

COURSE: Probability Theory and Stochastic Processes II
TuTh 5:30pm-6:45pm in Math & Psychology #105

PROFESSOR: Hye-Won Kang
Office: Math/Psychology Building #424
Email: hwkang@umbc.edu
Office Hours: Monday during 12:00pm-1:00pm and Tuesday during 10:00am-11:00am, or by appointment.
I will try to respond to all emails in the same day. However during the weekends, I am not available to answer them.

TEXT: “Introduction to Stochastic Integration”, by K.L. Chung and R.J. Williams (Second edition).

COURSE DESCRIPTION:

This course is an introduction to stochastic integration. Audience of the course is expected to have knowledge in introductory probability. We will cover:

- martingales
- stochastic integrations
- Ito formula
- stochastic differential equations

with emphasis on continuous time martingale theory, stochastic integrations, and stochastic differential equations. Intended audiences are graduate students in mathematics and statistics who are interested in probability theory.

PREREQUISITE:

Basic probability or statistics background is required. Measure theory will be helpful but it is not required. I plan to cover overview of the measure theory during several weeks.

GRADING POLICY:

Grades are based on homework, midterm exam, and take-home final exam. Final letter grade is decided based on the total grade as follows:

Letter Grade	Total Scores
A	$85 \leq \text{Total} \leq 100$
B	$70 \leq \text{Total} < 85$
C	$\text{Total} < 70$

However, factors such as overall distributions of grades or consistency in homework will affect on the final letter grade. Contributed portions of the total score are as follows:

	HOMEWORK	MIDTERM EXAM	FINAL EXAM	TOTAL
Percentage	40%	30%	30%	100%

HOMEWORK:

There will be biweekly assignments and it is due every Tuesday. You are required to turn in your homework to me before the class. All problems in every homework will be graded. You are encouraged to discuss together but copying from other students is NOT allowed. Any violation will result in ZERO grade and will be reported to the University Academic Integrity Committee. Late homework will NOT be accepted.

MIDTERM AND FINAL EXAMS:

All STAT 622 students are required to take 1 midterm exam and 1 final take-home exam. The midterm exam is during the lecture on Nov 8, 2018. The final take-home exam is due by Dec 17, 2018.

ATTENDANCE:

The attendance is highly recommended. Based on the previous experience, students who attend every lecture have a very higher tendency to get a higher score at the end. When you come to the class, you are expected to participate in the class. I ask that you are on time and pay attention to the class. No excuse for being habitually late and the use of smartphones during class is strongly discouraged. Please do not distract yourselves and other students.

INCOMPLETE:

If you do complete the course successfully except for a very small portion or a final project due to very extraordinary and emergence situation (such as to stop attending school for the rest of the semester due to injury in an accident), you will be considered to get Incomplete. You are required to submit a written statement and evidence describing reason to get Incomplete. If the reason to get Incomplete is because you are behind in the course, I would recommend to drop the course, instead.

ACADEMIC INTEGRITY:

By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of disciplinary action that may include, but is not limited to, suspension or dismissal. See the Faculty Handbook, or the UMBC Policies section of the UMBC directory. <http://gradschool.umbc.edu/students/integrity/>

APPROXIMATE COURSE SCHEDULE:

This course will cover various topics. The below is the approximate schedule of the course which is subject to change. The changed schedule will be updated regularly on the course web page in Blackboard.

WEEK	DATES	SECTIONS	TOPICS
1	Tu Aug 28 Th Aug 30	0-1	No class Measures and Integrals
2	Tu Sep 4 Th Sep 6	0-2 0-3	Measures and Integrals Measures and Integrals
3	Tu Sep 11	1-1	Basic Probability Theory
----- Wednesday, September 12, is the last day to withdraw from the course <u>without</u> receiving a 'W' on your transcript. -----			
	Th Sep 13	1-2	Basic Probability Theory
4	Tu Sep 18 Th Sep 20	1-3 1-4	Basic Probability Theory Basic Probability Theory
5	Tu Sep 25 Th Sep 27	2-1 HW1 due 2-2	Definition of the Stochastic Integral From Section 0-1 Definition of the Stochastic Integral
6	Tu Oct 2 Th Oct 4	2-3 2-4	Definition of the Stochastic Integral Definition of the Stochastic Integral
7	Tu Oct 9 Th Oct 11	2-5 HW2 due 4-1	Definition of the Stochastic Integral From Section 1 Quadratic Variation Process
8	Tu Oct 16 Th Oct 18	4-2 4-3	Quadratic Variation Process Quadratic Variation Process
9	Tu Oct 23 Th Oct 25	4-4 5-1 HW3 due	Quadratic Variation Process Ito Formula From Section 2
10	Tu Oct 30 Th Nov 1	5-2 5-3	Ito Formula Ito Formula
11	Tu Nov 6 Th Nov 8	Midterm Exam HW4 due	Review for Midterm Exam Sections 0, 1, 2, and 4 From Section 4
12	Tu Nov 13		No class
----- Tuesday, November 13, is the last day to withdraw from the course <u>with</u> receiving a 'W' on your transcript. -----			
	Th Nov 15	6-1	Applications of Ito Formula
13	Tu Nov 20 Th Nov 22	6-2	Applications of Ito Formula No class (Thanksgiving day)
14	Tu Nov 27 Th Nov 29	6-3 1	Applications of Ito Formula Stochastic Differential Equations

WEEK	DATES	SECTIONS	TOPICS
15	Tu Dec 4	2	Stochastic Differential Equations
		HW5 due	From Section 5
	Th Dec 6	3	Stochastic Differential Equations
16	Tu Dec 11	4	Stochastic Differential Equations
	Sat Dec 7-17	Final Exam	Sections 4, 5, 6, and Extra materials we covered
