Course Syllabus
MTH 660: Stochastic Processes
Fall Semester 2010

Course:

Title : MTH660 – Stochastic Processes

Section: 101

CRN : 3257

Classes : Lectures – TR 6:30 – 7:45 PM; SH 511

Instructor:

Dr. Alfred Akinsete
Morrow Library – ML110
Phone number 696 3285
Email Address – akinsete@marshall.edu

Office Hours:
TR 9:00 AM – 12:00Noon
Any other time by appointment

Course Description, Objectives, Credits, and Prerequisites:

Description: The course starts with a review of probability theory, random variables and conditioning. We focus mainly on the following: Discrete-Time Markov Process and Markov Chains, Poisson Process, Continuous – Time Markov Chains, Markovian Queuing Systems, and Random Walk. And depending on the availability of time, we may discuss any or all of Renewal Processes, Brownian motion and Markov Chain Monte Carlo (MCMC).

Objective: The course aims at the applications of stochastic processes to natural and physical phenomena.

Credit Hours: **3**

Prerequisite: MTH 445/545, or any equivalent course approved by the instructor.

Text Information:

Required Textbook: *Markov Processes for Stochastic Modeling,* by Oliver Ibe. Academic Press.
ISBN: 978-0-12—374451-7

Coverage:

Here is a tentative schedule and order of topics which will be covered.

Topic	Period	Ending Date	Cum. Week
Review of Basic Probability Concepts: Chapters 1	(2 weeks)	09/02/10	02
Discrete-Time Markov Chains: Chapters 2&3	(3 weeks)	09/23/10	05
Poisson Process: Somewhere else	(1 week)	09/30/10	06
Continuous-Time Markov Chains: Ch. 4 & More	(2 weeks)	10/14/10	08
Markovian Queuing Systems: Chapter 5	(2 weeks)	10/28/10	10

Topic	Period	Ending Date	Cum. Week
Random Walk: Chapter 8	(2 weeks)	11/11/10	12
Brownian Motion &Markov Chain Monte Carlo (If time permits)	(2 weeks)	12/02/10	14
Review for final	(1/2 week)	12/07/10	14.5
Final Examination		12/14/10	15

Attendance

Students are expected to attend all scheduled classes. It is the student's responsibility to find out what was discussed in a missed class. Although, attendance records will not be used to compute grades (except possibly in borderline cases), however, missing class can be expected to significantly reduce your chances of success. Note also that it is the student's responsibility to present approved notice of any absence that would be excused under the terms and regulations stipulated by the university.

Homework

Homework problems will be collected and graded. Make it a habit to do your homework the same day they are assigned. Ensure to submit your homework as at when due. Submission within 24 hours from when it is due will be based on 80% of full credit. No late submission will be accepted after 24 hours from when it is due. You are free to collaborate with other students on homework, although you must turn in your own work, and written in your own style and words. Solutions to problems must be made clear and neat. In cases where solutions require explanation and derivation, a one-number solution will not be accepted. Homework exercises assigned on a Tuesday (Thursday) shall be due for submission the following Thursday (Tuesday).

Academic Dishonesty

I really hate to say this, but MU compels me to tell you. In a case where a student is suspected to have cheated, the student may be asked to re-take the test. And where the student is found or confirmed to have cheated, a zero grade will be awarded to the student.

You may wish to refer to other university policies concerning academic dishonesty at,

http://www.marshall.edu/catalog/undergraduate/ug_09-10.pdf

My advice would be that you should not get yourself involved in academic dishonesty. I will prosecute to the fullest extent of the MU Catalog.

Other Policies

- Information regarding the university policy for students with disability can be found in http://www.marshall.edu/disable

- Statement regarding University Computing Services Acceptable Use Policy can be located at http://www.mars all.edu/ucs/CS/accptuse.asp
- Statement regarding Marshall's policy about inclement weather can found in the link

http://www.marshall.edu/www/policy/policy_07.html

- Statement regarding Marshall's policy on Affirmative Action can found in the link www.marshall.edu/eeoaa/Forms/EEO-Policy.pdf

Examination

The final grade will be based on the following components:

2 Tests	200 points [**09/28/2010** and **11/02/2010**]
Homework	100 points
Final Examination	100 points (Comprehensive)
Total	**400 points**

The semester grade will be based on the percentage of the 400 total possible points, using the following scale.

90 -100% -- A
80 - 89% -- B
70 - 79% -- C
60 - 69% -- D
0 - 59% -- F

***FINAL EXAMINATION*: Tuesday December 14 [6:30 PM – 8:30 PM]**

A short summary of my teaching philosophy

The following is a short form of my teaching philosophy. It is intended to inform you of my teaching style and what I expect from you in the course of our teaching and learning.

My teaching philosophy is guided by the axiom 'Tell me, I'll listen, show me, I'll understand, involve me and I'll learn', which elevates involvement and participation as key issues in the learning process. Reflecting on my teaching, I recognize the magnitude of the impact I am to my students. As a faculty, my primary goals are to provide qualitative teaching, nurtured by quality research and other services to the university and the community within their respective foci and mandates. In the discharge of this responsibility, especially in the teaching of mathematical sciences courses, I see the learners as the focus, the teacher as facilitator, resource, organizer, participant and assessor, while the classroom becomes part of the rich learning environment, where learners are assisted to develop those skills that promote life long learning in their various vocations. Over the years, I have seen myself *teaching students*, rather than only *teaching them mathematics and statistics.*

I have embraced **learner centered-ness** in the course of my teaching profession, through the use of tasks and activities that promote learner autonomy and encourage students to become problem solvers as these have beneficial influence on learning as well as the dynamics of the classroom itself. The beauty of the learner centered approach is that it allows the teacher to understudy each group of learners and also offers the teacher the benefit of switching smoothly between the roles of facilitator, resource, organizer

and participant in order to enhance learning, rather than being the focus in the classroom. I therefore see it with utmost responsibility to organize my courses and conduct myself in a manner that allows students to benefit immensely from this approach. I fervently believe that different levels of teaching and different categories of learners place before the teacher different demands and challenges. Ultimately however, students who are encouraged to take responsibility for their learning by effective participation and involvement in class through direct interaction with instructors and course-mates emerge matured and independent, and they are capable of navigating successfully through challenges in their work place. I have found out that students are generally willing to participate as long as they are made to understand the significance of the process, and not a way to uncover their ignorance, if any.

Obviously, some students initially are negatively disposed to this approach particularly in a learning culture that reveres the teacher as a repository of knowledge. Also learners who are timid may readily not adjust to this method. With counseling, persuasion and perseverance, such students soon realize that the whole essence of learning itself is the development of the learner through interaction and involvement and they too become very comfortable as they readily blend with others in the class. I encourage my students to interact with one another and work in small groups. This affords the students the opportunity to engage in interpersonal relationship, be more relaxed, and ultimately benefit from one another.

One of the great attributes of being an excellent teacher is to also be teachable. An individual is not an island of knowledge, and there are great and many ideas and resources that one could learn from others. To this end, I solicit feedback from my students in the middle of the semester, rather than having to wait for the usual end of semester evaluation. I also meet regularly with class representatives on what are needful to be addressed to ensure that a healthy environment is created and maintained for learning. This self assessment allows me to address any problems that might have arisen in the course of teaching and learning.

Additional Resource Materials

The following are other resource materials. Let me know if you are interested in any of them, and I would be glad to let you have it for a period of time.

1. Ibe, C. O. (2005). *Fundamentals of Applied Probability and Random Processes*. Academic Press, Burlington, MA.
2. Olofsson, P. (2005). *Probability, Statistics, and Stochastic Processes*. John Wiley, Hoboken, NJ.
3. Allen, J.S. L. (2003). *An Introduction to Stochastic Processes with Applications to Biology*. Pearson Prentice Hall, Upper Saddle River, NJ.
4. Grimmett, G.R; Stirzaker, D.R. (1992). *Probability and Random Processes*. Oxford University Press, NY.
5. Doob, J.L. (1953). *Stochastic Processes*. John Wiley, Canada.
6. Taylor M. H. and Karlin S. (1998). *An Introduction to Stochastic Modeling*. Academic Press, San Diego, CA.

7. Yates D. R and Goodman J. D. (2005) *Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers.* Wiley, Hoboken, NJ.
8. Prabhu N.U. (1998). *Stochastic Storage Processes: Queues, Insurance Risk, Dams, and Data Communications.* Springer, NY.
9. Prabhu, N. U. (2007). Stochastic Processes: Basic Theory and Its Applications. World Scientific, Singapore.
10. Resnick S. I. (2003). *Adventures in Stochastic Processes.* Birkhauser Boston, NY.
11. Higgins, J. J., and Keller-Mcnulty, S. (1995). *Concepts in Probability and Stochastic Modeling.* Wadsworth, CA.
12. Flamagne, Jean-Claude (2003). *Lectures in Elementary Probability Theory and Stochastic Processes.* McGraw Hill, NY.
13. Durrett, R. (1999). *Essentials of Stochastic Processes*. Springer, NY.
14. Feller, W (1968). *An Introduction to Probability Theory and Its Applications*. John Wiley, Princeton.
15. Hoel, P. G., Port, S. C. and Stone C. J. (1972). *Introduction to Stochastic Processes*. Houghton Mifflin, Boston, MA.
16. Lin, X. S. (2006). *Introductory Stochastic Analysis for Finance and Insurance.* John Wiley, Hoboken, NJ.
17. Bhat, U. N and Miller, K. G. (2002). *Elements of Applied Stochastic Processes.* John Wiley, Hoboken, NJ.
18. Miller, S. L. and Childers D. G. (2004). *Probability and Random Processes: With Applications to Signal Processing and Communications.* Elsevier Academic Press, Burlington, MA.
19. Ross, S. (1996). *Stochastic Processes.* John Wiley, United States of America.
20. Taylor H. M. and Karlin, S. (1981). *A Second Course in Stochastic Processes.* Academic Press, San Diego, CA.
21. Wolff, R. W. (1989). *Stochastic Modeling and the Theory of Queues.* Prentice Hall, Upper Saddle River, NJ.
22. Minh, D.L. (2001). *Applied Probability Models*. Duxbury, Pacific Grove, CA.
23. Kao, E. P.C. (1997). *An Introduction to Stochastic Processes.* Wadsworth, Belmont, CA.
24. Tijms, H. C. (2003). *A First Course in Stochastic Models.* John Wiley, Hoboken, NJ.
25. Bailey, N. T. J. (1964). T*he Elements of Stochastic Processes with Applications to the Natural Sciences*. John Wiley, NY.