



## Introduction to the Computer as an Analysis Tool

**OPIM 101: *Spring 2008***

### Basics

<b>Professors</b>	Shawndra Hill, Steve Kimbrough, Thomas Lee	
<b>Course Webpage</b>	Accessible from <a href="https://webcafe.wharton.upenn.edu">https://webcafe.wharton.upenn.edu</a>	
<b>First/Last Class</b>	First class: Jan 14; Last Class: April 23/24	
<b>Lecture Times and Rooms</b>	Sec 001, T, 10:30A – 12Noon	TBD
	Sec 002, T, 1:30P – 3:00P	TBD
<b>Recitations</b>		
<b>Lee</b>	Sec 201, R, 9:00A – 10:30A Sec 202, R, 10:30A – 12Noon Sec 203, R, 1:30P – 3:00P	
<b>Kimbrough</b>	Sec 204, W, 10:30A – 12 Noon Sec 205, W, 1:30 – 3:00P Sec 206, W, 3 – 4:30P	
<b>Hill</b>	Sec 207, R, 12Noon – 1:30P Sec 208, R, 1:30 – 3:00P	
<b>Exam 1 Date/Time</b>	Common Exam, T, 4 Mar, 6-8PM, location TBD	
<b>Exam 2 Date/Time</b>	Common Exam, R, 13 May, 6-8PM, location TBD	
<b>Course Assistant</b>	TBD	
<b>Office Hours</b>	TBD	
<b>Contact</b>	Email: shawndra@wharton; sok@wharton; thomasyl@wharton Fax: (215) 898-3664	

### Overview

Business is about making decisions: Who to hire or partner with, what resources to purchase, how much, when, where. Whether you run a small start-up or a large multinational, whether your firm designs and manufactures physical goods or provides services such as investment banking, you will face similar types of questions. This course introduces you to a data-driven, model-based approach to decision-making. Because the mathematical models that we construct will quickly become too complicated to solve by hand, we will also (learn to) use computer-based tools such as spreadsheets and databases to solve our models and analyze the results. Key topics that we will cover include constrained optimization, process modeling, operational analysis, simulation, and decision theory. Because data gathering and model execution can quickly become tedious, we will also learn to construct and re-use macros to automate the repetition and simplify our task. The goal is to provide a set of foundational skills applicable to your upcoming summer as well as to your future at Wharton and beyond. At the same time, we aim to provide an overview of problems and techniques that characterize the disciplines that comprise Operations and Information Management.

The course assumes no specific background beyond basic mathematics skills; no prior experience with Microsoft Excel, Microsoft Access, programming, marketing or strategy is expected. Early in the semester, in-class exercises and assignments will require students to practice and then demonstrate basic Excel proficiency so that lack of skills will not create an obstacle to absorbing more critical course content.

## Course Format

In a significant shift from prior semesters, classes in the Spring 08 semester will consist of large (approx. 200-250 students), weekly lectures, smaller (approx. 65 students), weekly recitations, and in-class computer lab exercises held concurrently with recitations. Recitations, in particular, are led by faculty and are structured as interactive sessions involving discussions and problem-solving. Students are expected to come to class prepared to discuss materials covered in the readings and lecture. In some instances, preparation of problems prior to class will be necessary.

### ***A special note on mentoring:***

As will be discussed further in class, we will also schedule weekly *mentoring* sessions which constitute small groups (ten to fifteen students) working with an experienced, upper-class student to solve practice problems related to the prior week's lecture/recitation materials. Mentoring sessions are intended to supplement rather than replace lectures and recitation. Students will have the opportunity to sign-up for mentoring on a first-come-first-serve basis at the beginning of the semester. Mentoring is strictly optional so you do not have to sign-up. However, for those students who do sign-up, there is an expectation that you attend consistently throughout the semester. This is so that we can manage the workload consistently and to ensure fairness.

## Course Materials

### ***Textbook:***

The prescribed textbook for the course, available from the Penn Bookstore, is:

Custom Coursebook (*Intro to the Computer ... Spring 2008*) *Note: Because of changes to the curriculum and changes to the underlying materials from which this reader is drawn, we strongly suggest that you do not use a version of the reader from previous semesters. If you do, the readings and textbook problems will not align.*

### ***Online:***

*webCafe* is a web-based application that houses online materials for enrolled students across Wharton. You can access our course by logging into <http://webcafe.wharton.upenn.edu> (using your Wharton ID/password), and choosing the course titled **OPIM 101 Spring 2008**.

### ***Import note:***

The webCafe will be the definitive source for all assignments and deadlines. If you do not already have a Wharton computer account, you will need to obtain one (visit Wharton Computer Consultants on the Forum Level of Huntsman Hall). You will not have access to the webCafe until you officially register for the course.

### ***Lecture notes:***

Lecture notes will be posted on the webCafe in advance of lectures. If we printed lecture notes for distribution in-class, every student would be charged on their Bursar's bill. Because not all students use physical notes, for cost and environmental reasons, we will post notes on-line; you can choose whether or not to print the lecture notes yourself.

### ***Software:***

All software required for the course will be available through the Wharton computing labs in Huntsman Hall. If, for convenience, you wish to acquire copies to use on your personal computer or laptop, the necessary software will include:

- Microsoft Excel 2007. The class will not provide support for versions of Excel older than Office 2007. All assignments must be submitted as Office 2007 **xlsx** files. Proficiency exercises will be in Office 2007. Note that older versions of Excel are functionality similar, the "ribbon" interface is quite different. You will need to enable the "Solver" add-in by selecting the "Office Button" in Excel 2007. At the bottom of the menu, select the "Excel Options" button. In the resulting window, in the menu to the left, select the option for "Add-Ins". At the bottom of the window, you

will see a drop-down box labeled "Manage:" with options next to a button labeled "Go". In the drop-down box, select the option for "Excel Add-ins". Select the button "Go."

- Microsoft Access 2007. As before, versions before Office2007 will not be supported.

***A special note on computing resources:***

Students must have access to a personal computer (either their own or those in the labs) to complete course assignments. Students using their own computers must have the capability to read and create documents in Office07 format. Excel files, in particular, must be submitted in xlsx format. Unfortunately, there is currently no version of Excel07 or Access07 for MacOSX. If you are using a Mac, you may dual boot an Intel-based Mac (BootCamp is free from Apple and other options are available) or use an emulator (such as VMWare Fusion) to run Windows Vista or XP with some version of Office07. Students using their own computers should comply with all software licensing terms.

### **Deliverables, Grading and Class Participation**

Assignments and case studies through the course will reinforce your learning of how to use information technology to solve business problems. During this course, you will be assigned six in-class lab assignments that are ungraded. These assignments are intended to help you practice concepts discussed in-class. You will be assigned three graded group case assignments and a series of six to eight in-class graded individual exercises. In addition, there are two exams. The exams are NOT cumulative. You are expected to participate in classroom discussions. The breakdown of percentage points for each deliverable can be found in the table below:

<b>Excel Proficiency</b>	<b>Pass/Fail</b>
<b>Graded cases</b>	30%
<b>In-class recitation exercises</b>	10%
<b>Exam 1</b>	30%
<b>Exam 2</b>	30%

Examinations are closed book/notes/computer/PDA/iPod (the idea should be clear). We will discuss their format in due course. However, please note that exams are BOTH \*common\* exams. See: <http://www.upenn.edu/registrar/> and look at the schedule of COMMON exams. All sections take their midterm on the same day/same time. Likewise ALL assignments are due on the same day and posted on the same day.

In general, Cases will be due on the assigned dates. Late submissions will NOT be accepted. NO EXCEPTIONS. This rule is due to the fact that we post solutions to assignments.

Case assignments should be completed in groups of 2-3 students. This does NOT mean that you can work in a group of four or more and submit multiple copies of the same assignment. The work that you submit must be written entirely and only by members of your group. If you have any questions about this policy, please speak to an instructor. During the semester, you will be responsible for the group formation process. You are allowed to create groups across sections. If one or more partners drop out of the course leaving you alone, do NOT simply work with an existing group of 3 students. Please see the instructor(s) immediately.

All other assignments (anything other than the case assignments), should be written entirely and only by you. Note: it is certainly reasonable and even encouraged to talk with fellow students about the course material, to clarify concepts, and to work through practice problems. However, to re-emphasize: submitted work must be your own. If there are any questions, please consult with a faculty member (not a TA or mentor).

Class participation is also part of your final grade. Students are expected to come prepared and to contribute at least occasionally. Although the lecture is large, the recitations are deliberately small to facilitate interaction. In-class exercises are another opportunity to demonstrate your involvement. There will be no shortage of opportunities to participate. Quality of contribution is more important than quantity. While we expect the majority of students to perform well on class participation, we will adjust grades accordingly for exceptional performance (in either direction).

Students are expected to adhere to the principles of the [University's Code of Academic Integrity](#).

### Support Questions and Assistance

The mentoring sessions provide a regular meeting for the discussion of the weekly course content. In addition to mentoring sessions we also have course Teaching Assistants (TAs) that hold regular office hours and can answer questions by e-mail about the course material or assignments. An office hours schedule will be posted shortly after the beginning of the semester.

Assignments will be graded by a designated set of graduate student graders. If you have any concerns about the answers to the assignments, you may direct those to the TA, the Mentors or the Instructors. If you have a question about your grade, or believe you have been graded incorrectly please put your concern in writing and resubmit your paper for a regrade. We will regrade your entire paper taking into account your written comment. There will be a designated time window for the submission of regrade requests after each assignment.

The Penn Tutoring Center also supports OPIM101. We will provide more information about their services on the Webcafe.

As far as is possible, rather than emailing us, you should post your questions on the relevant webCafe **discussions forum**. This is far more efficient than individual back-and-forth email. There are two discussion forums currently active:

1. Administrative questions about the course where you will find a set of frequently-asked-questions (FAQ's) already prepared for you: *Administrative FAQ*.
2. Questions and comments about specific lectures: *lecture questions*.

Before posting a question, make sure that you read through the course content on webCafe, the frequently-asked-questions, and the questions other students have posted. Often, you will find the answer to your question there.

Due to the inefficient and impersonal nature of electronic mail response, email support is not provided for general course questions. A bounty of in-person support resources are here to assist you, and look forward to answering your questions. Please visit us during the published office hours.

Please contact a TA or your mentor first:

If the TA or mentor is unable to resolve your query, they will refer you to the Head TA, who may in turn refer you to the course instructor.

If you have questions pertaining to your spreadsheets or to problem sets, please bring these along with you to office hours. Do not send spreadsheets or problems via email as your question will be more quickly answered in person.

In the event that you feel the need to email us because of an emergency related to class, *make sure you use OPIM101 as the subject line*, so that we recognize that it is from one of you, and so that our spam filters do not accidentally delete your message.

## On Technical Ability, Waivers and Prior Experience

Many of you have significant experience with computer technologies. If you are an expert in a particular area, please contribute your expertise to the class discussion. A potentially dangerous strategy is to assume that because you are technologically literate, you know everything you need to know about business modeling and quantitative analysis. While our goal is to make this class as accessible as possible to all students, it is very difficult to do well if you rely only on prior knowledge and/or doing the readings on your own. Moreover, technological and general business expertise notwithstanding, it is very difficult to participate in class when you aren't there.

As a rule, we do not grant waivers of OPIM101 except for M&T students (who are exempt) and dual degree students who are receiving a degree from the College or Engineering in addition to Wharton (if you are dual degree, see your instructor for options).

## Course Schedule

We may add or modify web-based readings from time to time. Make sure that you check the **Documents and Slides** section of webcafe before every session – you will find a document for every classroom session, which will contain detailed information about pre-class readings, a copy of the class slides, and information about assignments/projects. **The topics indicated with an asterisk (\*) will take place in the laboratory which you can find in 375/380 JMHH otherwise the class will meet in the room assigned to the course.**

**PART 1: Data Modeling with Excel:** First, you will get an introduction to using Microsoft Excel.

**PART 2: Deterministic Modeling (Optimization):** Second, you will learn about decision making under *certainty*. You will learn about the following set of skills/problems: linear programming formulation, linear programming sensitivity analysis, transportation and assignment problems, integer programming, and non-linear programming.

**PART 3: Automation using VBA Scripting:** Third, you will learn how to automate excel using VBA. You will learn about VBA Macros: modules, variables, decisions and looping.

**PART 4: Probabilistic Modeling (Optimization):** Fourth, you will learn about decision making under *certainty*. You will learn about decision analysis and simulation.

**PART 5: Data Acquisition from Databases with SQL:** Finally, you will learn how to query Microsoft Access data bases. You will get both an introduction to database management and an introduction to structured query language (SQL).

Ses	Date (T)	Date (WR)	Topics	Readings	Assignment
		16,17 Jan	Course Intro/Excel Lab (in-class)*		
	22 Jan		Constrained Optimization, LP		
		23, 24 Jan	LP Formulation Exercises		
	29 Jan		LP (Transport/Assignment)		
		30, 31 Jan	LP Formulation, Excel Solver*		
	5 Feb		Sensitivity Analysis		2/4 Case 1 out
		6, 7 Feb	Sensitivity Analysis		
	12 Feb		IP and NLP		
		13,14 Feb	IP Constraints and Formulation		
	19 Feb		NLP, Inventory, and Risk		
		20, 21 Feb	Excel Proficiency*		
	26 Feb		LP Formulation, PERT/CPM		2/25 Case 1 due
		27, 28 Feb	LP Formulation, PERT/CPM		
COMMON EXAM 2, ALL SECTIONS 4 Mar, 6-8P, PLACE TBD					
	11 Mar		NO CLASS, SPRING BREAK		
		12, 13 Mar	NO CLASS, SPRING BREAK		
	18 Mar		VBA		3/17 Case 2 out
		19, 20 Mar	VBA Lab 1 and 2 (in-class)*		
	25 Mar		VBA		
		26, 27 Mar	VBA Lab 3 and 4 (in-class)*		
	1 Apr		Probability and Simulation		
		2, 3 Apr	VBA Review and Probability		
	8 Apr		Decision Analysis and Trees		
		9, 10 Apr	Decision Trees		4/10 Case 2 due
	15 Apr		Introduction to Databases (DB): Queries from Single Tables		
		16, 17 Apr	DB Lab (in-class)*		
	22 Apr		Introduction to Databases: Queries from Multiple Tables		
		23, 24 Apr	Group By; Pivot Tables; Access to Excel		4/24 Case 3 due
COMMON EXAM 2, ALL SECTIONS 13 May, 6-8P, PLACE TBD					