SYLLABUS
Math 306: Operations Research

LOGISTICS
Instructor: Jonathan Bloom
Email: bloomjs@lafayette.edu
Office: 221 Pardee
Office Hours: T,Th 2-4
Suggested Book: Linear Programming by Vášek Chvátal
Course Website: webbox.lafayette.edu/~bloomjs/306

GRADING
Your grade will be distributed as follows:

- Homework/Labs: 10%
- Midterm #1: 20%
- Midterm #2: 20%
- Midterm #3: 20%
- Consulting Project: 30%

HOMEWORK/LABS
Homework will be assigned each week and “due” the following Monday. Select assignments will be collected for grading on the Monday they are due. As the consulting project (see below) involves working with/for a local business, it is imperative that your work not only be correct but also presentable. As preparation, homework will be graded for both correctness and presentation.

NOTE: Late homework will NOT be accepted for any reason. Instead, the lowest homework score will be dropped.

CONSULTING PROJECT
Our final project will give you the opportunity to use the optimization algorithms learned in class to solve a real-world problem.

Roughly 4 weeks into our course you will form groups of size 2-3. At that time, several Easton-based businesses will visit our class and present their respective optimization problems. Each group, acting as a consultant, will then work to solve one of these optimization problems. (Groups may suggest alternative projects – these may be allowed on a select basis.)

In lieu of a final exam, each group will prepare both a written report and an Excel file. Oral presentations outlining each group’s solutions and aimed at the company being consulted for will be given during the last week of classes. Together, the report and presentation will constitute 30% of your grade.
IMPORTANT DATES

| Midterm #1     | Wednesday, February 14th |
| Midterm #2     | Wednesday, March 21st    |
| Midterm #3     | Monday, April 23rd       |
| Consulting Project | TBA                    |

Our three midterm exams will be held in the **evening** from 6-8pm on the dates specified above. These exams will be held in **Pardee 217**.

SPECIAL NEEDS

If as a student you have any specific learning needs that require special arrangements (e.g., more time to complete an exam or a distraction free setting), you must discuss those needs with me during the first week of the semester. To be eligible for special arrangements, you must provide me with the appropriate form from ATTIC.

ACADEMIC INTEGRITY

All materials turned in to the instructor must be the work **solely** of the individual student. In particular, any collaboration or behavior arousing the instructor’s reasonable suspicion of academic dishonesty will be referred to the Dean of Studies for appropriate disciplinary actions (see Student Handbook).

COURSE OBJECTIVES

1. Teach students how to translate optimization problems into a linear program
2. Teach students how to implement the simplex method by hand and using Excel
3. Teach students about consequences of the simplex method
4. Teach students about dual problem, shadow prices, complimentary slackness
5. Teach students about integer linear programming and show classic examples
6. Teach students about graph theory and various graph algorithms
7. Introduce students to a real-world optimization problem

LEARNING OUTCOMES

1. Be able to translate optimization problems into a linear program.
2. Be able to solve a linear program both by hand and using Excel; be able to recognize “pit-falls” in the Simplex algorithm.
3. Be able to analyze an optimization problem using sensitivity analysis

4. Know when to use integer linear programming and how to implement conditional constraints

5. Be able to implement Kruskal, Dijkstra, clustering algorithms, and max-flow/min-cut algorithms

The student work in this course is in full compliance with the federal definition of a four credit hour course. Please see the Lafayette College Compliance webpage (https://registrar.lafayette.edu/wp-content/uploads/sites/193/2013/04/Federal-Credit-Hour-Policy-Web-Statement.doc).