AMAT 362—Probability for Statistics—Spring 2021 Syllabus

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Pre-Requisites: Calculus of Several Variables (AMAT 214) and Introduction to Proofs (AMAT 299).

Lecture Place and Times: *ONLINE* on *MW 11:40-1:00pm*

Office Hours Place and Times: By appointment with Brendan Mallery bmallery@albany.edu or me.

Course Texts: The following texts are recommended:

- *Introduction to Probability* by Anderson, Seppäläinen, Valkó [ASV].
- *Introduction to Probability* by Grinstead and Snell [GS];
- *Probability* by Pittman [Pit];
- *Introduction to Probability, 2nd edition* Bertsekas and Tsitsiklis [BT]

Course Topics: This course is meant to serve as a calculus-based introduction to probability that provides a foundation for statistics as covered in AMAT 363. Additionally, this course is meant to serve as preparation for the *Society of Actuaries* Exam P. The topics for the P exam are listed below, but I will follow my own selection of topics and spend more or less time focusing on topics that I think are important.

(1) General Probability: set theory, Venn diagrams, sample space and events; definition of probability measure, basic axioms; addition and multiplication rules; independence versus mutually exclusive events; calculation of conditional probabilities; combinatorics; Bayes' theorem and law of total probability.
(2) Univariate Random Variables: discrete and continuous univariate random variables (RVs) including binomial, negative binomial, geometric, hypergeometric, Poisson, uniform, exponential, gamma, normal, mixed distributions and their applications; PDFs and CDFs of these RVs; expectation/mean, mode, median, percentile and higher moments; variance, standard deviation, coefficient of variation; probability and moment generating functions; sums of independent RVs, such as Poisson and Normal; transforms.
(3) Multivariate Random Variables: joint probability functions (PFs), PDFs, CDFs; conditional and marginal PFs, PDFs, CDFs and moments for these; covariance and correlation; transforms of multivariate RVs; probabilities and moments for linear combinations of RVs; central limit theorem.

Grading Schema:

- 45% Lecture Worksheets
- 20% Final Exam
- 15% Exam 1
- 15% Exam 2
- 5% Participation and Attendance

Attendance and Missed Work Policy: Attendance is required unless a reasonable excuse is provided to the instructor via email. Worksheets corresponding to lectures 1-8 will be handed in as a packet before the first exam. Worksheets corresponding to lectures 9-16 will be handed in before the second exam. Worksheets corresponding to lectures 17-24 must be handed in before the final exam.

Academic Dishonesty Policy:

Use of Chegg.com and similar websites is strictly prohibited. Students who post questions from exams or worksheets on online forums such as Chegg will get an automatic 5% subtracted from their overall grade for the first question posted. A 10% subtraction will occur for the second posted question and an automatic failing grade will be given on the third offense.

THREE STRIKES AND YOU'RE OUT!

The final exam will occur remotely between Wednesday, May 12, 2021 and Saturday, May 15, 2021.

The format of the exams are still to be determined.

Monday		Wednesday	
Feb 1st	Lecture 1	**Feb 3rd**	Lecture 2
Feb 8th	Lecture 3	**Feb 10th**	Lecture 4
Feb 15th	Lecture 5	**Feb 17th**	Lecture 6
Feb 22nd	Lecture 7	**Feb 24th**	Lecture 8
Mar 1st **♠Midterm 1♠**		**Mar 3rd** ♡*NO ClASS*♡	
Mar 8th	Lecture 9	**Mar 10th**	Lecture 10
Mar 15th	Lecture 11	**Mar 17th**	Lecture 12
Mar 22nd	Lecture 13	**Mar 24th**	Lecture 14
Mar 29th	Lecture 15	**Mar 31st**	Lecture 16
Apr 5th **♠Midterm 2♠**		**Apr 7th**	Lecture 17
Apr 12th	Lecture 18	**Apr 14th**	Lecture 19
Apr 19th	Lecture 20	**Apr 21st**	Lecture 21
Apr 26th	Lecture 22	**Apr 28th**	Lecture 23
May 3rd	Lecture 24	**May 5th**	Lecture 25
May 10th **♠Final Review♠**		**May 12th** ♡*NO MORE CLASSES*♡	

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