Purdue University
Daniels School of Business

MGMT 57300 Spring 2026 Syllabus

Course Information

Course number and title: MGMT 57300 - Optimization modeling with spreadsheets
CRN: MGMT 57300
Meeting days and times: KRAN 250, MW 4:30pm - 6:00pm, 01/12/2026 - 02/25/2026
Instructional Modality: Face-to-face
Course credit hours: 2.0
Prerequisities: MGMT 670 or equivalent

Instructor Contact Information

Name: Prof. Alex L. Wang
Office: Kran 463
Office Hours: Fridays 3-4:45 in KRAN 250, or by appointment
Email address: wang5984@purdue.edu

I will be available via email daily, and try to respond as soon as possible (generally within 24-48 hours). When emailing me, please place MGMT 573 and the topic in the subject line. (e.g., MGMT 573 - Case 2 Question).

Course Description

The course emphasizes applications of optimization through cases and computer exercises. The applications are chosen to provide insights into business and economics. Areas covered include linear, network, integer, and nonlinear optimization. At the end of the course, the students should have the ability to model optimization problems work with software to solve optimization problems relate to optimization theory in a variety of application settings develop optimization insights into applications in marketing, finance, and operations and get some basic exposure to EXCEL automation.

Learning Resources, Technology and Texts

Course website

All lecture slides, notes, and lecture recordings will beposted to Brightspace.

Textbook and course materials

Baker, K. R., Optimization Modeling with Spreadsheets, 3rd edition, Wiley 2015, Available electronically at Purdue University Libraries

- Either 2nd or 3rd edition is fine.
- For access outside Purdue, you will need to login through the library.
- Case packet and lecture notes posted on Brightspace.

Software

- Excel add-on Analytic Solver Basic (Discussions will primarily focus on this environment)
    - Analytic Solver is installed in KRAN 250
    - The software can be purchased to install on your machine if you would prefer. Please see the attached installation instructions.
      The course code is: **MGMT573AW26SP**
      The book code is: **LABBYOD**

Course Learning Outcomes

By the end of the course, students should be able to

- model optimization problems
- work with software to solve optimization problems
- relate to optimization theory in a variety of application settings
- develop optimization insights into applications in marketing, finance, and operations

Assignments

Over the course of the semester, you will complete 2 homework assignments (individually), 4 case assignments (in teams), and one final exam (individually). Homework assignments will focus on developing the fundamental skills in optimization and modeling, whereas case assignments provide opportunities for the application of those skills to the more complex/open-ended situations common in managerial decision-making.

Case assignments are subject to the following expectations:

- Each team member is expected to maintain a professional standard of conduct and to contribute an honest and good-faith effort. This includes attending and actively participating in team meetings, completing assigned tasks on time, and responding promptly to team communications. At the end of the course, **each team member will evaluate the contributions and level of effort of their teammates for each assignment.**
- Each team member is expected to understand the reason for choosing a particular technique, the mechanics of the solution procedure, and the implication(s) of the final solution(s) and recommendation(s).
- If a team member does not contribute, then their name should not appear on the assignments handed in, and they may do the entire assignment and hand it in separately.

Case assignments and homeworks are due at the beginning of class on the specified due dates. Assignments can be turned in up to 2 days late. Each late day results in a 20% grade deduction. An assignment that has not been turned in 48 hours after the due date results in a 0 grade.

Grading Scale

Each student's grade will be made up of the following items:

- **Case assignments (3/4)** 35 + 10%
- **Homework assignments (2)** 30%
- **Final examination** 20%
- **Class participation** 5%

Attendance/Participation Policy

Students are expected to be prepared for, to attend, and to participate in lectures. Attendance will not be explicitly recorded, however each student will receive a class participation grade at the end of the course.

Preparation. Each student is expected to be prepared for each class and to complete all assigned readings and exercises. Lecture material will be posted on the course website. Students are expected to be aware of the announcements, events, and files posted on the course website.

Participation. Students are expected to contribute to class discussions. During classroom lectures in the traditional format, cell phones are not to be used and the use of laptops should be restricted to the course content in discussion. Disruptive use of personal property during class will be penalized by reducing the class participation grade.

Course Schedule

OMS refers to the textbook Optimization Modeling with Spreadsheets. Topics marked with an asterisk are not covered in OMS (use the PDF slides).

Week	Class	Date	Topic	Reading	Due
Week 1	1	1/12	**Linear Programming Basics** • Assumptions in Linear Programming • Feasibility, optimality, production frontier • Introduction to Analytic Solver • Binding/non-binding constraints	OMS § 1, 2.1, 2.2, 2.5 Slides	
	2	1/14	**Linear Programming Sensitivity** • Allocation problem • Three-dimensional geometry • Parameter analysis • Sensitivity to change in unit profits • Sensitivity to right hand side	Slides	

Week 2	-	1/19	**No Class: MLK Day**		
	3	1/21	**Linear Programming Duality** • Decreasing marginal utility • Shadow prices, reduced costs • Duality theory*	OMS § 4.4, 4.6.4 Slides	
Week 3	4	1/26	**Integer Programming** • Allocation with fixed-cost constraints • Comparison with relaxation	OMS § 6.1, 7.1–7.3 Slides	
	5	1/28	**Transportation and network flow** • Transportation problem • Solution tree structure* • Integrality property* • Assignment problem • General network flow problem • Perfect matching* • Dual formulation*	OMS § 3, 4.1, 4.3, 4.5, 4.6 Slides	
Week 4	6	2/2	**Matching and sponsored search** • Hall's Theorem and Constricted Sets* • Auction Strategy • Matching Markets • Sponsored Search Markets	Slides	HW 1 Case 1
	7	2/4	**Arbitrage and asset pricing*** • Arbitrage detection • Removing arbitrage • Duality and risk-neutral prices • Fundamental theorem of arbitrage • Asset pricing with binomial market • Asset pricing in incomplete market	Slides	

Week 5	8	2/9	**Productivity/Efficiency Analysis** • Constant returns to scale • Variable returns to scale* • Efficient frontier • Data envelopment analysis • Multiple input/outputs with given relative weights • CRS efficiency and hypothetical comparison unit via LP • VRS efficiency and hypothetical comparison unit via LP*	OMS § 5.1-5.6 Slides	Case 2
	9	2/11	**Nonlinear Optimization** • Marketing media selection • Cobb-Douglas functions and elasticity • Optimality conditions • Proportional allocation	OMS § 8.1-8.3 Slides	
Week 6	10	2/16	**Portfolio Optimization** • Markowitz problem • Efficient frontier* • Shadow price and tangents* • Zero covariance portfolio and Two fund theorem* • Sharpe Ratio* • Risk-free asset*	OMS § 8.4 Slides	Case 3
	11	2/18	**Production planning with multiple sources** • Linearizing objective • Handling separability* • Minimizing piecewise linear convex functions • Alternate formulation*	OMS § 8.5 Slides	
Week 7	12	2/23	**Stochastic programming** • Stochastic programming • Agricultural planning under weather uncertainty • Expected value of perfect information* • Value of stochastic solution*	OMS § 8.5 Slides	

	13	2/25	**Optimization in Python**	Google Colab Notebook	Case 4 HW 2
Week 8	-	TBD	**Final exam TBD**		

Academic Integrity

Students are encouraged to discuss readings, computer exercises, homework exercises, and other course content with classmates. Such discussions constitute a valuable aspect of the student's own learning experience. **However, all work counted towards a student's grade must be prepared and answered solely by the individual student or team to which the work is assigned.**

Incidents of academic misconduct in this course will be addressed by the course instructor and referred to the Office of Student Rights and Responsibilities (OSRR) for review at the university level. Any violation of course policies as it relates to academic integrity will result minimally in a failing or zero grade for that assignment, and at the instructor's discretion may result in a failing grade for the course. Students are strongly recommended to read the academic integrity guide published by the Office of the Dean of Students at: http://www.purdue.edu/odos/osrr/academic-integrity/index.html

Usage of Generative Artificial Intelligence/Large Language Models

Generative AI systems, such as ChatGPT or Gemini, can serve as valuable learning tools when used appropriately. Students are welcome to use these tools as a Socratic mentor—to ask questions, clarify concepts, explore examples, and deepen their understanding of course material. However, **generative AI should not be used to directly produce or complete any part of the course deliverables**.

Submitting AI-generated answers, formulas, or solutions as one's own is considered a violation of academic integrity. Violations can include a failing grade for the course and restrictions from further class attendance. All suspected incidents of academic dishonesty will also be referred to the Office of Student Rights and Responsibilities for further review of the student's status with the University, which may include being separated from the University.

Nondiscrimination Statement

Purdue University is committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her potential. A hyperlink to Purdue's full Nondiscrimination Policy Statement is included in the Academic Resources table on your Brightspace homepage.

Accessibility

Purdue University strives to make learning experiences accessible to all participants. If you anticipate or experience physical or academic barriers based on disability, you are encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247, as soon as possible.

If the Disability Resource Center (DRC) has determined reasonable accommodations that you would like to utilize in my class, you must release your Course Accommodation Letter to me. Instructions on sharing your Course Accommodation Letter can be found by visiting: How To Use Your Course Accommodation Letter. Additionally, you are strongly encouraged to contact me as soon as possible to discuss implementation of your accommodation.

Mental Health/Wellness Statement

If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try Therapy Assistance Online (TAO), a web and app-based mental health resource available courtesy of Purdue Counseling and Psychological Services (CAPS). TAO is available to all students at any time by creating an account on the TAO Connect website, or downloading the app from the App Store or Google Play. It offers free, confidential well-being resources through a self-guided program informed by psychotherapy research and strategies that may aid in overcoming anxiety, depression and other concerns. It provides accessible and effective resources including short videos, brief exercises, and self-reflection tools.

If you need support and information about options and resources, please contact or see the Office of the Dean of Students. Call 765-494-1747. Hours of operation are M-F, 8 a.m.-5 p.m.

If you find yourself struggling to find a healthy balance between academics, social life, stress, etc., sign up for free one-on-one virtual or in-person sessions in West Lafayette with a Purdue Wellness Coach at RecWell. Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is free and can be done on BoilerConnect.

If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS offices in West Lafayette or Indianapolis.

Emergency Preparedness

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email on a frequent basis.

Course Evaluation

Toward the end of this semester, you will be provided with an opportunity to give feedback on this course and your instructor. Purdue uses an online course evaluation system, and I will not have access to this anonymous feedback until after final grades are submitted. You will receive an official email from evaluation administrators with a link to the online evaluation site and will receive a prompt to complete the survey when you login to Brightspace. The subject line will be: Please take 2-5 minutes to complete the survey. Check your "Junk E-mail" folder occasionally to be sure the evaluation emails were not accidentally routed there. Your participation is an integral part of this course, and your feedback is vital to improving education at Purdue University. I strongly urge you to participate in the evaluation system.

Disclaimer

This syllabus is subject to change. You will be notified of any changes as far in advance as possible via an announcement on Brightspace. Monitor your Purdue email daily for updates.