Math 105: Lotteries and Loans

Fall 2022 – Section 101

Course number: 38062
Credit hours: 4
Instructor: Tuan Pham, email: tnpham@eou.edu
Office: Loso Hall 225, telephone: 541-962-3465
Zoom office hours: M,T,Th,F 1:00-2:00 PM (Pacific time) or by appointment. Link: https://eou.zoom.us/j/97279586897
Time and place: this is an asynchronous online class.
Canvas: https://eou.instructure.com/courses/36983
Textbook: "*Counting and Probability*" (3rd edition) and "*Mathematics of Finance*" (2nd edition) in the series Modules in Mathematics by Steven Roman.
Prerequisite: Math 095 or equivalent.

Catalog description: This course is an introduction to certain areas of mathematics whose applications are important and whose study will help develop critical thinking skills. Two major topics are covered. One topic is the mathematics of finance, or "loans", which includes borrowing, saving, mortgages, leases and amortization and derivative securities. The other topic is "lotteries", which includes the elementary counting techniques including permutations and combinations, finite sample space probability theory, normal distributions and the Central Limit Theorem, and games of chance.

Learning Outcomes: Upon successful completion of this class, a student should be able to:

1. Count large sets using the counting techniques such as the Fundamental Counting Principle, permutations and combinations.
2. Describe the sample space of an experiment and compute the probability of an outcome or event.
3. Determine whether two events are independent.
4. Calculate the conditional probability of an event given another event.
5. Compute the probability of an event in a binomial experiment.
6. Compute the expected value of a random variable.
7. Compute various probabilities in applications such as games, lotteries, and basic genetics.
8. Calculate compound interest and the associated annual percentage rate (APR).
9. Find the present and future value of an annuity.
10. Given the terms of a loan, produce an amortization schedule.
11. Calculate the price of a bond.
12. Given the terms of two loans/income streams, determine which is preferable, from the point of view either of the payer or payee.
13. Compute the value of a (constant) perpetuity.
14. Compute the present and future value of (exponentially) growing annuities.
15. Apply concepts from the theory of interest to make rational decisions in practical situations.

Grading components:

Syllabus quiz: 1%
Homework: 30% (plus 2% extra credit)
Class participation: 15%
Midterm: 28%
Final exam: 26%

Means of assessment:

- **Syllabus quiz**: due on Thursday 9/29 at 3 PM (Pacific time). This will help you be familiar with the policy of the course.
- **Homework**: There will be 9 homework sets to be turned in on Canvas by 3 PM (Pacific time) each Tuesday. You are to write out your solutions showing your work. If you have specific questions, please feel free to start a thread on the discussion board. Then scan your work and upload the file(s) to Canvas in one of the following formats: pdf, jpg, jpeg, png, doc, docx. Please make sure that your submission is clear enough to read.

  You are encouraged to work together, but must individually write in your own words and reflect your own understanding. Late submissions will not be accepted except in cases of emergency or illness with relevant documentations. Only a few selected problems will be graded in detail. The rest will be given credit on the basis of completion. The lowest homework score will be dropped.

  For the last homework set, you will work in a group. Only one report is required per group. The emphasis of this homework set is on the writing quality of your work. (More specific instructions will be given later.) If you seek help at the Writing Center (free of charge, information below), you will earn a bonus of 2% of the total course score. Make sure to attach a customer report to your group report to prove that you have used their service.
- **Class participation**: Post at least twice on the discussion board for each assignment, either asking a question or offering help, and you will get full credit (4 points per assignment). While you may post in the discussion forum at any time, only posts made by the due date for that assignment will count toward your class-participation score.
- **Midterm Exam:** The midterm exam will be on November 3, 2022. It covers the "lotteries" part of the course. You may bring a 4 x 6 note card (both sides) with any formulas or notes on it. A business, scientific, or graphing calculator is highly recommended. The time limit is 90 minutes. Scratch paper is allowed.
- **Final exam:** The final exam will be on December 14, 2022. The final exam only covers the "loans" part of the course. The same policy as of the midterm exam applies.

Proctored tests: Both midterm and final exams are proctored. If you want to take your tests at the EOU's Testing Center or at an EOU Regional Center, please contact the Testing Center at testing@eou.edu to establish a proctor. You can also take the test at home using SmarterProctoring (some system requirements apply). More information can be found at www.eou.edu/testing. Please contact the Testing Center if you have any questions.

Grade lines: the course grade lines will not be harder than the standard grade lines: A 100-93%, A- 92.99-90%, B+ 89.99-87%, B 86.99-83%, B- 82.99-80%, C+ 79.99 - 77%, C 76.99-73%, C- 72.99-70%, D+ 69.99-67%, D 66.99-63%, D- 62.99 - 60% and F $<$ 60%.

Other Learning Resources:

- The Learning Center at Loso Hall 234 offers free tutoring service, both physical and virtual. Visit https://www.eou.edu/lcenter/ for appointment.
- The Writing Center at Loso Hall 234 provides a place, both physical and virtual, where every EOU writer can find an interested, responsive reader. Go to eou.mywconline.com/ to schedule an appointment with the Writing Center.

Academic Misconduct Policy:
Eastern Oregon University places a high value upon the integrity of its student scholars. Any student found responsible for an act of academic misconduct (including but not limited to cheating, unauthorized collaboration, fabrication, facilitation, plagiarism or tampering) may be subject to having his or her grade reduced in the course in question, being placed on probation or suspended from the University, or a combination of these.

Students with Disabilities policy:
Any student who feels he or she may need an accommodation for any type of disability must contact the Disability Services Office in Loso Hall, Room 234. Phone 541-962-3081.