Course title and number  ISEN 340 Operations Research II
Term (e.g., Fall 200X)  Fall 2016
Meeting times and location  TBD

Course Description and Prerequisites
Probabilistic methods for industrial and service systems; stochastic processes used in industrial engineering, including Poisson processes and discrete and continuous-time Markov chains; applications to production operations, inventory control, revenue management, quality control, reliability, digital simulation and finance.
Prerequisites: MATH 304 and ISEN 310

Learning Outcomes
At the end of this course, the student should
- be able to model and understand uncertainty in real world engineering problems,
- be able to formulate and solve probabilistic models that capture the essential elements of an engineering problem,
- be able to interpret the model solution to assist in engineering decision making, and
- have an appreciation for a wide variety of applications of the methods developed.

Instructor Information
Name  TBD
Telephone number  TBD
Email address  TBD@tamu.edu
Office hours  TBD
Office location  TBD

Textbook and/or Resource Material
**Grading Policies**

Quizzes: 25% (approximately 5 spread throughout the semester, announced two days ahead)

Exam 1: 25% (around week 5 of the semester)

Exam 2: 25% (around week 10 of the semester)

Final Exam: 25% during the week of finals

Grades assigned are A for 90%–100%, B for 80%–89.9%, C for 70%–79.9%, D for 60%–69.9% and F for less than 60%.

**Attendance and Make-up Policies**

Class attendance is not optional. You are expected to attend all class lectures except for university excused absences. Make-up for the exams and quizzes will be offered only in case of a university excused absence. The university rule regarding excused absences can be found at http://student-rules.tamu.edu/rule07.

**Course Topics, Calendar of Activities, Major Assignment Dates**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Required Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Review of probability: probability spaces, events, probability laws, law of total probability, Bayes’ theorem; random variables, distribution functions, expectation, including mean and variance</td>
<td>Chapter 1, 2</td>
</tr>
<tr>
<td>2</td>
<td>Sequences of random variables, joint distributions, conditional probability and conditional expectation, random processes</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>3</td>
<td>Discrete time Markov chains, the Markov property, one-step and n-transition probabilities using MATLAB</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>4</td>
<td>Discrete time Markov chains continued, classification of states, first step analysis, applications and case studies</td>
<td>Chapter 4</td>
</tr>
<tr>
<td>5</td>
<td>Discrete time Markov chains continued, long run behavior, review and first exam</td>
<td>Chapter 4</td>
</tr>
</tbody>
</table>
Poisson process, definitions, law of rare events, interarrival times, arrival times
Chapter 5

Chapter 5

Poisson process continued, conditional arrival times, nonstationary Poisson process, compound Poisson processes
Chapter 5

Continuous time Markov chains, definitions, time dependent transition probabilities, transition rates
Chapter 6

Chapter 6

Continuous time Markov chains continued, Kolmogorov differential equations and solutions using MATLAB, birth-death processes
Chapter 6

Chapter 6

Continuous time Markov chains continued, long run behavior, applications and case studies, review and second exam
Chapter 6

Chapter 7

Renewal theory and applications, counting process, elementary renewal theorem, key renewal theorem
Chapter 7

Chapter 7

Renewal theory and applications continued, renewal reward processes, alternating renewal processes, applications
Chapter 7

Chapter 8

Queueing theory and applications, exponential models, transient and limiting analysis using MATLAB
Chapter 8

Chapter 8

Queueing theory and applications, M/G/1 and variations, applications and case studies
Chapter 8

Final exam during the week of finals

Other Pertinent Course Information

The course will use computational tools to solve larger problems. Handouts for MATLAB will be provided. Students are expected to apply prior knowledge of MATLAB in this course.

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For
Academic Integrity

For additional information please visit: http://aggiehonor.tamu.edu

“An Aggie does not lie, cheat, or steal, or tolerate those who do.”

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning and to follow the philosophy and rules of the Honor System. Ignorance of the rules does not exclude any member of the Texas A&M University community from the requirements or the processes of the Honor System. For additional information please visit: http://student-rules.tamu.edu/; http://student-rules.tamu.edu/aggiecode; and http://student-rules.tamu.edu/rule20. The complete information of university regulations regarding the handling of academic misconducts (including the appeal process) can be found at http://aggiehonor.tamu.edu/.

I, <insert instructor name>, as the rest of the Industrial & Systems Engineering Faculty, uphold the Aggie Honor Code as an axiom of our academic excellence. We consider its sincere observance to be essential for membership in our department and Texas A&M. We extend you the trust conferred to those who faithfully adhere to our honor code. Abuse of this trust is intolerable, thus I will report and assign an extreme penalty to those who do not stand with us in preserving the integrity symbolized by the Aggie Honor Code, “An Aggie does not lie, cheat, or steal or tolerate those who do.”

In this course the penalty for any violation of the Aggie Honor Code, as minimal as it may be, is F*.