

# OPERATIONS RESEARCH II

## MAT 362, SECTION 010 SYLLABUS

### SPRING SEMESTER 2024

**PROFESSOR:** Dr. Brooks Emerick  
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**OFFICE PHONE:** (610) 683-4406  
**COURSE WEBSITE:** <http://www.brooksemerick.com/mat-362>  
**LECTURE:** MWF 10:00 – 10:50 AM  
**CLASSROOM:** Lytle Hall 228  
**OFFICE HOURS:** Mon, Tue, and Wed 1:00 – 2:00 PM Lytle 266  
Tue and Thu 10:00 – 11:00 AM Lytle 266  
Thu 12:00 – 3:00 PM Library Book-n-Brew  
or by appointment

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#### TEXTBOOK AND SOFTWARE:

- Textbook: Introduction to Mathematical Programming, Operations Research: Volume One (Fourth Edition) by Wayne L. Winston and Munirpallam Venkataramanan. (~ \$81 used on Amazon, ~ \$27 to rent)
  - Software: Microsoft Excel with Solver Add-In and Python.
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**COURSE OVERVIEW:** Operations Research is a classic study of mathematical optimization and its applications to a wide array of real-world applications. Operations Research uses quantitative methods to determine the best decision for an operating system. A mathematical approach to studying methods as applied to the decision process in industry is taken. The methods studied are selected from among: linear programming; game theory; integer programming; graph theory and network analysis; nonlinear programming; and metaheuristics. Students will be required to use appropriate computer software, including Excel and Python. The objectives of the course are

- To learn fundamental principles, generalizations, or theories.
- To experience and solve decision problems commonly encountered in operations research.
- To add to his/her mathematical knowledge methods used in solving decision problems.
- To achieve greater depth and breadth in the study of operations research concepts.
- To study applications of mathematical optimization.
- To know how to use computer software to find optimal solutions to complex real-world based operations research applications.

This course will cover select sections of Chapters 6, 7, 8, 9 and 14 of the text.

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**GRADES:** Your grade is determined by your participation and performance on homework assignments, projects, class exams, and a comprehensive final exam.

- 1) **Homework (25%)** – There will be five written Problem Sets. Problems may be taken from the textbook or elsewhere. Each assignment is to be hand-written on the problem set packet and submitted via D2L. Some assignments may have a Excel/Python component.
- 2) **Projects (20%)** – There will be two projects, each worth 10% of your grade. You are solely responsible for your own project.
- 3) **Exams (30%)** – There will be two midterm exams, the sum of which will total 30% of your grade. Some exams may have a take-home component. Here is the exam schedule:
  - i) In-Class Exam I: Friday, March 10. To cover Sections 4.14, 6.5-6.10, 7.1-7.5
  - ii) In-Class Exam II: Friday, April 28. To cover Sections 8.1–8.3, 8.5, 14.1–14.4, 9.1–9.3
- 4) **Final Exam (25%)** – Comprehensive final exam is two hours in length and will be held on **Wednesday May 8** from 11:00 AM to 1:00 PM. The exam will be written and may contain a take-home component.

Percentages are subject to minor modification. Any such changes will be communicated to the students in a timely manner.

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**ATTENDANCE:** I will take attendance every day. Attendance is expected. If you know that you will not be able to attend class, please notify me beforehand. Absences will be counted as unexcused unless you have a documented illness or emergency. If you miss class, it is your responsibility to get a copy of the notes for the day, to collect any material that was returned that day, and to arrange to submit any homework by the due date. **Missing class is not a legitimate reason to turn in an assignment late.**

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**WORKSHEETS:** I hand out a worksheet and post it on the course webpage almost every day. I will frequently post on the course webpage a listing of blank worksheets for each section that will be covered in the course. These worksheets are NOT graded and they only exist to facilitate the lecture and to provide you with extra problems to prepare you for the quizzes and exams. Next to the link for the blank worksheets will be another link that has the written out solutions. This way, you can check your answers and see the solution written out fully so that you can understand the methods used to arrive at the answer. The worksheets are posted and handed out in class for your benefit and they are not graded.

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**WRITTEN HOMEWORK:** The textbook for this course is structured as a traditional textbook with plenty of workable problems at the end of each chapter. Written assignments will be taken mostly from textbook problems. The due dates for written homework are laid out explicitly on the course schedule.

Written problem sets come in the form of a packet, which will be posted on the course webpage and on D2L. Solutions are to be written on the printed out packet and submitted by **11:59 PM** on the indicated day in the schedule. **You must upload your solutions using a photo generated from the GeniusScan app or other scanning software to D2L by the due date.** Some problems may require an Excel or Python file to be uploaded as well. Late homework will receive a zero unless there are extraordinary circumstances that can be documented via the Dean of Students office. Homework is graded on both the mathematical content and on the exposition, where appropriate.

Students are encouraged to work together, but each must submit his/her own work. Below are some grading policies concerning the written problem sets:

- If it is unclear to me how you arrived at your solution or if I cannot follow your work, you will not receive full credit. (Show all work.)
- Poorly drawn graphs or poor handwriting in general may result in a loss of points.
- Blatant copying and submission of identical solutions will result in a zero for all parties involved, especially if the assignment requires an Excel or Python program.
- Waiting until the last minute to start the homework is too late. You should start the homework soon enough so that you can take advantage of office hours.

If you have any questions or concerns about any homework question, either on the written homework or the online homework, do not hesitate to email me.

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**EXAMS:** The two regular exams will be administered live in class (dates are above, on the schedule, and on the website). Exams are 50 minutes long during normal lecture hours in Lytle Hall 228. You are required to attend both in-class exams. If you are absent during an exam, then you will receive a zero. **Make up exams are given only in the case of a serious medical problem or emergency documented by the Dean of Students office.** Written documentation of any such situation will be required. One or both exams may have a take-home component. In this case, all take-home portions shall be finished at the required due date and submitted on D2L.

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**PROJECTS:** There are two projects throughout the course (due dates are on the schedule). Full project descriptions will be provided in class and on the course website at least two weeks before the project is due. **You must schedule two meetings with me, in person, to discuss your progress on the project.** Each project will require a written report in Word or  $\text{\LaTeX}$  as well as appropriate justifications and solutions using Excel or Python. The projects are due by **11:59 PM** on the due date detailed on the schedule. Project submissions can either be emailed to me or uploaded to D2L.

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**GENERAL POLICIES/IMPORTANT NOTES:** I expect the following from you:

- Arrive/Log on to the lectures on time with required readings and/or homework completed.
- Do not talk while I'm talking, but do collaborate during in-class activities.
- Be attentive during class lectures and participate in class discussions.
- **Put your cell phone on silent** and do not use it during class.
- **Do not use your laptop during class.**
- Use the restroom before you come to class.

Failure to abide by these simple classroom rules may affect your grade. You can expect the following from me:

- The course website (<http://www.brooksemerick.com/mat-362>) is maintained regularly. Assignments, solutions, lecture notes, and other course materials will be posted on the website and updated frequently. Before you ask me a question, check the website. Check your emails regularly for announcements.
- I will post grades to D2L.
- If my office hours are inconvenient for you, email me and I will make time outside of class to meet with you to discuss the course material and assignments.
- Graded assignments will be handed back to you in class or feedback will be provided on D2L in a timely manner.
- Do not be afraid to email me about anything. I will try my best to respond swiftly.
- I rarely deviate from the grading scale (shown below).
- I *never* give extra credit to a single person. However, class-wide extra credit opportunities may arise during the semester.
- Feedback on exams and homework will rarely be given during class time. If you have questions about your grade, please come to office hours or email me to set up an appointment to discuss it.

**ACADEMIC DISHONESTY:** I do not tolerate academic dishonesty. You are required to abide by the Student Code of Conduct outlined in the most recent policies and procedures in the The Key Student Handbook ([www.kutztown.edu/TheKey](http://www.kutztown.edu/TheKey)). Violations of the policy will be handled by the Office of Academic Honesty in the Dean of Students Office.

**SPECIAL ACCOMMODATIONS:** If you plan to disclose a disability to the Disability Services Office (215 Stratton Administration Building) and are seeking accommodations for this course, please discuss this with me during office hours as soon as you can. Accommodations relating to a quiz/homework/exam often take time to arrange; therefore, please make every attempt to discuss the matter with me at least three days before the due date (or quiz/exam date). I cannot take any action retroactively.

**GRADING SCALE:**

Grade	Percentage
A	[92%, 100%]
A-	[90%, 92%)
B+	[88%, 90%)
B	[82%, 88%)
B-	[80%, 82%)
C+	[76%, 80%)
C	[70%, 76%)
D	[60%, 70%)
F	[0%, 60%)