

# 2018 Syllabus and Course Outline:

## CHE223H1S Statistics- Quantitative Decision Making

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**Course Instructor:** Prof. Alison McGuigan  
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**Course Description:** In this course, you will learn how to summarize and describe data (Descriptive statistics), how to describe variation in data (probability and probability distributions), how to develop models describing relationships between variables (regression), and how to determine if two populations are different (hypothesis testing (t-tests and ANOVA)). The course will primarily use Excel for statistical analysis however students are free to use R, Matlab or whatever other software they prefer.

**Course Instruction:** The course will consist of lectures supported by classroom tutorials. In addition, a number of “extra help” tutorial sessions will be run to support course deliverables (right before assignment deadlines and midterms/ exams etc). The lecture time on Friday will provide an overview of the theory and a few examples however students are strongly advised to complete the practice problems each week to ensure they can use the tutorials effectively to ask questions about specific problems that have encountered when trying to apply the lecture material.

**Course Objectives:** By the end of the course students will be able to:

- Visualize and analyze data by using various data plots
- Understand the definition of a random variable
- Discuss probability, and normal and binomial distribution
- Make statistical decisions for a single, two or multiple independent populations
- Model and analyze data through linear regression analysis

**Reference Text:** This course requires WileyPlus access to Applied Statistics and Probability for Engineers, 7th Edition, Douglas C. Montgomery and George C. Runger, Jan 2018. This is available through the campus ebookstore (ISBN: 9781119583769 - \$60.00). This resource contains large practice problem sets and you will be required to complete one designated example problem per week prior to tutorials.

**Lectures:** Friday 10-12 (WB130) OR Fri 3 – 5pm (GB221)

**Tutorials:** Mondays, 1-2 pm Room SS1069 (TUT02) OR 2 – 3pm in Room MY330 (TUT01)

**Evaluation:**

Evaluation Components	Percent	Date
Midterm Exam	25	Wednesday, March 6 <sup>th</sup> 12-2pm in EX 320
Tutorial assignments	30	Due (part 1) Feb 15 <sup>th</sup> , (part 2) April 5 <sup>th</sup> 2019
Tutorial pre-problems	5	Each week
Final Exam	40	TBA
<b>Total</b>	<b>100</b>	

## Course Outline:

Wk	Date	Topics covered	Textbook sections for more info
1	Jan 7	Course overview and role of statistics in engineering, random variables, definitions and data summary and data visualization	Chapter 1 and 6
2	Jan 14	Probability	Chapter 2
3	Jan 21	Quantifying variation in data –probability distributions	Chapter 3 (3.1-3.4) Chapter 4 (4.1-4.5)
4	Jan 28	Normal probability plots, binomial distribution and normal approximation,	Chapter 3 ((3.5) Chapter 4 (4.5-4.6)
5	Feb 4	independence, linear functions, propagation of error,	Chapter 5 (5.1-5.4, 5.6)
6	Feb 11	One sample decision making: Statistical inference, point estimation, central limit theorem, confidence intervals,	Chapter 7 and 8
7	Feb 18	Reading week	
8	Feb 25	Review for midterm	
9	Mar 4	Hypothesis testing for single samples	Chapter 9 (9.1-9.8)
10	Mar 11	Two samples decision making: inference on the means	Chapter 10 (10.1-10.2)
11	Mar 18	Paired t-test, ANOVA	Chapter 10 (10.4-10.7)
12	Mar 25	Regression	Chapter 11
13	April 1	Regression	Chapter 12 (12.1-12.4)
14	April 8	Review	

## Course Policies and General Information:

**Course announcements:** Announcements, updates, course material, evaluation, etc. will be posted on Quercus. Students are responsible for checking the posted information regularly. Please turn on announcements or check Quercus daily to ensure you receive updates about the course in a timely manner.

**Attendance:** Attendance at lectures is recommended and attendance at tutorials is expected.

**Tutorial pre-work:** Completion of 1 mandatory tutorial exercise each week will make 5% of your grade. Your work will be automatically graded by Willey Online but you will receive credit simply by attempting the questions. This will ensure you are investing sufficient study time in the course to be successful in the midterm and final exams

**Assignments:** There will be one two-part assignment, which will contribute to 30% of your final mark. This will be a case study using data collected from the second-year analytical labs. You may work on the assignment in teams of two (or individually if you cannot find a partner). More detailed instructions will be provided on Quercus regarding the assignment.

**Late submissions:** Late submitted assignments will be marked down 5% per day and will not be accepted if submitted more than a week late. Extensions may be granted when students present the TA with a compelling reason and satisfactory documentation (e.g., a doctor's note).

**Mark revisions:** Students have a maximum of ONE week after a test is handed out to ask for re-mark or revisions. All the scores (except for the final exam) will be posted on Quercus. Students have until April 8<sup>th</sup> to check the accuracy of the score posted (mid-term, assignment and tutorial pre-work). After that date, requests for revisions must be directed to the Registrar's office.

**Email communication:** The Course Instructor may be contacted via email to get clarification on course issues, or to ask brief questions. If you need clarification of course material, help is available during tutorials or in the extra help sessions. Urgent issues must be communicated in person.

**Missed midterm tests:** Students who miss the midterm tests will be assigned a mark of zero for the test unless they document a compelling reason for missing it. Make-up tests will be scheduled if the reason is accepted. Please submit all petition document to the undergraduate office directly.

**Cell phones and lecture recording:** During lectures and tutorials, please do not use cell phones unless instructed. Please do not video or audio record the lectures.

**Academic honesty:** Please refer to <http://www.utoronto.ca/academicintegrity/>