Syllabus: Math and CS 339

Operations Research

Spring 2022

Instructor: Dr. Hundley
Office: Olin 222
Office Hours: To be determined. Due to the rapid spread of COVID-19, office hours will be conducted online only for the first couple of weeks of class, and at that time may be restructured.
Contact info: *Office Ph:* 527-5151, *Email:* hundledr@whitman.edu
Class Website: `http://people.whitman.edu/~hundledr` . Occasionally I will put things on Canvas (and will let you know in class).

Course Numbering: This course is cross listed as Math 339 and CS 339, but all the material is identical for both sections.

1. **Text:** *Introduction to Mathematical Programming (Operations Research, Vol 1).* By Wayne Winston and Munirpallam Venkataramanan, 4th edition. We will cover chapters 3, 4, 6, 7 , 8, 9 (we may run short for the last sections).

   For us, this text is completely interchangeable with Wayne Winston's larger text, "Operations Research: Applications and Algorithms" (that is, our book is the first several chapters of the larger text).

2. **Technology:**

   We'll be using various software packages. The programs LINDO and LINGO come with the text (see me if you don't have the CD). We will occasionally use Excel- or more precisely, the free version, called LibreOffice Calc. We may also look at Matlab, which is only available in the computer labs in Olin.

3. **Grading Criteria.**

   - HOMEWORK: Will be assigned daily, and will make up 20% of your overall grade. The starred problems should be written up completely (and neatly) and will be collected weekly (we'll discuss this in class).

     Late Homework: A penalty will be given for any late homework. In any event, once an exam has been given, homework for the sections covered can no longer be turned in for credit.

   - EXAMS: We will have two exams and a final exam (see the course calendar for the dates). These dates will not change, so you may plan around them. Overall, the exams are each worth 25% of the overall grade.

     The final will be administered at the time published on the Registrar's website and may rely on topics from the first two exams. The final will be worth 30% of your overall grade.

The exams may also have a take home component (solving problems using the software). This will be announced closer to the exam date, but with plenty of advance time to plan around your other things. Typically, the take home exam is there so that you may use the computer.

GRADING: Grading is done on a standard scale:

$A = 92 - 100$	$A- = 90 - 91$	$B+ = 88 - 89$	$B = 82 - 87$	$B- = 80 - 81$
$C+ = 78 - 79$	$C = 72 - 78$	$C- = 70 - 71$	$D = 60 - 69$	$F = 59$ and below

4. **Academic Honesty**. Academic standards will be *strictly* adhered to as outlined in the College's policies. This means that cheating will not be tolerated. Looking at another student's exam or quiz (whether or not you mean to copy answers) while taking it will be considered cheating. *Please don't test this policy!*

5. **Academic Resource Center (ARC)**

   If you are a student with a documented disability who will need accommodations in this course, please meet with the Academic Resource Center for assistance in developing a plan to address your academic needs. Please contact me in advance of each session where you will need accommodations

6. **Please be courteous to your fellow students**: No electronic devices should be used during class (please put away your phone!), with the exception of tablets on which you're making notes. (NO laptops unless you've cleared it with me).

7. **Be sure to check your Whitman email at least daily.** I will occasionally send out important information about the class via email.

I would like to create a learning environment for you that supports a diversity of thoughts, perspectives and experiences. To help accomplish this:

1. If you have a name and/or set of pronouns that differ from those that appear in your official College record, please let me know (feel free to send me an email if that's easier for you).

2. If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me. I want to be a resource for you. Remember that you can also submit anonymous feedback. Also, the Academic Resource Center has a great staff that are there to help you as well.

3. I (like many people) am still in the process of learning about diverse perspectives and identities. If there was something in class that made you feel uncomfortable, please talk to me about it. (Again, anonymous feedback is always an option).

Religious Accommodations as required by Washington State:

In accordance with the Colleges Religious Accommodations Policy (link below), I will provide reasonable accommodations for you if, because of religious observances, you have conflicts with scheduled exams, assignments, or required attendance in class. Please review the course schedule at the beginning of the semester to determine any such potential conflicts and let me know by the end of the second week of class about your needs for religious accommodations. If you believe that I have failed to abide by this policy, the link to the grievance policy is also included below, as per state law.

Link for the College's Religious Accommodations policy:

`https://www.whitman.edu/campus-life/diversity/intercultural-center/religious-and-spiritual-life/religious-accomodations`

Link for the College's Grievance policy:

`https://www.whitman.edu/human-resources/grievance-policy`

Link for the Washington State law:

`https://app.leg.wa.gov/RCW/default.aspx?cite=28B.137`

What is Operations Research?

It is generally defined to be an analysis of some system or operation (usually using scarce resources). Typically, this type of analysis results is an optimization problem. Here is a more detailed list of topics:

- (Chapters 3, 4 and 6) Linear Programming: Model formulation, solving an LP using Simplex and Big-M, analysis of the solutions, and sensitivity. We will use LINDO and possibly Excel. This is a very large part of the course, about 60%.
- (Chapter 7) Transportation and Assignment Problems.
- (Chapter 8) Network Models.
- (Chapter 9) Integer Programming.