone:  
Room: Gasson 209

Boston College Mission Statement
Strengthened by more than a century and a half of dedication to academic excellence, Boston College commits itself to the highest standards of teaching and research in undergraduate, graduate and professional programs and to the pursuit of a just society through its own accomplishments, the work of its faculty and staff, and the achievements of its graduates. It seeks both to advance its place among the nation's finest universities and to bring to the company of its distinguished peers and to contemporary society the richness of the Catholic intellectual ideal of a mutually illuminating relationship between religious faith and free intellectual inquiry.

Boston College draws inspiration for its academic societal mission from its distinctive religious tradition. As a Catholic and Jesuit university, it is rooted in a world view that encounters God in all creation and through all human activity, especially in the search for truth in every discipline, in the desire to learn, and in the call to live justly together. In this spirit, the University regards the contribution of different religious traditions and value systems as essential to the fullness of its intellectual life and to the continuous development of its distinctive intellectual heritage.

Course Description
This course is an introduction to finite combinatorics and probability, emphasizing applications. Topics include finite sets and partitions, enumeration, the binomial theorem, probability, conditional probability and independence, Bayes’ theorem, elementary statistics, random variables, expectation and variance, the normal distribution and the normal approximation to binomia distributions.

Course Objectives
1. The student will demonstrate knowledge across cultural settings and will learn the impact of culture, gender, and age in political propaganda as demonstrated by understanding the impact of ambiguous language in presenting statistical arguments.

2. The student will demonstrate ethical knowledge pertaining to media sensationalism as demonstrated by applying Bayesian methods to correctly interpret probabilistic claims in areas like political polling and medical testing.

3. The student will demonstrate skill in representing and solving enumeration problems which involve Boolean set operations, permutations, and combinations. These skills will be acquired through practice on homework problems in Chapter 5.

4. The student will demonstrate skill in evaluating probabilities of events for finite and abstract sample spaces, including conditional and Bayesian probabilities. These skills will be acquired through practice on homework problems in Chapter 6, which involve applying the methods of Ch. 5 to probability as well as the use of tree diagrams to represent conditional probability.

5. The student will demonstrate skill in representing data sets and finite random variables, as well as computing expectation, variance and standard deviation. The binomial and normal distributions, and the relationship between them, will be included among these random variables. These skills will be acquired
through practice on homework problems in Chapter 7.

**Grading**
Students’ grades will be based on the weighted average of homework and exam scores according to this formula: 20% homework, 40% in-class exams (20% each) and 40% final exam.

**WCAS Grading System**
The undergraduate grading system consists of twelve categories: A (4.00), A- (3.67), excellent; B+ (3.33), B (3.00), B- (2.67), good; C+ (2.33), C (2.00), C- (1.67), satisfactory; D+ (1.33), D (1.00), D- (.67), passing but unsatisfactory; F (.00), failure; I (.00), incomplete; F (.00), course dropped without notifying office; W (.00), official withdrawal from course. The graduate grading system is A (4.00), A- (3.67), Excellent; B+ (3.33), B (3.00), good; B- (2.67), C (2.00), passing but not for degree credit; F (.00), failure.

Grade Reports. All students are required to log into the web through Agora to access their semester grades. Students must utilize their BC username and password to log on. If your username or password is not known the HELP Desk located in the Campus Technology Resource Center (CTRC) in O’Neill Library will issue a new one. The CTRC requires a valid picture ID (a BC ID, driver’s license or passport) to obtain your password.

**Text(s)/Readings (Required)**
Finite Mathematics And Its Applications by Goldstein, Schneider and Siegel, custom edition for Boston College, available at the BC bookstore. MyMathLab subscription for on-line homework is also required.

**Important Policies**
[http://www.bc.edu/content/bc/schools/advstudies/guide/academicinteg.html](http://www.bc.edu/content/bc/schools/advstudies/guide/academicinteg.html)

**Written Work**
Graduate and undergraduate students are expected to prepare professional, polished written work. Written materials must be typed in the format required by your instructor. Strive for a thorough, yet concise style. Cite literature appropriately, using APA, MLA, CLA format per instructors decision. Develop your thoughts fully, clearly, logically and specifically. Proofread all materials to ensure the use of proper grammar, punctuation, and spelling. You are encouraged to make use of campus resources for refining writing skills as needed [http://www.bc.edu/libraries/help/tutoring.html](http://www.bc.edu/libraries/help/tutoring.html).

**Scholarship and Academic Integrity**
It is expected that students will produce original work and cite references appropriately. Failure to reference properly is plagiarism. Scholastic dishonesty includes, but is not necessarily limited to, plagiarism, fabrication, facilitating academic dishonesty, cheating on examinations or assignments, and submitting the same paper or substantially similar papers to meet the requirements of more than one course without seeking permission of all instructors concerned. Scholastic misconduct may also involve, but is not necessarily limited to, acts that violate the rights of other students, such as depriving another student of course materials or interfering with another student’s work.

**Request for Accommodations**
If you have a disability and will be requesting accommodations for this course, please register with either Dr. Kathy Duggan (dugganka@bc.edu), Associate Director, Connors Family Learning Center (learning disabilities or AHD) or Dean Paulette Durrett, (paulette.durrett@bc.edu), Assistant Dean for students with disabilities, (all other disabilities). Advance notice and appropriate documentation are required for accommodations. For further information, you can locate the disability resources on the
web at http://www.bc.edu/content/bc/libraries/help/tutoring/specialservices.html.

**Attendance**

Class attendance is an important component of learning. Students are expected to attend all classes and to arrive by the beginning of and remain for the entire class period. When an occasion occurs that prevents a student from attending class, it is the student’s obligation to inform the instructor of the conflict before the class meets. The student is still expected to meet all assignment deadlines. If a student knows that he or she will be absent on a particular day, the student is responsible for seeing the instructor beforehand to obtain the assignments for that day. If a student misses a class, he or she is responsible for making up the work by obtaining a classmate’s notes and handouts and turning in any assignments due. Furthermore, many instructors give points for participation in class. If you miss class, you cannot make up participation points associated with that class. Types of absences that are not typically excused include weddings, showers, vacations, birthday parties, graduations, etc. Additional assignments, penalties and correctives are at the discretion of the instructor. If circumstances necessitate excessive absence from class, the student should consider withdrawing from the class. In all cases, students are expected to accept the decision of the instructor regarding attendance policies specific to the class.

Consistent with our commitment of creating an academic community that is respectful of and welcoming to persons of differing backgrounds, we believe that every reasonable effort should be made to allow members of the university community to observe their religious holidays without jeopardizing the fulfillment of their academic obligations. It is the responsibility of students to review course syllabi as soon as they are distributed and to consult the faculty member promptly regarding any possible conflicts with observed religious holidays. If asked, the student should provide accurate information about the obligations entailed in the observance of that particular holiday. However, it is the responsibility of the student to complete any and all class requirements for days that are missed due to conflicts due to religious holidays.

There may be circumstances that necessitate a departure from this policy. Feel free to contact the WCAS at 617-552-3900 for consultation.

**Deadlines**

Assignments will have firm deadlines; late homework will not be accepted.

**Course Assignments**

Class will meet twice weekly for a total of 6 hours per week. In addition, it is expected that 12 hours per week will be spent on homework assignments and reading for the next class. Online assignments will be available after each class meeting. Supplementary problems from the textbook will also be assigned in each class. These will not be graded, but will provide for additional practice of material and topics that need more clarification.

6/23: Sec. 5.1-5.3. Sets, Venn diagrams and counting

6/25: Sec. 5.4-5.5. The multiplication principle, permutations and combinations

6/30: Sec. 5.6-5.7. Further counting problems, binomial theorem

7/2: Sec. 5.8. Multinomial coefficients, Exam I
7/7: Sec. 6.2, 6.3. Experiments, outcomes, assignment of probabilities

7/9: Sec. 6.4, 6.5. Calculating probabilities, conditional probability and independence

7/14: Sec. 6.6, 6.7. Tree diagrams, Bayes’ theorem

7/16: Sec. 7.1. Visual representation of data, Exam II

7/21: Sec. 7.2, 7.3. Frequency and probability distributions, binomial trials

7/23: Sec. 7.4-7.6. Mean, variance, standard deviation, the normal distribution

7/28: Sec. 7.7. Normal approximation to the binomial distribution, review

7/30: Final exam