Math 309, Optimization Modeling, Section 1 - Fall 2023 Syllabus

Professor:	Dr. Andy Felt	Office:	D355
Office Hours:	M, T, W, Th, F 12:00 – 12:50 p.m.	Phone:	none
(zoom available)	or by arrangement	email:	`afelt@uwsp.edu`

Class Meetings: M, T, R, 3:00 - 3:50 p.m., Sci. A210.

Text: *Introduction to Mathematical Programming*, 4th ed., Winston and Venkataramanan, and *AMPL*, 2nd ed., Fourer, Gay and Kernighan.

Course Canvas Page: `https://uws.instructure.com/courses/611213`.

Calculators and Computers: A calculator will not be necessary in this course, but you may find one useful once or twice. You will need to use a computer to complete much of the homework.

Prerequisites: Math 109 or 111 or 225

Fundamental Skills to be Learned:

- Recognizing real life situations where mathematical models apply.
- Translating the real life situations into mathematical models.
- Solving the mathematical model.
- Interpreting the solution in the context of the real life situation.

Grading:

Category	Percent
Homework Assignments	22%
2 Exams	48%
Final Exam (Comprehensive)	30%

This percent gets you	⇒	at least this grade
92%	⇒	A,
90%	⇒	A−,
88%	⇒	B+,
82%	⇒	B, etc.

Homework: Assignments should have the following format:

- Looseleaf paper only (no spiral schnibbles)
- Name, section, assignment, date on first page
- Uploaded to Canvas as a single pdf document
- Stapled

The grade for each assignment will include 20% based on accuracy and quality of written communication. Examples on this topic are given in Assignment 0. *No late homework is accepted for any reason.* Assignments are due at the beginning of class on the day they are due.

Exams: Exams will test your ability to solve problems and understand concepts from lecture and the book. Exams must be ONLY your own work.

Help: Everybody needs help at some point. The key is to *get help right away* when you need it. Here are some ways to get help:

- ask a question in class;
- ask me during office hours;
- ask me in an email;

Disability Accommodations: Reasonable accommodations are available for students who have a documented disability. Please notify the instructor during the first week of class of any accommodations needed for the course. All accommodations must be approved through Disability Services, `https://www.uwsp.edu/datc/Pages/default.aspx`.

General Course Policies:

- Exams must be ONLY your own work. You may work together on homeworks (unless otherwise specified), but the material you turn in must be *your own*. Please see `https://www.uwsp.edu/dos/Pages/Student-Conduct.aspx` to read about your rights and responsibilities as a student, and Chapter 14 (at that page) to read about Wisconsin's academic misconduct code.
- Use of calculators will not be allowed on exams.
- Cell phones, computers, and other technology should be turned off during class and exam times, except when explicitly told so by the instructor.
- Everyone becomes ill sometimes. When illness or other emergencies require absence from class, I expect you to contact me immediately, preferably by email. I expect you to try to keep up with what is being taught by following in your book and doing the homework. Either have a friend bring your homework, or slide it under my office door. To account for illness and other emergencies, at least one homework scores will be dropped.
- **Academic Dishonesty:** You may discuss homework assignments with each other, and you may seek help from the instructor. However, we want you to become an independent problem solver. Therefore, you must limit the amount of outside help you receive. You must not copy any part of another person's work, and you must not share any part of your work with others. If there is *any* doubt about the amount of help given or received, you should immediately consult with the instructor before submitting the assignment. Please see `https://www.uwsp.edu/dos/Pages/Student-Conduct.aspx` to read about your rights and responsibilities as a student, and Chapter 14 (at that page) to read about Wisconsin's academic misconduct code.
- The course materials and recordings are the property of the instructor, and may not be copied or recorded (including audio and video recording) without the instructor's permission. Students may not copy or share course materials, answers, or recordings outside of class, including posting on internet sites or selling to commercial entities. Students are also prohibited from providing or selling their personal notes to anyone else or being paid for taking notes by any person or commercial firm without the instructor's express written permission. Unauthorized use of these copyrighted lecture materials and recordings constitutes copyright infringement.

Tentative Calendar

Week of	Approximate Coverage (Section numbers from Winston)
5 Sep.	3.1 Sample LP
	3.2 Graphical solution of LPs
11 Sep.	3.3 Special cases
	3.4 Diet problems
	(AMPL 1.2-1.6 and Ch. 2) Solution in AMPL
18 Sep.	AMPL set notation
25 Sep.	3.5 Work-scheduling problems
	3.6 Capital budgeting problems
2 Oct.	3.7 Staged financial planning
	3.8 Blending problems
9 Oct.	3.9 Production problems
	3.10 Multiperiod inventory problems
	3.11 Multiperiod financial models
	3.12 Multiperiod work scheduling

Week of	Approximate Coverage (Section numbers from Winston)
16 Oct.	Exam I
	9.1 Intro. to integer programming
	9.2 Formulation of IPs
23 Oct.	IP modeling
30 Oct.	9.3, 9.4 Branch and bound for MILPs
6 Nov.	8.2 Shortest path problems
13 Nov.	8.3 Max flow problems
20 Nov.	8.5 Min cost network flow problems
	Exam II
27 Nov.	8.6 Min spanning tree problems
	Postman problems
4 Dec.	Traveling salesperson problems
	7.1 Transportation problems
11 Dec.	7.2 Assignment problems
Finals	Thursday, 21 Dec. Final Exam 12:30–14:30