

**STOCHASTIC PROCESSES**  
**MATH 5780-002 – FALL 2008**

**Instructor:** Tolya Puhalskii

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**Home page:** <http://www-math.cudenver.edu/~puhalski/>

**Course page:** <http://www-math.cudenver.edu/~puhalski/teaching/08-stpr>

**Time and Location:** Monday & Wednesday 4:00 p.m. – 5:15 p.m., WC 148

**Office hours:** Monday & Wednesday 2:30 p.m. – 3:30 p.m. (or by appointment).

**Catalogue course description.** Markov processes in discrete and continuous time, renewal theory, martingales, Brownian motion, branching processes, and stationary processes. Applications include queuing theory, performance evaluation of computer and communication systems and finance.

**Prerequisites.** Math 3191, 3200, and 4810/5310.

**Textbook.** Introduction to Stochastic Processes by Gregory F. Lawler, 2nd ed.

**Course objectives.** To learn the properties of the various classes of stochastic processes used for modeling randomness evolving in time. To become aware of the tools of the theory of stochastic processes.

**Technology.** To complete certain assignments, you will have to use Matlab or similar software.

**Examinations.** There will be one midterm exam and a final exam. Both exams are take-home. The final exam will partly be a project requiring Monte Carlo simulation.

**Homework.** Homework will be assigned and collected regularly. The assignments will be posted on the course web page. They have to be turned in by 5 p.m. on the due date. Late homework: no points will be deducted if you have made a prior arrangement with me. Else, I will deduct 10% for turning in late homework. You will be able to access your homework scores via Blackboard.

**Grading.** Your final course grade will be determined by the following percentage scale:

92.0 or more	=	A
90.0 – 91.9	=	A–
87.0 – 89.9	=	B+
81.0 – 86.9	=	B
79.0 – 80.9	=	B–
76.0 – 78.9	=	C+
70.0 – 75.9	=	C
68.0 – 69.9	=	C–
55.0 – 67.9	=	D
Below 55.0	=	F

	Weight
Homework	30%
Midterm	30%
Final Exam	40%

**Incomplete grades.** Incomplete grades (IW or IF) are not granted for low academic performance. To be eligible for an incomplete grade, students must

- (1) successfully complete 75 percent of the course,
  - (2) have special circumstances (verification may be required) that preclude them from attending class and completing graded assignments, and
  - (3) make arrangements to complete missing assignments with the original instructor.
- The Course Completion Agreement is available from the CLAS Advising Office (NC 2024) or from the Department of Mathematical Sciences (6th floor of the CU-Denver Bulding).

**Drop deadlines.** The last day to drop without the drop charge is **August 18, 2008**.

The last day to drop with a tuition refund and no transcript notation is **September 3, 2008 by 5 p.m. The drop charge applies.** This is an absolute deadline.

The last day for CLAS students to drop or withdraw without a petition and a special approval from the student's dean is **November 7, 2008 by 5 p.m.** Signatures from the instructor and the Dean are required. This is an absolute deadline.

**Students with disabilities.** The University of Colorado Denver is committed to providing reasonable accommodation and access to programs and services to persons with disabilities. Students with disabilities who need academic accommodations must register with Disability Resources and Services (DRS), 177 Arts Building, 303-556-3450, TTY 303-556-4766, FAX 303-556-2074. I will be happy to provide approved accommodations, once you provide me with a copy of DRSs letter.

**Religious Holiday Accomodations.** You must inform me at the beginning of the semester in order for me to accomodate any rescheduling of your coursework.

## **Tentative schedule**

**08/11:** Sect. 1.1

**08/13:** Sect. 1.2, 1.3

**08/18:** Sect. 1.3, 1.4

**08/20:** Sect. 1.5

**09/03:** Sect. 1.6

**09/08:** Sect. 2.1, 2.2

**09/10:** Sect. 2.2, 2.3

**09/15:** Sect. 2.4

**09/17:** Sect. 3.1

**09/22:** Sect. 3.2

**09/24:** Sect. 3.3

**09/29:** Sect. 3.3, 3.4

**10/01:** Sect. 4.1

**10/06:** Sect. 4.1, 4.2

## **Midterm Exam**

**10/08:** Sect. 4.2, 4.3

**10/13:** Sect. 5.1

**10/15:** Sect. 5.2, 5.3

**10/20:** Sect. 5.3, 5.4

**10/22:** Sect. 5.5

**10/27:** Sect. 5.5, 5.6

**10/29:** Sect. 7.1, 7.2

**11/05:** Sect. 7.2, 7.3

**11/10:** Sect. 7.4

**11/12:** Sect. 8.1, 8.2

**11/17:** Sect. 8.2, 8.3

**11/19:** Sect. 8.4

**12/01:** Sect. 8.5, 8.6, 8.7, 8.8

## **Final Exam**

## Dean's office announcements

- CLAS students must use their email.cudenver.edu email address. Email is the official method of communication for all University of Colorado Denver business. All email correspondence will take place using your CU-Denver email address. Go to <http://www.cudenver.edu/registrar> to update and/or change your email address.
- Students must complete and submit a drop/add form to make any schedule changes. Students are not automatically dropped from a class if they never attended, stopped attending or do not make tuition payments.
- Students are responsible for completing financial arrangements with financial aid, family, scholarships, etc. to pay their tuition. Students will be responsible for all tuition and fees for courses they do not officially drop using proper drop/add procedures and forms. Students who drop after the published drop/add period will not be eligible for a refund of the COF hours or tuition.

## Important Dates

- August 11, 2008; First day of Class
- August 17, 2008 ; Last day to be added to a wait list using the SMART system.
- August 17, 2008: Last day to add a course using the SMART system.
- August 11 - September 3, 2008; Students are responsible for verifying an accurate fall 2008 course schedule via the SMART registration system. Students are NOT notified of their wait-list status by the university. All students must check their schedules prior to September 3, 2008 for accuracy.
- August 18, 2008: LAST DAY TO DROP WITHOUT DROP CHARGE.
- August 18, 2008: Wait Lists are dropped. Any student who was not added to a course automatically from the wait list by this date and time MUST complete a drop/add form to be added to the class. Students are NOT automatically added to the class from the wait list after this date and time. If your name is not on the official student roster, you are not registered for the course.
- August 19, 2008: First day instructor may approve request to add a student to a full course with a Schedule Adjustment Form.
- August 24-29: CAMPUS CLOSED due to Democratic National Convention. Classes resume on September 2, 2008.
- September 3, 2008 at 5 PM; Last day to add structured courses without a written petition for a late add. This is an absolute deadline and is treated as such. This deadline does not apply to independent study, internships, and late-starting modular courses.
- September 3, 2008 at 5 PM; Last day to drop a fall 2008 course with a tuition refund minus the drop charge and no transcript notation. Drops after this date will appear on your transcript. This is an absolute deadline and is treated as such.

- September 3, 2008 at 5 PM; Last day to completely withdraw from all fall 2008 courses with a tuition refund and no transcript notation. Drop charge applies. Drops after this date will appear on your transcript. This is an absolute deadline and is treated as such.
- September 3, 2008 at 5 PM; Last day to request pass/fail option for a course.
- September 3, 2008 at 5 PM: Last day to request a no credit option for a course.
- September 3, 2008 at 5 PM: Last day to register for a Candidate for Degree.
- September 3, 2008 at 5 PM: Last day to petition for a reduction in thesis or dissertation hours.
- September 3, 2008 at 5 PM: Last day to apply for fall 2008 graduation. You must make an appointment and see your academic advisor before this date to apply for graduation.
- September 15, 2008: Early Alert starts for Faculty
- September 24, 2008: Early Alerts ends at 5:00 P.M.
- October 27, 2008 at 5 PM; Last day for non CLAS students to drop or withdraw from all classes without a petition and special approval from the student's academic Dean. This is treated as an absolute deadline.
- November 7, 2008 at 5 PM; Last day for CLAS students to drop or withdraw from all classes without a petition and special approval from the student's academic Dean. Students still need signatures from the faculty and Dean. This is treated as an absolute deadline.
- After November 7, 2008 all schedule changes require a petition. Petitions are available in NC 2024.
- No schedule changes will be granted once finals week has started. There are NO exceptions to this policy.