

*University of Pennsylvania*  
**The Wharton School**

Department of Operations, Information and Decisions

**OIDD 612: *Business Analytics***

**Class Schedule**

TR 9:00-10:20am, 10:30-11:50am, 1:30-2:50pm EDT

<b>Instructor</b>	<b>Email Contact</b>	<b>Office Hours</b>	<b>Link for Class and Office Hours</b>
Noah Gans	<a href="mailto:gans@wharton.upenn.edu">gans@wharton.upenn.edu</a>	TBA	<a href="https://bluejeans.com/1459692549">https://bluejeans.com/1459692549</a>

<b>Teaching Assistants</b>	<b>Email Contact</b>	<b>Office Hours</b>	<b>Link for Office Hours</b>
TBA	TBA	TBA	TBA
TBA	TBA	TBA	TBA
TBA	TBA	TBA	TBA

***Course Description***

OIDD 612 is a course on the use of decision models for business analytics. Its main topics include constrained optimization and decision making under uncertainty. The emphasis is on models that are widely used in diverse industries and functional areas, including operations, finance, accounting, and marketing.

The applicability and use of these models have increased dramatically in recent years due to extraordinary improvements in computer, information, and communication technologies. Large volumes of data are available from automatic capture of point-of-sale (POS), Enterprise Resource Planning (ERP), and Customer Relationship Management (CRM) systems.

Information has come to be recognized as a critical resource, and quantitative models play an increasingly critical role in deploying this resource, in organizing and structuring information, so that it can be used more productively. Friendly interfaces have become effective “delivery vehicles” for powerful decision models that enable the use of these data for more effective short-term, tactical and long-term, strategic decision making.

In addition to introducing you to simple, commonly-used quantitative models, the course will help you develop a sense for the kinds of problems that can be tackled using available methods and software and raise your awareness of some of the issues involved in gathering the relevant data. We believe the course will have an impact on the way you think about available data and how it can be used to provide more value in management decisions.

***Canvas Site***

The course has a Canvas web site from which you can download printable materials.

<https://canvas.upenn.edu/courses/1533372>

The Canvas site will also have Excel files with sample solutions to homework problems, solutions to the textbook’s end-of-chapter problems, software, and other materials of interest.

***Online-Class Management***

The class format is **online and synchronous**. Class sessions will use **BlueJeans** conferencing software. Before the class starts, you can make sure your audio, video, and microphone work on BlueJeans, following this link:

<https://bluejeans.com/111?ll=en>.

How You Should use BlueJeans Video and Audio

With many students and online communication, we’ll need to follow fairly strict communications guidelines so that sessions do not become confusing.

- Please keep your video on and your microphones muted as a default.
- Only unmute your microphone if/when you have a turn to speak.
- If bandwidth is limited and quality is low, you may also need to mute your video.

# DRAFT Syllabus

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## How You Should use BlueJeans Chat

Unfortunately, BlueJeans does not have a facility that allows students to virtually “raise their hands” to ask for a turn to speak. So we will use its chat function for that purpose. This means, we need to also follow strict guidelines regarding chat.

- Chat should ONLY be used for asking for a turn to speak.
- Chat should NOT be used for side conversations.

## Experimenting with How We Run the Class

While the guidelines above follow from “best practices” that are being offered by Penn and Wharton, they are not guaranteed to work well, and we may change some of them as we all gain experience in live classes.

## **Computer Software**

We will use *Microsoft Excel* spreadsheets extensively throughout the course. In the first half we will also use Excel's *Solver* add-in to solve constrained optimization problems, and in the second we will use *Crystal Ball*, an add-in for Monte Carlo simulation. If you are a PC user, you will be able to download Crystal Ball from Canvas site and run it on your laptop. If you are a mac OS user, you will be able to use Wharton’s virtual labs to run Crystal Ball: <https://support.wharton.upenn.edu/help/virtual-lab>.

## **Recommended Text**

There is no required text for the course. Most students find that the class notes, explanatory notes, and spreadsheet examples we distribute on Canvas work well for them as they follow the course. At the same time, some students like having a textbook as a complementary source to study, as well as a source of additional practice problems.

If you’d like to have a textbook, we recommend

Cliff T. Ragsdale, *Spreadsheet Modeling and Decision Analysis*, Revised 5<sup>th</sup> Edition, Cincinnati: South-Western College Publishing, 2008, 7 selected chapters.

## **Course Grading**

The course is being offered online, and there are likely to be students who live in locations for which live attendance is difficult. Fortunately these students can instead follow video recordings of our class sessions. Given this situation, we will not be using your class attendance or class participation in determining your course grade. Rather, your course grade will be based on the points you earn on three homework assignments and on the final exam, with weights as follows:

Homework Assignments	45%
Final examination	55%

The three homework assignments will be equally weighted, each counting for 15% of the total score.

## **Homework Assignments and Self Study Problems**

### Homework Assignments

Your work on homework problems is essential to your mastery of the material. The assignments may be **completed individually or in pairs**. You are free to discuss the homework assignments with other students beyond a homework partner in general terms but not share specific answers.

When thinking of whether to work alone or not, you may consider the following trade-offs. Working alone has the advantage that you get the best insight into how well you are mastering the material. On the other hand, particularly if this material is entirely new to you, you may find that discussing the problem with another person helps in the learning process.

To hand in a homework assignment, you will **upload a Word or PDF file** with your write-up to **Canvas** by **9am Philly time** of the day on which the homework is due. If you complete an assignment as part of a pair, please hand in **one write-up per pair**, not two copies of the same assignment. Remember to include your **name(s) and student ID(s)** at the top of the front page. **Late submissions will not be accepted.**

### Self-Study Problems

We will also distribute a set of **self-study problems** and their solutions. The self-study questions will be similar to homework sets. Together, the homework and self-study problems will give you a good idea of the kind of questions you can expect on the final exam. You do **not** need to hand in your solutions to the self-study problems.

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## Final Exam

The final examination is scheduled for **Wednesday October 21<sup>st</sup> from 9am to 11am EDT**. The exam will be offered **online**, and will be open-book, open-notes. Once the specific details are settled, we will announce them. A practice exam with solutions will be distributed before the last class session.

## Class Schedule

The schedule below provides a class-by-class view of topics, associated readings, and course deliverables.

Class	Date	Session Topic	Notes / Suggested Readings	Due
1	Sept 1	Introduction	<ul style="list-style-type: none"><li>• <b>Text–1; 1–13:</b> Sketches of applications.</li><li>• <b>Text–2; 17–39:</b> Geometry of linear optimization problems, for intuition.</li></ul>	
2	Sept 3	Interpreting Optimization Results Constrained Optimization and Economics	<ul style="list-style-type: none"><li>• <b>Text–3; 45–62:</b> Formulating a linear optimization problem and implementing it in a spreadsheet.</li><li>• <b>Text–4; 136–151:</b> Sensitivity analysis.</li><li>• <b>Notes from Class #1 - <i>Fabulous Nuts</i>:</b> We'll discuss this problem in class.</li></ul>	
3	Sept 8	Network Applications I	<ul style="list-style-type: none"><li>• <b>Text–3; 63–102:</b> Many examples: in class we'll cover those listed in 3.10 and 3.12.</li><li>• <b>Notes from Class #2 – <i>GlobChem</i>:</b> We'll discuss this problem in class.</li></ul>	
4	Sept 10	Network Applications II	<ul style="list-style-type: none"><li>• <b>Notes from Class #3 – <i>RE Investment</i>:</b> We'll discuss this problem in class.</li></ul>	
5	Sept 15	Integer models	<ul style="list-style-type: none"><li>• <b>Text–6; 232–268:</b> Integer models, examples. We will focus mainly on <i>binary</i> variables.</li></ul>	HW 1
6	Sept 17	Decision Making Under Uncertainty	<ul style="list-style-type: none"><li>• Decision Trees: test marketing; the value of information.</li></ul>	
7	Sept 22	Introduction to simulation	<ul style="list-style-type: none"><li>• <b>Text–12; 559–586:</b> Basics of Monte Carlo simulation.</li></ul>	
8	Sept 24	Risk management	<ul style="list-style-type: none"><li>• Asian options.</li></ul>	HW 2
9	Sept 29	Optimization via simulation	<ul style="list-style-type: none"><li>• Newsvendor problem.</li></ul>	
10	Oct 1	Nonlinear Optimization Using Scenarios to Model Uncertainty	<ul style="list-style-type: none"><li>• Portfolio analysis.</li></ul>	
11	Oct 6	Decision Trees and Optimization	<ul style="list-style-type: none"><li>• Decision-making in clinical trials</li></ul>	HW 3
12	Oct 8	Course Wrap-up	<ul style="list-style-type: none"><li>• Review and exam preparation</li></ul>	

Final Exam – Wednesday October 21, 9am-11am

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## Class Preparation

Before each class you will be able to access detailed lecture notes on Canvas. These notes are designed to help you focus on the class discussion rather than on note taking. It is good practice to review these lecture notes soon after each class to reinforce your learning from the class.

If you decide to use the recommended text, we suggest you complete the associated readings listing in the class schedule, above, *before* class to help you to prepare for what's covered in class and to better keep up. Those readings are marked in the class schedule as **Text–m; ppp–qqq** and refer to Chapter *m*, pages *ppp–qqq* of the Ragsdale text.

## TA Office Hours

Teaching assistants' (TAs) office hours will be posted on Canvas. All sections of the course in a given quarter have the same assignments and exam, and you may approach any of the TAs with questions.

## Ethics Matrix

The course involves a mix of work by individuals, pairs, and groups, and the matrix below describes who you are allowed to work with and what materials you are allowed to use for each assignment. It is your responsibility to understand and follow the matrix.

	Materials						People				
	Approved calculator	Laptop / other electronics*	Current book, class notes	Past notes / summaries	Past exams / assignments	Internet content / other outside materials	Homework Partner	Other student(s) in same section	Student(s) in other sections (same term)	Wharton student not taking the class this term	Person outside of Wharton
OIDD 612: Business Analytics											
Homework	A	A	A	A	A	A	W	D	D	D	D
Final Exam	A		A								
	A = Allowed material Shaded Cell = Not allowed						W = Allowed to work together D = Discussion of general concepts and procedures is allowed but no sharing of specific answers. Shaded Cell = Not allowed				
<p><u>Homework</u> can be done alone or in a pair. You may discuss homework problems with people outside of your homework partner in general terms, but you may not share specific answers with people outside of your homework partner.</p> <p><u>Final exam</u> preparation may be done with others. The materials you are allowed to use during the final exam may only include the course book, documents posted on the course web site this quarter, your own written notes, and a calculator.</p> <p>*During the final exam, you may use your laptop/other electronic device only to access the exam online, access/read your notes, and submit your work. In particular, you should not use a laptop or other electronics to perform any optimization or simulation tasks.</p>											