

Syllabus: Math and CS 339  
Operations Research  
Spring 2024

Instructor: Dr. Hundley

Office: Olin 222

Office Hours: Monday, Friday at noon, Wed and Thu at 3PM (or send an email to schedule at another time).

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).

We will occasionally have a short paper to write (in LaTeX), and these grades will be counted as separate homeworks. We'll have a short introduction to LaTeX, and there will also be videos available for you to get started (we'll discuss this more in class).

**Late Homework/papers:** 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:

$$\begin{array}{llllll} A = 92 - 100 & A- = 90 - 91 & B+ = 88 - 89 & B = 82 - 87 & B- = 80 - 81 \\ C+ = 78 - 79 & C = 72 - 78 & C- = 70 - 71 & D = 60 - 69 & F = 59 \text{ and below} \end{array}$$

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.

## Religious Accommodations:

In accordance with the College's 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-accommodations>

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 in 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.