OAKLAND UNIVERSITY
DEPARTMENT OF MATHEMATICS AND STATISTICS
STUDENT INFORMATION SHEET

SEMESTER: Winter 2018

COURSE: STA 5225: Stochastic Processes I, CRN 14173

CLASS TIME AND ROOM: TR 5:30PM-7:17PM in room 136B Dodge Hall (DH)

COURSE WEBSITE: https://moodle.oakland.edu/login/index.php

FACULTY: Xianggui (Harvey) Qu; Office 371 MSC; Phone: 248-370-4029; qu@oakland.edu

OFFICE HOURS**:** TR 2:00PM-3:00PM or by appointment.

COURSE OBJECTIVES: Random walk models, Markov chains and processes, birth and death processes, queuing processes, diffusion processes and non-Markov processes.

PREREQUISITES: STA513. A course in differential equations is recommended.

TEXTBOOK: **Introduction to Stochastic Processes with R by Robert P. Dobrow, 2016, published by John Wiley & Sons, Inc.**

CALCULATOR POLICY: You can use your calculator in all tests, homework assignments. To receive full credit on test and homework, be sure to show all the necessary work for setting up a calculation. Using a calculator to store formulas is not allowed in all tests.

TESTS AND HOMEWORK: **One mid-term exam in class (worth 30 points) is temporarily scheduled on Thursday, March 15. Homework will be assigned and graded regularly. No homework after due date will be collected and graded. Homework will be worth 30 points. Final examination (worth 40 points) is comprehensive and is scheduled on Thursday, April 19 from 7:00PM to 10:00PM.**

GRADING POLICY: **Your course grade will be based upon total points you have earned out of the total 100 points. According to the departmental guideline of grades 95% —> 4.0, 80% —> 3.0, 65% —> 2.0, 50% —>1.0, less than 50% —> 0.0, Your grade in STA 5225 (0 to 4 scale) is calculated as follows: (total points earned -35)/15.**

MAKE-UP POLICY: **There will be no make-up tests. If you miss a test and have a valid excuse, your grade will be determined by giving more weight to the final exam.**

EMERGENCY CLOSING: If the University is closed at the time of a scheduled test or exam, the exam will be given during the next class period when the University reopens. The Oakland University emergency closing number is 370-2000.

ACADEMIC HONESTY: Cheating is a serious academic crime. Oakland University policy requires that all suspected instances of cheating be reported to the Academic Conduct Committee for adjudication. Anyone found guilty of cheating in the course will receive a course grade 0.0, in additional to any penalty assigned by the academic Conduct Committee. Working with others on homework assignments does not constitute cheating; handing in an assignment that has essentially been copied from someone else does. Receiving help from someone else or from unauthorized written materials during tests is cheating, so is using a calculator as an electronic "crib sheet".

IMPORTANT DATES:

January 17 (Wednesday)	**LAST DAY 100% TUITION REFUND** **LAST DAY "NO – GRADE" DROP** **LAST DAY TO ADD A CLASS**
March 14 (Wednesday)	**LAST DAY "W-GRADE" DROP**
April 17 (Tuesday)	**LAST CLASS OF STA 5225 IN WINTER 2018**
April 19 (Thursday)	**FINAL EXAMINATION: 7:00PM – 10:00PM**

STA5225 TENTATIVE SYLLABUS
(Subject to change)

Days of class	Chapters and Topics
January 4, 9	Chapter 1: Introduction and Review
January 11, 16	Chapter 2: Markov Chain Cornucopia and Basic Computations
January 18, 23	Chapter 2: Long-Term Behavior of Markov Chains and Simulation
January 25, 30	Chapter 3: Limiting Distribution, Stationary Distribution, and Irreducible Markov Chains
February 1, 6	Chapter 3: Periodicity, Ergodic Markov Chains, Time Reversibility and Absorbing Markov Chains
February 8, 13	Chapter 4: Branching Processes
February 15, 27	Chapter 5: Markov Chain Monte Carlo: Metropolis-Hastings Algorithm and Gibbs Sampler
Mach 1, 6	Chapter 5: Markov Chain Monte Carlo: Perfect Sampling, Convergence Rate, Total Variation
Mach 8, 13	Chapter 6: Poisson Process: Interarrival Times, Infinitesimal Probabilities, Thinning, and Superposition
Mach 15	**Midterm Exam**
March 20	Chapter 6: Spatial and Nonhomogeneous Poisson Processes
Mach 22, 27	Chapter 7: Continuous-Time Markov Chains: Alarm Clocks, Transition Rates, and Infinitesimal Generator
Mach 29, April 3	Chapter 7: Continuous-Time Markov Chains: Long-Term Behavior, Time Reversibility, Queueing Theory, and Poisson Subordination
April 5, 10	Chapter 8: Brownian Motion: Random Walk, Gaussian Process

April 12, 17	Chapter 8: Brownian Motion: Transformations, Variations, and Martingales
April 19	7:00PM – 10:00PM Final Exam