



# MATH 106 6381 FINITE MATHEMATICS (2172) MATH-106

Spring 2017 Section 6381 3 Credits 01/09/2017 to 03/05/2017

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## FACULTY CONTACT

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## COURSE DESCRIPTION

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(Not intended for students planning to take MATH 107 or higher-numbered mathematics courses.) Prerequisite: MATH 012 or an appropriate result on the placement test. A study of mathematical models in finite mathematics, including linear models, systems of linear equations, linear programming, sets and counting, probability, descriptive statistics, and the mathematics of finance. The aim is to demonstrate fluency in the language of finite mathematics; find, solve, and graph linear equations and inequalities; describe sample spaces and event; assign probabilities to events and apply probability rules; and apply the mathematics of finance to formulate and solve problems.

## COURSE INTRODUCTION

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Critical-thinking skills are essential to daily life. In this course, we will examine mathematical models in finite mathematics and sharpen our problem-solving skills. This course emphasizes the application of these skills to fields extending from business to sports.

We will

- analyze linear models and systems of linear equations, working with applications ranging from supply and demand to nutrition
- solve optimization problems, allocating resources efficiently to maximize profit or minimize cost
- count possibilities for events and study probability, the mathematics of chance
- apply the tools of descriptive statistics to organize and analyze data drawn from the real world
- explore applications in financial management and learn the effects of time and interest rates on saving or borrowing money

access, analyze, interpret and evaluate information to foster learning and to guide decision-making

## COURSE OUTCOMES

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After completing this course, you should be able to

- demonstrate fluency in the language of finite mathematics and communicate mathematical ideas using appropriate terminology and technology
- find, solve, and graph linear equations and inequalities in two variables; use Gaussian elimination to solve systems of linear equations; and apply graphical techniques to solve linear programming problems
- describe and perform operations on sets and apply counting principles using Venn diagrams, inclusion-exclusion and multiplication principles, and the permutation and combination formulas
- describe sample spaces and events, assign probabilities to events, and apply probability rules, including those for independent events, conditional probability, and discrete probability distributions
- organize, visually represent, and measure central tendency and variance of data, applying tools of descriptive statistics
- apply the mathematics of finance to formulate and solve problems involving simple interest, compound interest, annuities, and amortized loans
- use mathematical modeling to translate, solve, and interpret applied problems related to linear modeling, systems of linear equations, linear programming, counting, probability, statistics, and finance

## COURSE MATERIALS

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Click to access your course materials information (<http://webapps.umuc.edu/UgcmBook/BPage.cfm?C=MATH%20106&S=6381&Sem=2172>)

## GRADING INFORMATION

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You are responsible for the following graded items:

Component	Weighted Percentage
LEO Discussion Topic Participation	10%
Six Quizzes (7.5% each)	45%
Loan Project	10%
Statistics Project	10%
Final Examination	25%
<b>Total</b>	<b>100%</b>

To calculate your final course grade, you may use this formula:  $0.10$  (percentage score on LEO Discussion Topic participation work) +  $0.45$  (average of percentage scores on quizzes) +  $0.10$  (loan project percentage) +  $0.10$  (statistics project percentage) +  $0.25$  (final exam percentage score).

The work to do in this course consists of

- weekly reading assignments (ungraded)
- weekly homework assignments (ungraded)

- weekly LEO Discussion Topic participation (graded)
- projects (graded)
- quizzes (graded)
- a final examination (graded)

These course components are described below.

### **Weekly Reading Assignments**

Even though there is no numerical score associated with the weekly reading assignments, how well you do in the course depends heavily on how conscientiously you follow the reading assignments.

When doing the reading for this course, you need to ***slow down!***

Reading mathematics is not like reading anything else. You need to look carefully at the numbers and formulas and spend time making sure you understand them and that they make sense. Reading any mathematical text can take three to four times longer, per page, than reading a non-mathematical text.

### **Homework**

There are ungraded homework assignments in each of the first seven weeks of class. The homework assignments give you practice in solving problems associated with each week's topics. Your aim should be mastery of all concepts, and you will be given opportunities to succeed in solving all of the problems every week. As completing the homework problems on time will help you understand and master the topics, plan your weeks according to the schedule. Even though there is no numerical score associated with the weekly homework assignments, how well you do in the course depends on how conscientiously you do the homework assignments.

During each of the first seven weeks of class, there will be a problem set assigned. See the Course Schedule for assignment dates in each week.

### **Weekly LEO Discussion Topic Participation**

By registering for a Web-based course, you have made a commitment to participate in course discussions and online activities. Plan to participate regularly. Participation for this course is defined as proactive discussion and problem-solving. This requires you to actively reflect on weekly readings and to develop original ideas in your responses. You are expected to demonstrate critical thinking and your understanding of the content in the assigned readings as they relate to the issues identified in the discussions. You are encouraged to respond to other students as well as to your instructor. You are expected to adhere to the general rules of online etiquette.

For individual participation on an ongoing basis, there is a collection of participation topics posted in weekly LEO discussions, drawn primarily from the exercises in your OER (open e-resource) e-texts. For participation credit, over the eight weeks of the term, you are expected to solve eight topics (from different textbook sections). You are free to choose any topic, complying with the discussion instructions, provided someone else has not already attempted it or "reserved" it.

For each participation topic, you will earn up to 10 participation points for the accuracy of your solution. You may be given opportunities to attempt your solution more than one time. If you make an error, you may get feedback and a chance to edit your work and resubmit it. The goal of online participation and problem solving is to help you understand the concepts and to give you an opportunity to practice solving problems and get feedback from me.

Online participation work is to be posted in LEO discussions. Participation work submitted by other means will not be accepted.

You may earn a total of 80 online participation points (8 topics at 10 points each is the maximum for regular participation credit).

At the end of the term, your total number of participation points will be multiplied by  $5/4$  to arrive at a percentage, and that score will count 10 percent toward your final grade. For instance, a total of 80 participation points corresponds to the participation percentage  $80(5/4) = 100\%$ .

## Projects

You are required to complete two projects in this course. See the Project Descriptions section of the syllabus for details.

## Quizzes

Quizzes are important milestones, as they provide valuable feedback for instructors and students. Quizzes are open book and will be given as indicated in the schedule.

You will be given one week to work on each quiz, and the due dates of the quizzes can be found in the schedule. Each quiz will be posted in the Assignment Folder under the *Assignments* link in our LEO classroom at the beginning of the designated academic week, and each will be due at the end of that academic week. Quizzes may be submitted in plain-text format, as attached files such as Microsoft Word documents, or as handwritten and scanned documents.

Quizzes must be individually completed and represent your own work. Neither collaboration nor consultation with others is allowed.

To keep up with the pace of this course, you should submit quizzes on or before the due date. After the due date, solutions will be posted. Quizzes submitted after the solutions are posted will not be accepted. Makeup quizzes are not available except in cases of documented emergency.

## Final Examination

All sections of this course have a required final examination, administered in a 72 hour period during Week 8, the last week of the course.

The final exam is open book and includes multiple-choice and short answer questions. **However, you are required to show your work and calculations, where requested, in order to receive full credit.**

**The final exam must be individually completed and represent your own personal work. Collaboration or consultation with others is not allowed. Use of any instructors' solutions manuals for any text or e-text is not allowed. Use of *any* online problem-solving service (Homework Raptor, Chegg, etc) is not allowed! Any evidence that a student even contacted or consulted an online problem-solving service SHALL result in a formal academic integrity violation charge being filed in accordance with UMUC Academic Policy 150.25.**

The solutions for the final examination will not be posted.

You are expected to take the exam as scheduled. In the event of illness or extraordinary circumstances, you must contact your faculty member and provide documentation to request an exception and approval to take a makeup exam. If the request is not approved, the exam grade will be recorded as a zero.

## Additional Information

## Late Policy

Meeting course deadlines is crucial for success in computer-mediated courses. You may read at your own pace, but homework, LEO participation, quizzes, and projects must adhere to the timetable given in the schedule. Otherwise the grade will be zero. No late homework, LEO participation, quizzes, or exams will be accepted.

### **Guideline for Receiving Tutoring Services**

We appreciate that many students may seek tutoring services to supplement our instructional program. However, tutors may not be used to complete any portion of assignments, projects, quizzes, and exams on behalf of students. Students are expected to submit their own work. Students who are suspected of submitting the work of their tutors will be reported to the dean's office for potential investigation.

If you are to receive tutoring services, inform your tutor of this expectation and clarify your tutor's role and responsibility to your academic endeavors at UMUC.

## **PROJECT DESCRIPTIONS**

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You are required to complete **two** projects in this course.

### **Loan Project: Buying a House**

For this assignment, you will analyze a home mortgage loan. In our classroom, navigate **Content > Projects > Loan Project** for detailed instructions.

### **Statistics Project**

For this assignment, you will implement a project involving statistical procedures. The topic may be something that is related to your work, a hobby, or something you found interesting. In our classroom, navigate **Content > Projects > Statistics Project** for detailed instructions.

## **ACADEMIC POLICIES**

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### **Academic Policies and Guidelines**

#### **ACADEMIC INTEGRITY**

As a member of the University of Maryland University College (UMUC) academic community that honors integrity and respect for others you are expected to maintain a high level of personal integrity in your academic work at all times. Your work should be original and must not be reused in other courses.

#### **CLASSROOM CIVILITY**

Students are expected to work together cooperatively, and treat fellow students and faculty with respect, showing professionalism and courtesy in all interactions. Please review the Code of Civility for more guidance on interacting in UMUC classrooms: <https://www.umuc.edu/students/support/studentlife/conduct/code.cfm> (<https://www.umuc.edu/students/support/studentlife/conduct/code.cfm>).

#### **POLICIES AND PROCEDURES**

UMUC is committed to ensuring that all individuals are treated equally according to Policy 040.30 Affirmative Action, Equal Opportunity, and Sexual Harassment (<https://www.umuc.edu/policies/adminpolicies/admin04030.cfm>).

Students with disabilities who need accommodations in a course are encouraged to contact the Office of Accessibility Services (OAS) at [accessibilityservices@umuc.edu](mailto:accessibilityservices@umuc.edu) (<mailto:accessibilityservices@umuc.edu>), or call 800-888-UMUC (8682) or 240-684-2287.

The following academic policies and procedures apply to this course and your studies at UMUC.

150.25 Academic Dishonesty and Plagiarism (<https://www.umuc.edu/policies/academicpolicies/aa15025.cfm>) – UMUC defines academic dishonesty as the failure to maintain academic integrity. All charges of academic dishonesty will be brought in accordance with this Policy.

**Note:** Your instructor may use **Turnitin.com**, an educational tool that helps identify and prevent plagiarism from Internet resources, by requiring you to submit assignments electronically. To learn more about the tool and options regarding the storage of your assignment in the Turnitin database go to: <https://www.umuc.edu/library/libresources/turnitin.cfm> (<https://www.umuc.edu/library/libresources/turnitin.cfm>).

151.00 Code of Student Conduct (<https://www.umuc.edu/policies/studentpolicies/stud15100.cfm>)

The following policies describe the requirements for the award of each degree:

Degree Completion Requirements for the Graduate School (<https://www.umuc.edu/policies/academicpolicies/aa17040.cfm>)

170.40 Degree Completion Requirements for a Bachelor's Degree (<https://www.umuc.edu/policies/academicpolicies/aa17041.cfm>)

170.41 Degree Completion Requirements for an Associate's Degree (<https://www.umuc.edu/policies/academicpolicies/aa17042.cfm>)

170.71 Policy on Grade of Incomplete (<https://www.umuc.edu/policies/academicpolicies/aa17071.cfm>) - The grade of I is exceptional and only considered for students who have completed 60% of their coursework with a grade of B or better for graduate courses or C or better for undergraduate courses and request an I before the end of the term.

170.72 Course Withdrawal Policy (<https://www.umuc.edu/policies/academicpolicies/aa17072.cfm>) - Students must follow drop and withdrawal procedures and deadlines available at <https://www.umuc.edu/> (<https://www.umuc.edu/>) under Academic Calendar.

130.80 Procedures for Review of Alleged Arbitrary and Capricious Grading (<https://www.umuc.edu/policies/academicpolicies/aa13080.cfm>) – appeals may be made on final course grades as described herein.

205.06 Calculation Of Grade-Point Average (GPA) for Inclusion on Transcripts and Transcript Requests (<https://www.umuc.edu/policies/academicpolicies/aa20506.cfm>) – Note: Undergraduate and Graduate Schools have different Grading Policies (i.e. The Graduate School does not award the grade of D). See Course Syllabus for Grading Policies.

## GRADING

According to UMUC's grading policy, the following marks are used:

	<b>Undergraduate</b>	<b>Graduate</b>
<b>A</b>	90-100	90-100
<b>B</b>	80-89	80-89
<b>C</b>	70-79	70-79*
<b>D</b>	60-69	N/A**
<b>F</b>	59 or below	69 or below
<b>FN</b>	Failure-Non attendance	Failure-Non attendance
<b>G</b>	Grade Pending	Grade Pending
<b>P</b>	Passing	Passing
<b>S</b>	Satisfactory	Satisfactory
<b>U</b>	Unsatisfactory	Unsatisfactory
<b>I</b>	Incomplete	Incomplete
<b>AU</b>	Audit	Audit
<b>W</b>	Withdrew	Withdrew

\* The grade of "B" represents the benchmark for The Graduate School. Students must maintain a Grade Point Average (GPA) of 3.0 or higher. Classes where final grade of C or F places a student on Academic Probation must be repeated.

\*\* The Graduate School does not award the grade of D.

### **COURSE EVALUATION SURVEY**

UMUC values its students' feedback. You will be asked to complete an online evaluation toward the end of the term. The primary purpose of this evaluation process is to assess the effectiveness of classroom instruction in order to provide the best learning experience possible and make continuous improvements to every class. Responses are kept confidential. Please take full advantage of this opportunity to provide your feedback.

### **LIBRARY SUPPORT**

Extensive library resources and services are available online, 24 hours a day, seven days a week at <https://www.umuc.edu/library/index.cfm> (<https://www.umuc.edu/library/index.cfm>) to support you in your studies. The UMUC Library provides research assistance in creating search strategies, selecting relevant databases, and evaluating and citing resources in a variety of formats via its Ask a Librarian service at <https://www.umuc.edu/library/libask/index.cfm> (<https://www.umuc.edu/library/libask/index.cfm>).

### **LEARNING MANAGEMENT SYSTEM SUPPORT**

To successfully navigate the online classroom new students are encouraged to view the Classroom Walkthrough under Help in the upper right menu of the LEO classroom. Those requiring technical assistance can access Help@UMUC Support directly in LEO under the Help menu. Additional technical support is available 24 hours a

day, seven days a week via self-help and live chat at <https://www.umuc.edu/help> (<https://www.umuc.edu/help>) or by phone toll-free at 888-360-UMUC (8682).

## SYLLABUS CHANGES

All items on this syllabus are subject to change at the discretion of the Instructor and the Office of Academic Affairs.

# CLASS & ASSIGNMENT SCHEDULE

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Week	Activities
1	<p><b>Week 1: Mathematics of Finance</b> <b>(1/9 - 1/15)</b></p> <p><b>Read:</b></p> <ul style="list-style-type: none"><li>eReadings:<ul style="list-style-type: none"><li><a href="#">Applied Finite Mathematics</a>, "Mathematics of Finance" (Chapter 9)</li><li><a href="#">Applied Finite Mathematics</a>, "Mathematics of Finance: Homework" (Chapter 10)</li></ul></li><li>Course Resources &gt; UMUC Course Modules &gt; Course Module 4</li></ul> <p><b>Watch:</b></p> <ul style="list-style-type: none"><li><b>Content &gt; Course Resources &gt; Video Library &gt; Video Library Topics for Weeks 1, 5, 6, 7</b>, select topics under <i>Finance</i></li></ul> <p><b>Do:</b></p> <ul style="list-style-type: none"><li>Post any questions in the "Have a Question?" discussion (if desired)</li><li>Week 1 Homework Assignment for Practice. See <b>Content &gt; Homework for Practice &gt; Week 1 Homework Instructions</b></li><li>Introduction participation and Week 1 LEO Discussion Topic Participation: <b>due 1/15</b></li><li>Work on Loan Project. See <b>Content &gt; Projects &gt; Loan Project</b> in our LEO classroom.</li></ul>



**Week 2: Linear Equations, Inequalities, and Models**

**(1/16 - 1/22)**

**Read:**

- eReadings:
  - Basic Mathematics Review, Chapter 5 Sections 5.4 - 5.8
  - Basic Mathematics Review, Chapter 7, Sections 7.2 - 7.7
  - Precalculus, Chapter 2, Sections 2.4 and 2.5; and Chapter 9, Section 9.2
- Course Resources > UMUC Course Modules > Course Module 1, Topic I

**Watch:**

- **Content > Course Resources > Video Library > Video Library Topics for Weeks 2, 3, 4;** select topics under:
  - *Linear Equations in 1 and 2 Variables*
  - *Graphing Linear Equations*
  - *Solving Linear Equation Applications*
  - *Performing Linear Regression*
  - *Linear Inequalities in 1 and 2 Variables*
  - *Solving Systems of Equations and Inequalities in 2 Variables*

**Do:**

- Week 2 Homework Assignment for Practice. See **Content > Homework for Practice > Week 2 Homework Instructions**
- Week 2 LEO Discussion Topic Participation: **due 1/22**
- **Quiz 1**, covering Week 1 course material: **due 1/22**
- Work on Loan Project. See **Content > Projects > Loan Project** in our LEO classroom.

**Week 3: Systems of Linear Equations and Systems of Linear Inequalities**  
**(1/23 - 1/29)**

**Read:**

- eReadings:
  - [Precalculus](#), Chapter 9, Section 9.7
  - [Basic Mathematics Review](#), Chapter 7, Section 7.8
  - [Applied Finite Mathematics](#), "Linear Programming - A Geometric Approach" (Chapter 5)
  - [Applied Finite Mathematics](#), "Linear Programming - A Geometric Approach: Homework" (Chapter 6)
- [Course Resources > UMUC Course Modules > Course Module 1, Topics I and II](#)

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**Watch:**

- **Content > Course Resources > Video Library > Video Library Topics for Weeks 2, 3, 4;** select topics under:
  - *Linear Inequalities in 1 and 2 Variables*
  - *Solving Systems of Equations and Inequalities in 2 Variables*

**Do:**

- Week 3 Homework Assignment for Practice. See **Content > Homework for Practice > Week 3 Homework Instructions**
- Week 3 LEO Discussion Topic Participation: **due 1/29**
- **Quiz 2**, covering Week 2 course material: **due 1/29**
- Work on Loan Project. See **Content > Projects > Loan Project** in our LEO classroom.

**Week 4: Linear Programming, Sets, and Counting**

**(1/30 - 2/5)**

**Read:**

- eReadings:
  - Applied Finite Mathematics, "Linear Programming - A Geometric Approach" (Chapter 5)
  - Applied Finite Mathematics, "Linear Programming - A Geometric Approach: Homework" (Chapter 6)
  - Applied Finite Mathematics, "Sets and Counting" (Chapter 11)
  - Applied Finite Mathematics, "Sets and Counting: Homework" (Chapter 12)
- Course Resources > UMUC Course Modules > Course Module 1, Topic II
- Course Resources > UMUC Course Modules > Course Module 2, Topic I

**Watch:**

- **Content > Course Resources > Video Library > Video Library Topics for Weeks 2, 3, 4;** select topics under:
  - *Linear Inequalities in 1 and 2 Variables*
  - *Solving Systems of Equations and Inequalities in 2 Variables*
- **Content > Course Resources > Video Library > Video Library Topics for Weeks 1, 5, 6, 7;** select topics under *Sets*

**Do:**

- Week 4 Homework Assignment for Practice. See **Content > Homework for Practice > Week 4 Homework Instructions**
- Week 4 LEO Discussion Topic Participation: **due 2/5**
- **Quiz 3**, covering Week 3 course material: **due 2/5**
- Complete and submit **Loan Project: due 2/5**. See **Content > Projects > Loan Project** in our LEO classroom.

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**Week 5: Probability**  
**(2/6 - 2/12)**

**Read:**

- eReadings:
  - [Applied Finite Mathematics](#), "Probability" (Chapter 13)
  - [Applied Finite Mathematics](#), "Probability: Homework" (Chapter 14)
  - [Applied Finite Mathematics](#), "More Probability" (Chapter 15)
  - [Applied Finite Mathematics](#), "More Probability: Homework" (Chapter 16)
- Course Resources > UMUC Course Modules > Course Module 3, Topic I

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**Watch:**

- **Content > Course Resources > Video Library > Video Library Topics for Weeks 1, 5, 6, 7**; select topics under *Probability*

**Do:**

- Week 5 Homework Assignment for Practice. See **Content > Homework for Practice > Week 5 Homework Instructions**
- Week 5 LEO Discussion Topic Participation: **due 2/12**
- **Quiz 4**, covering Week 4 course material: **due 2/12**
- Work on data collection for Statistics Project. See **Content > Projects > Statistics Project** in our LEO classroom.

**Week 6: Statistics**  
**(2/13 - 2/19)**

**Read:**

- eReadings: [Online Statistics Education: A Multimedia Course of Study](#):
  - Chapter 1, Section: "Distributions"
  - Chapter 2, Section: "Histograms"
  - Chapter 3, Sections:
    - "Measures of Central Tendency"
    - "Measures of Variability"
  - Chapter 5, Section: "Binomial Distributions"
- Course Resources > UMUC Course Modules > Course Module 3, Topic II

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**Watch:**

- **Content > Course Resources > Video Library > Video Library Topics for Weeks 1, 5, 6, 7**; select topics under:
  - *Probability*
  - *Describing Data*

**Do:**

- Week 6 Homework Assignment for Practice. See **Content > Homework for Practice > Week 6 Homework Instructions**
- Week 6 LEO Discussion Topic Participation: **due 2/19**
- **Quiz 5**, covering Week 5 course material: **due 2/19**
- Work on Statistics Project. See **Content > Projects > Statistics Project** in our LEO classroom.

7	<p><b>Week 7: Statistics and Review</b> (2/20 - 2/26)</p> <p><b>Read:</b></p> <ul style="list-style-type: none"> <li>• eReadings: <u>Online Statistics Education: A Multimedia Course of Study</u>: <ul style="list-style-type: none"> <li>◦ Chapter 7, Sections: <ul style="list-style-type: none"> <li>▪ "Areas of Normal Distribution"</li> <li>▪ "Standard Normal"</li> <li>▪ "Normal Approximation to Binomial"</li> </ul> </li> </ul> </li> <li>• Course Resources &gt; UMUC Course Modules &gt; Course Module 3, Topic II</li> </ul> <p><b>Watch:</b></p> <ul style="list-style-type: none"> <li>• <b>Content &gt; Course Resources &gt; Video Library &gt; Video Library Topics for Weeks 1, 5, 6, 7</b>; select topics under: <ul style="list-style-type: none"> <li>◦ <i>Probability</i></li> <li>◦ <i>Describing Data</i></li> </ul> </li> </ul> <p><b>Do:</b></p> <ul style="list-style-type: none"> <li>• Week 7 Homework Assignment for Practice. See <b>Content &gt; Homework for Practice &gt; Week 7 Homework Instructions</b></li> <li>• Week 7 LEO Discussion Topic Participation: <b>due 2/26</b></li> <li>• <b>Quiz 6</b>, covering Week 6 course material: <b>due 2/26</b></li> <li>• Complete and submit <b>Statistics Project: due 2/26</b>. See <b>Content &gt; Projects &gt; Statistics Project</b> in our LEO classroom.</li> </ul>
8	<p><b>Week 8: Review and Final Exam</b> (2/27 - 3/5)</p> <p><b>Do:</b></p> <ul style="list-style-type: none"> <li>• Week 8 LEO Discussion Topic Participation: <b>due 3/5</b></li> <li>• <b>Final Exam</b> (cumulative): <b>due 3/5</b></li> </ul> <p>The <b>Final Exam</b> will be available in LEO at 12:01 a.m. on Friday, <b>3/3</b>.</p> <ul style="list-style-type: none"> <li>• The <b>Final Exam</b> is due 11:59 p.m. on Sunday, <b>3/5</b>. It is open book and includes multiple-choice and short answer questions. However, you are required to show your work and calculations, where requested, in order to receive full credit. The final exam is comprehensive and covers all 8 weeks of course material. The final exam must be individually completed and represent your own personal work. Following is NOT allowed for the final exam: <ul style="list-style-type: none"> <li>◦ Collaboration or consultation with any other person(s);</li> <li>◦ use of any instructors' solutions manuals for any text/e-text;</li> <li>◦ use of any online problem-solving service</li> </ul> </li> </ul> <p>. The solutions for the final exam will not be posted.</p>

