

TEXAS A&M UNIVERSITY COMMERCE  
COLLEGE OF SCIENCE, AGRICULTURE AND ENGINEERING  
DEPARTMENT OF MATHEMATICS

**CLASS SYLLABUS**

Instructor:	Dr. Joshua Patterson	Semester:	Spring, 2023
Office Phone:	903-468-8660	Office Hours:	MW @ 3:30-4:30pm & T @ 9:30-10:30am & TR @ 1-2pm [ONLINE] or by appointment
Office:	Binnion 303A		
Website:	<a href="http://faculty.tamuc.edu/jpatterson/">http://faculty.tamuc.edu/jpatterson/</a>		
Email:	Joshua.Patterson@tamuc.edu		

- I. Course: MATH 503.01W, Actuarial Math, 3 credit hours
- II. Course Description: A course in business/financial mathematics designed as an introduction to actuarial science and as preparation for the Exam P/1 and Exam FM actuarial exams. Encounters appropriate topics from analysis, linear algebra, probability and statistics, and financial mathematics.  
Prerequisites: MATH 401 or MATH 402/403 or equivalent, each with a grade  $\geq$  'C'.
- III. Textbook: We will not have a required textbook. I will upload weekly notes to D2L that will serve as our textbook. The notes will primarily reference the following two resources:
- Exam P
    1. *An Introduction to Mathematical Statistics and its Applications*, 5th Edition, by Richard J. Larson and Morris L. Marx, Prentice Hall, ISBN-13: 978-0-321-69394-5
  - Exam FM
    1. *A Basic Course in the Theory of Interest and Derivatives Markets: A Preparation for the Actuarial Exam FM/2*, by Marcel B. Finan, Arkansas Tech University, available for free here.

My notes may contain elements and cover topics from other textbooks listed as 'suggested readings' by SOA in their most recent Exam P / Exam FM syllabus. These textbooks may include the following:

- Exam P
  1. *A First Course in Probability* (Tenth Edition), 2019, by Ross, S.M., Pearson, ISBN: 978- 0134753119
  2. *Mathematical Statistics with Applications* (Seventh Edition), 2008, by Wackerly, D., Mendenhall III, W., Scheaffer, R., Thomson Brooks/Cole ISBN: 978-0495110811
  3. *Probability for Risk Management*, (Third Edition), 2021, by Hassett, M., Stewart, D., Milovanovic, J., ACTEX, ISBN: 978-1-64756-322-6
  4. *Probability and Statistics with Applications: A Problem-Solving Text*, (Second Edition) 2015, by Asimow, L. and Maxwell, M., ACTEX, ISBN: 978-1-62542-472-3
  5. *Probability and Statistical Inference* (Tenth Edition), 2020, by Hogg, R.V., Tanis, E.A., and Zimmerman, D.L., Prentice Hall, ISBN: 978-0135189399
  6. *Probability* (2nd Edition), 2018, by Leemis, L.M., Lightning Source, ISBN: 978-0-9829174-7-3
- Exam FM
  1. *Mathematics of Investment and Credit* (Seventh Edition), 2017, by Broverman, S.A., ACTEX Publications, ISBN 978-1-63588-221-6
  2. *Mathematical Interest Theory* (Third Edition), 2019, by Vaaler, L.J.F., Harper, S.K., and Daniel, J.W., The Mathematical Association of America, ISBN: 978-1-4704-4393-1
  3. *Financial Mathematics: Theory and Practice*, 2012, by Brown, R and Kopp, S, Reprint: ACTEX Learning, Published by McGraw-Hill Ryerson: ISBN: 978-1-63588-694-8
  4. *Interest Theory – Financial Mathematics and Deterministic Valuation* (Second Edition), 2018, by Francis, J. and Ruckman, C., Actuarial Brew, ISBN 978-0998160412
  5. *Financial Mathematics for Actuaries*, 3rd Edition, 2022, by Chan, Wai-Sum, and Tse, Yiu-Kuen, World Scientific Publishing ISBN: 978-9811243271 (hardcover) or 978-9811245671 (paperback).

IV. Resources: SOA provides the following to potential exam candidates that I encourage you to utilize.

1. Exam P Details: <https://www.soa.org/education/exam-req/edu-exam-p-detail.aspx>
2. Exam FM Details: <https://www.soa.org/education/exam-req/edu-exam-fm-detail.aspx>
3. Online Sample Exams:  
<https://www.soa.org/education/exam-req/syllabus-study-materials/edu-exam-p-online-sample/>

In addition, a practice exam for either Exam P or Exam FM can be taken here:

<http://www.saab.org/actuarialmuorg.cgi>

V. Technology: Access to a CAS (computer algebra system) is highly recommended, such as Mathematica, Matlab, or R. While I am not going to require a specific CAS, it is worth noting that R is both designed for statistical applications, open-source and free. Use the following steps to install both R, and it's companion RStudio:

- (a) Go to <https://cran.r-project.org/> to download and install R for your choice of operating system.
- (b) Go to <https://www.rstudio.com/products/rstudio/download/> to download and install RStudio for your choice of operating system.

**NOTE: R must be installed before installing RStudio.**

For documentation on how to use R, see <https://cran.r-project.org/doc/contrib/Faraway-PRA.pdf>

In addition, we will likely use WolframAlpha.com, a free web-based CAS for various calculations throughout the semester.

VI. Student Learning Outcomes:

- The Exam P SLOs given here: <https://www.soa.org/4af194/globalassets/assets/files/edu/2022/2023-05-exam-p-syllabus.pdf>
- The Exam FM SLOs given here: <https://www.soa.org/4ae116/globalassets/assets/files/edu/2023/2023-04-exam-fm-syllabus.pdf>

VII. Methods of Evaluation:

Evaluation methods may include grading homework, chapter or major **oral** exams, quizzes, and computer assignments.

Participation: Since this class is online, we will be using **Discord** to facilitate collaboration. Discord has many advantages over Zoom; namely it allows everyone to collaborate with everyone else, it supports LaTeX for math symbols, WolframAlpha for in-text computation, voice, video, and text. It has an app for all major phone operating systems, and can be installed on PC and Mac; best of all, it's **free for everyone**.

Discord Invite Link: <https://discord.gg/bVuQ3MHYeN>

Homework: Homework assignments will be uploaded and assigned through D2L weekly. They will be due each Sunday at 11:59pm. Each homework assignment will be worth 30 points. Your highest 10 homeworks will be used to compute your homework grade. Late work will be subject to a reduction of 5 points per day.

Final Exam: The Final Exam will be comprehensive and is worth 150 points. It will be facilitated by a take-home written exam which is uploaded to D2L. Students will then work the problems assigned and schedule a time with me to conduct the oral exam on Discord. The purpose of the take-home written exam is to motivate the oral discussion. Your Final Exam grade is determined entirely by the oral portion—written work will not be graded. A copy of the rubric I use for evaluating the oral portion will be included at the end of this syllabus.

Extra Credit: On occasion, we may have an extra credit opportunity extended to the class. These extra credit opportunities will be limited to a maximum of 5 points per opportunity and no more than 15 points for the entire class.

Grades: If one does not complete at least half of all homework assignments, the course grade will be an F. The maximum possible points available in this course are:

10 Homeworks	300 points
Final Exam	150 points
Total	450 points

Your course grade will be based on the percentage of the points you make to the total points available in the course:

$A \geq 90\%$ ,       $B \geq 80\%$ ,       $C \geq 70\%$ ,       $D \geq 60\%$ ,       $F < 60\%$

#### VIII. Other Information:

- **A&M-Commerce Supports Students' Mental Health**  
The Counseling Center at A&M-Commerce, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit <https://www.tamuc.edu/counsel>
- **The information for students with disability:** 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 have a disability requiring an accommodation, please contact: Office of Student Disability Resources and Services, Texas A&M University-Commerce, Gee Library, Room 162, Phone (903) 886- 5150 or (903) 886-5835, Fax (903) 468-8148, email: [StudentDisabilityServices@tamuc.edu](mailto:StudentDisabilityServices@tamuc.edu)
- **Basic Tenets of Common Decency:** "All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment." (Student's Guide Handbook, Policies and Procedures, Conduct.) This means that rude and/or disruptive behavior will not be tolerated.
- **Free tutoring service** is provided by the Math Skill Center (Binnion Hall Room 328) with the following hours: M and W, 8am–8pm; T and R, 8am–6pm; and F 8am–12pm

**CLASS SCHEDULE, Spring 2023**  
**MATH 503.01W**  
**ONLINE**

Week of	Monday
1/16	Syllabus & Introduction / Exam P: General Probability
1/23	Exam P: General Probability
1/30	Exam P: Univariate Random Variables
2/6	Exam P: Univariate Random Variables
2/13	Exam P: Multivariate Random Variables
2/20	Exam P: Multivariate Random Variables
2/27	TBD
3/6	TBD
3/13	<b>SPRING BREAK (NO CLASSES)</b>
3/20	Exam FM: Time Value of Money
3/27	Exam FM: Annuities/cash flows with non-contingent payments
4/3	Exam FM: Loans
4/10	Exam FM: Bonds
4/17	Exam FM: General Cash Flows, Portfolios, and Asset Liability Management
4/24	Exam FM: General Cash Flows, Portfolios, and Asset Liability Management
5/1	Review
5/8	FINAL ORAL EXAM: <b>Schedule your time early!</b>

\*This schedule is for reference. The TBD weeks will be assigned according to class specific needs (i.e. we may spend more time on Exam P, or Exam FM). In any case, the actual coverage of each week may be different. Please join the Discord server to stay up to date with any changes that may take place.

**EXTRA CREDIT OPPORTUNITY**

Those who use the discord invite link on pg. 2 to join the discord server before 1/23/2023 will earn 5 points extra credit to be applied to the first homework grade.

**WELCOME TO THIS CLASS**  
**HAVE A SUCCESSFUL SEMESTER**

Instructor Name	Student Name	Student ID	Discord Username
Joshua Patterson, PhD			

Grading Rubric for Oral Final Exam

Trait	Description	Score	Weight	Grade
<i>Resolution</i>	Answers and results are accurate.	0 1 2 3 4 5	×9	
<i>Knowledge</i>	Displays a deep and systematic wealth of knowledge of the material.	0 1 2 3 4 5	×9	
<i>Synthesis</i>	Student demonstrates that they have internalized and consolidated the major concepts and ideas.	0 1 2 3 4 5	×9	
<i>Communication</i>	Information is clearly and effectively delivered.	0 1 2 3 4 5	×3	
				Total: /150

Score	Description	Explanation of Score
5	Strong	Shows control and skill in this trait; many strengths present.
4	Competent	Strengths outweigh the weaknesses; a small amount of revision is needed.
3	Developing	Strengths and need for revision are about equal.
2	Emerging	Need for revision out weighs strengths.
1	Initiation	Need for revision far out weighs strengths.
0	Absent	Student did not take the Exam.

Comments