Course title and number  ISEN 310 Uncertainty Modeling for Industrial Engineering
Term (e.g., Fall 200X)  Fall 2016
Meeting times and location  TBD

Course Description and Prerequisites
Models and methods based on probability and statistics for industrial engineering applications; random variables, expectation, distribution fitting, reliability of systems, central limit theorem and interval estimates in the context of production and service systems.
Prerequisites: ISEN 230 and STAT 211

Learning Outcomes
Students will be able to

• characterize uncertainty to perform decision-making under uncertainty, and
• apply probability and statistics based methods for analysis and prediction in engineering systems.

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

Textbook and/or Resource Material
None. Course notes and handouts will be provided.

Grading Policies
Homework, Assignments and Quizzes: 25%

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>
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<tbody>
<tr>
<td>1</td>
<td>Basic Probability Review; probability of events; 3-card example</td>
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<td>2</td>
<td>Conditional probability, law of total probability; Monte Hall Problem</td>
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<td>3</td>
<td>Discrete random variables; Special cases: binomial, geometric, Poisson</td>
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<tr>
<td>4</td>
<td>Continuous random variables; Special cases: exponential, uniform, gamma, normal; empirical distributions</td>
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<td>5</td>
<td>Expectation, mean, variance and expected value of functions of random variables; Exam 1</td>
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<td>6</td>
<td>Case Study 1: newsvendor problem and applications; Case Study 2: Setting safety stock in inventory models</td>
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<td>7</td>
<td>Distribution fitting, notion of IID, autocorrelation plot, histogram, probability plot</td>
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<td>8</td>
<td>Point estimates of mean and variance, Goodness of fit: Chi-squared test</td>
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<td>9</td>
<td>Kolmogorov-Smirnov test; collect inter-arrival and service time data, and fit; analysis of failure data</td>
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<td>10</td>
<td>Reliability modeling: hazard rate functions, series and parallel systems; Exam 2</td>
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<td>11</td>
<td>Failure models, reliability testing, warranties; setting warranty period and policies</td>
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<td>12</td>
<td>Central Limit Theorem; collection of IID and independent random variables</td>
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<td>13</td>
<td>Application in PERT – Project Evaluation and Review Technique</td>
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<td>14</td>
<td>Interval Estimates: confidence intervals for means and variances: one and two variables; system comparison</td>
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**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 additional information visit [http://disability.tamu.edu](http://disability.tamu.edu)

**Academic Integrity**

For additional information please visit: [http://aggiehonor.tamu.edu](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/); [http://student-rules.tamu.edu/aggiecode](http://student-rules.tamu.edu/aggiecode); and [http://student-rules.tamu.edu/rule20](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*. 