# Course Syllabus for STAT/CS/SE 3341
# **Summer** 2016

The content of this syllabus may change at the discretion of the instructor.

**Class location and times:**
Tuesdays & Thursdays, 3:00pm – 5:15pm | JSOM 2.717 | Tuesday May 24 to Thursday August 4

**Instructor information:**
Dr. Tristan Whalen | Office: FN 2.206 | Email: tgw100020@utdallas.edu
Please include 3341.0U1 in every email you send to me.
Office Hours are by appointment in summer semesters.

**Course prerequisites:**
Calculus II (or equivalent) and Discrete Math for Computing I
MATH 1326 or MATH 2414 or MATH 2419, and
CE/CS/TE 2305

**Course content:**
Axiomatic probability theory, independence, conditional probability. Discrete and continuous random variables, special distributions of importance to CS/SE and expectation, Central Limit Theorem. Introduction to stochastic processes. Illustrative examples and simulation exercises from queuing, reliability, and other CS/SE applications. Basic statistical inference, parameter estimation, hypothesis testing, and linear regression.

**Learning objectives:**
Students will learn fundamental rules of probability, discrete and continuous distributions, and statistical methods most commonly used in computer science and software engineering. They will be introduced to stochastic processes, Markov chains, and statistical inference, and they will apply the theory and methods to the evaluation of queuing systems and the computation of their vital characteristics.

**Required materials:**
**Textbook:** *Probability and Statistics for Computer Scientists*, M. Baron, Chapman & Hall/CRC Press (2014), Second Edition
ISBN 9781439875902

**Scientific/Graphing/Statistics Calculator:** A calculator is permitted on quizzes and exams. It is recommended to have probability distribution functions and matrix functions. Note that mobile phones are not permitted on exams.

**Computer and internet access:** for online homework, email announcements, and course materials in elearning.

**Homework:**
Homework is assigned online via WeBWork. Instructions will be posted in elearning and announced in class.

**Quizzes:**
A quiz will be given in class about once per week (no quiz during the first week or exam weeks). The quiz will typically reflect the material covered on the homework due the night before before quiz day.

**Tentative Summer 2016 Calendar*:**

| Week | Section(s) | Topic(s) |
|---|---|---|
| 1<br>May 24, 26 | 1<br>2.1-2.2<br>2.4 | Introduction. Sets, events, and outcomes. Probability axioms, probability rules. Conditional probability, independence. Bayes' Rule, Law of Total Probability. |
| 2<br>May 31, June 2 | 3.1-3.3<br>3.4 | Random variables. Random vectors, joint and marginal distributions, expected value, variance, and standard deviation.<br>Discrete distributions: Bernoulli, Binomial, Geometric, Poisson. |
| 3<br>June 7, 9 | 4.1<br>4.2<br>4.3 | Continuous random variables.<br>Continuous distributions: Uniform, Exponential, Gamma, Normal.<br>Central Limit Theorem. |
| 4<br>June 14, 16 | | Catch up, review for exam 1.<br>**June 16: Exam 1** (Probability Core). |
| 5<br>June 21, 23 | 6.1<br>6.3 | Introduction to stochastic processes. Binomial processes.<br>Poisson processes. |
| 6<br>June 28, 30 | 6.2 | Markov chains, transition probabilities, steady state distributions. |
| 7<br>July 5, 7 | 7.1<br>7.3 | Introduction to queuing systems. Bernoulli single-server queuing process, unlimited and limited capacity. |
| 8<br>July 12, 14 | | Catch up, review for exam 2.<br>**July 14: Exam 2** (Advanced Probability Topics). |
| 9<br>July 19, 21 | 8<br>9.1 | Introduction to statistics. Parameter estimation, method of moments, method of maximum likelihood. |
| 10<br>July 26, 28 | 9.2-9.3<br>9.4 | Confidence intervals.<br>Hypothesis testing. |
| 11<br>August 2, 4 | | Catch up, review for exam 3.<br>**August 4: Exam 3** (Statistics Topics). |

***Instructors reserve the right to change the schedule if necessary.**

**Grading:**

10% Homework average
15% Quiz average
25% Exam 1
25% Exam 2
25% Exam 3

A+: [97, 100], A: [93, 97), A-: [90, 93)
B+: [87, 90), B: [83, 87), B-: [80, 83)
C+: [77, 80), C: [73, 77), C-: [70, 73)
D+: [67, 70), D: [63, 67), D-: [60, 63)
F: [0, 60)

**Assignment and grade policies:**

- There are no make-ups of quizzes. Your lowest quiz grade is dropped to account for an emergency.
- There are no make-ups of homework. Your lowest homework grade will be dropped.
- There are no make-ups of exams unless the circumstances are extraordinary.
- I have no plans to offer extra credit.
- I do not give free points or round grades. I follow the grade standards given above to keep things fair for all students.
- Your calculator is permitted on quizzes, but no other devices or notes are permitted.
- Your calculator is permitted on exams. A formula sheet is provided on all exams. No other devices or notes are permitted.

**Classroom policies:**

- Attendance is strongly recommended. Exams are based on the content and examples covered in class. If you choose not to attend class, it is your responsibility to drop the course.
- Put away and silence all mobile devices (smartphones, laptops, etc.) during class.
- Avoid leaving class early or coming in late.
- Participation in class is desired: avoid side conversations and instead raise your hand to speak.

**Instructor email and office policies:**

- I encourage you to email me throughout the course for help. You may also request an office appointment.
- Please, include your course number and section number in every email to me.
- I will not have office hours during this summer semester. However, I am available by appointment on school days, and can stay after class if there are many questions.

**UT Dallas syllabus policies and procedures:**

The information contained in the following link constitutes the university's policies and procedures segment of the course syllabus.
http://go.utdallas.edu/syllabus-policies