Worcester Polytechnic Institute
Department of Mathematical Sciences
Professor: Stephan Sturm
Teaching Assistant: Binod Manandhar

Fall 2014 - A Term

MA 2631

Probability

Sections A01 & A02

Syllabus

1. **Contact & office hours:**

Stephan Sturm
Stratton Hall 202C
Mon, 11:00 - 11:50 a.m.
(Tue, 1:00 - 1:50 p.m.)
Thu, 10:00 - 11:50 a.m.
and upon request per email
ssturm@wpi.edu
(508) 831-59 21
https://users.wpi.edu/~ssturm/

Binod Manandhar
Stratton Hall 204, Desk 3
Mon, 1:00 - 2:00 p.m.
Wed, 11:00-12:00 a.m.
Fri, 11:00 - 12:00 a.m.
and upon request per email
bmanandhar@wpi.edu

2. **Section A01**:

Lecture:	Mon, Tue, Thu, Fri,	12:00-12:50 p.m.,	Stratton Hall 202
Conference:	Wed,	12:00-12:50 p.m.,	Stratton Hall 202

Section A02:

Lecture:	Mon, Tue, Thu, Fri,	2:00-2:50 p.m.,	Stratton Hall 308
Conference:	Wed,	2:00-2:50 p.m.,	Stratton Hall 308

Note: Lecture and conference on September 24 & 25 will be switched: there will be a lecture on Wednesday, September 24 and a conference on Thursday, September 25.

3. **Textbook** (recommended):
   Lecture Notes to the class will be provided incrementally on piazza, https://piazza.com/wpi/fall2014/ma2631/home/.
   The book
   > Sheldon Ross, *A First Course in Probability*. Pearson Education, Inc., Upper Saddle River. 9^{th} edition, 2013. ISBN 978-0-321-79477-2

   is recommended to complement the lecture notes. In particular it contains a suitable and wide collection of problems and solutions.

4. **Ressources**:

   - Homework problems, lecture notes and solutions to midterm and final will be posted on the course site on piazza, https://piazza.com/wpi/fall2014/ma2631/home/. Solutions to homework problems will not be published, but students who do not understand the problem after receiving the graded homework are *highly encouraged* to discuss it in instructors's office hours.
   - A discussion forum will be hosted on piazza, https://piazza.com/wpi/fall2013/ma2631/home/. The forum supports different formatting options, and in particular the inclusion of mathematical symbols via LaTeX. See https://piazza.com/help/formatting.html for the general formatting guidelines and https://en.wikibooks.org/wiki/LaTeX/Mathematics#Symbols for a list of commands for specific symbols. While discussions (also about homework) are encouraged, please refrain from giving complete solutions of homework questions. Giving hints is okay, providing a solution is *dishonest* and will be treated as violation of the academic honesty policy, see 11. Instructors will endorse correct student answers and provide only answers if there is no student answer in reasonable time.
   - Grades will be posted on myWPI, https://my.wpi.edu

5. **Course description** as per course catalog:

   The purpose of this course is twofold:

   - To introduce the student to probability. Topics to be covered will be chosen from: axiomatic development of probability; independence; Bayes theorem; discrete and continuous random variables; expectation; special distributions including the binomial and normal; moment generating functions; multivariate distributions; conditional and marginal distributions; independence of random variables; transformations of random variables; limit theorems.

- To introduce fundamental ideas and methods of mathematics using the study of probability as the vehicle. These ideas and methods may include systematic theorem-proof development starting with basic axioms; mathematical induction; set theory; applications of univariate and multivariate calculus. This course is designed primarily for Mathematical Sciences majors and those interested in the deeper mathematical issues underlying probability theory.

Recommended background: MA 1024. Undergraduate credit may not be earned both for this course and for MA 2621.

6. **Preliminary course outline**:
Topic 1: Combinatorial analysis
Topic 2: The axioms of probability
Topic 3: Conditional probability and independence
Topic 4: Discrete random variables
Topic 5: Continuous random variables
Topic 6: Joint distribution of random variables
Topic 7: The classical limit theorems of probability theory

7. **Homework**: There will be two homework problem sets per week, one given out on Tuesday that is due at the beginning of Friday's class and one given out on Friday that is due at the beginning of Tuesday's class. The problem sets will be posted on https://piazza.com/wpi/fall2014/ma2631/home/.

   Guidelines:

   - Late submission policy: Up to two extensions of the deadline will be granted as long as they are requested per email at least 24 hours in advance. All other late homework (when submitted before the corrected homeworks of the other students are returned) will be graded with a reduction by 50% of the points.
   - The homework submission has not only to contain the result, but carefully developed calculations and proofs that can actually be followed by a reader.
   - Whereas the discussion of homework problems in (small) groups is not only okay but encouraged, the final write-up has to be done individually. Any copying of homework is a violation of the academic honesty policy (see 11.) and will be treated as such.

8. **Exams**: Midterm and final exam consist both of a 50 minute written exam. Both exams will be closed books, but a (simple) calculator and one double-sided "cheat sheet" will be allowed.

Midterm exam	**Final Exam**
Friday, September 26, 5:00 p.m	Thursday, October 16, 5:00 p.m.
Salisbury Labs 115 – Kinnicutt Hall	Fuller Labs – Perreault Hall – Lower Section

9. **Grading**: The total score will be composed from the individual scores by using the following weighting:

   - 30% Problem sets — lowest result will be dropped
   - 25% Midterm exam
   - 45% Final exam

   The achievement of the following total score will be sufficient for the stated letter grades:

   - A 85%
   - B 75%
   - C 60%

10. **Students with disabilities**: If you need course adaptations or accommodations because of a disability, or if you have medical information to share with me that may impact your performance or participation in this course, please make an appointment with me as soon as possible.

    If you have approved accommodations, please go to the Exam Proctoring Center (EPC) in Morgan Hall to pick up Letters of Accommodation.

    If you have not already done so, students with disabilities who need to utilize accommodations in this class are encouraged to contact the Office of Disability Services (ODS) as soon as possible to ensure that such accommodations are implemented in a timely fashion. This office can be contacted via email: DisabilityServices@wpi.edu, via phone: (508) 831-4908, or in person: 137 Daniels Hall.

11. **Academic honesty**: Each student is expected to familiarize him/herself with WPI's Academic Honesty policies which can be found at https://www.wpi.edu/offices/policies/honesty. All acts of fabrication, plagiarism, cheating, and facilitation will be prosecuted according to the university's policy. If you are ever unsure as to whether your intended actions are considered academically honest or not, please contact me.

Enjoy the Course!