ACCT 580-01: General Systems and Process Thinking

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W 6:00-8:40PM in Pigott 207 (computer lab)
Office Hours: **W** 4:30-5:30 PM; **Th** 4:30-5:30 PM; or by appointment.

Course Description

The goal of this course is to equip future accountants, financial analysts, controllers, CFOs, and business managers in general with a palette of essential tools to formulate and solve decision making problems for situations characterized by a high degree of complexity, with emphasis on accounting and finance applications. The term *general* in the title of the course implies that the approaches taught are applicable to a large class of problems characterized by complexity. The term *system* implies that the problems under study typically have multiple components that interact with each other over time in complex ways. The term *thinking* reminds us that, as with most modeling techniques, the key benefit of the approach lies in helping decision makers anticipate the implications of choosing one policy versus another and to visualize solutions that might not otherwise have been considered.

The course is delivered by means of lectures, case discussions and hands-on modeling in the computer lab. There is extensive use of software platforms such as Excel and Vensim. Decision making approaches include the Monte Carlo Method, System Dynamics, and both Linear and Nonlinear Programming. During the term students work on a variety of problems of practical relevance such as business valuation, value at risk, portfolio optimization, and option pricing.

Although no prior knowledge of simulation or computer programming is required, some familiarity with Excel is assumed. ACCT 580 will appeal more to those who enjoy working with computers and simulation languages, than to those who prefer less quantitative or analytical endeavors.

Students with Disabilities

If you have, or think you may have, a disability (including an 'invisible disability' such as a learning disability, a chronic health problem, or a mental health condition) that interferes with your performance as a student in this class, you are encouraged to arrange support services and/or accommodations through Disabilities Services staff in the Learning Center, Loyola 100, (206) 296-5740. Disability-based adjustments to course expectations can be arranged only through this process.

Schedule

A tentative distribution of topics throughout the quarter is attached at the end of this syllabus. Deadlines for assignments, exam dates, and the main topics covered in each exam are shown there. The schedule will be adjusted from time to time as the course progresses due to variations in the time needed to explain each topic. Such changes will be announced by email and in class with sufficient time for you to prepare.

I urge you not to fall behind in your readings and assignments. Once you fall behind it is very difficult to recover.

My office hours are shown in the heading above. Office hours are a great opportunity for you and I to discuss the course, financial accounting concepts, career choices, or basically any other topic or issue that you think I could help you with. It is best to come to office hours regularly throughout the course, rather than just before an exam, because at those times many of your classmates will be wanting to see me as well.

Teaching Materials

- REQUIRED

  Management Science: The Art of Modeling with Spreadsheets, 2nd Edition (2007)
  Stephen G. Powell, Dartmouth College Kenneth R. Baker, Dartmouth College
  ISBN: 978-0-470-03840-6

- RECOMMENDED

  Any good reference book on Excel.

- SOFTWARE

  Vensim PLE, distributed freely by Ventana Systems. Vensim PLE has the following online resources: (1) a user's guide in printable PDF format; (2) help system; and (3) a folder of demo models. The Ventana Systems web site is at http://www.vensim.com/

  Excel

- OTHER GOOD REFERENCES

  Introduction to Operations Research, by Hillier and Lieberman, 8th edition. (McGraw-Hill)

  Industrial Dynamics, by Jay W. Forrester (Pegasus Communications)

  The Logic of Failure: Recognizing and Avoiding Error in Complex Situations, by D. Dörner (Basic Books)

Evaluation

Performance evaluation will be based on: (1) homework assignments; (2) class activities; (3) a midterm exam; and (4) a term project. Relative weights in the final grade are:

Homework assignments (8)	**30%**	(group)
Participation in class activities	**10%**	(individual)
Midterm exam	**30%**	(individual)
Modeling project	**30%**	(group)

An approximate correspondence of final scores with letter grades is as follows:

< 50	> 50	> 60	> 70	> 75	> 85	> 89-90
F	D	C-,C,C+	B-	B	B+	A-, A

The correspondence is approximate because I wait for significant gaps in the ranked scores before changing letter grades. I also consider the trend in grades and participation in borderline cases. For example, a student with a final score of 88, improving grades over time and good participation may get an A-, whereas a student with a final score of 89, worsening grades over time and poor participation may get a B+.

- Class **participation** is indispensable for a good learning experience. Positive participation implies taking on a constructive role in class. Examples of positive participation are: coming to class, arriving on time, paying attention, making insightful comments, asking relevant questions, answering questions, and getting actively involved in discussions and class activities (including the online discussion forum.) Asking an excessive number of questions and/or making comments that do not contribute to the topic under discussion interferes with the learning experience of all students and counts as negative participation.
- The **modeling project** is a comprehensive exercise in which teams of 3-4 students will apply tools learned in the course to a problem of their choice. Deliverables: (1) model file; (2) written report; (3) powerpoint presentation; (4) oral presentation. All members of a group must be present in class and actively involved in the class discussion when their group is presenting. Absentee members will receive a zero in the oral presentation component of the grade unless their absence was due to a medical, family or work emergency. (Signed statement from a doctor or supervisor required.)
- **Homework assignments and the modeling project** are done by groups of 3-4 students. It will be helpful and enjoyable in this course to discuss assignments and readings with your classmates. It is very important, however, to make sure that every member of a study group is really learning the material. You should submit one paper for the entire study group, with the names of all contributing members listed on the first page. On the back of the first page indicate whether or not all members of the group contributed equally to the report. If the workload was not evenly distributed, indicate the percentage of the work that was done by each member of the group.

General rules for assignments

- Part of the grade in every assignment (homework, projects and exams) is related to presentation quality.
- Due dates for assignments are given in the schedule. All assignments must be turned in (hard-copy) and posted into the appropriate Angel "drop-box" by the due date. Papers cannot be delivered as an e-mail attachment. (E-mail attachment acceptable as proof of meeting the deadline.) Late assignments will not be graded.
- Please observe the following guidelines in all your papers:

  (1) put a staple on the top left hand corner of your paper;

  (2) whether typing or handwriting, do so neatly;

  (3) separate one problem from the next, and label each problem clearly;

  (4) number your pages;

  (5) before stapling verify that all pages are in the right order and that no page is upside down;

  (6) check your spelling, grammar and style;

  (7) give credit when quoting the work of others;

  (8) read your paper one last time before handing it in to check the logic of your arguments and also to see whether you really answered the question(s) asked.
- Good written and verbal communication skills are a critical requirement for success in any business endeavor and in any career you may choose to follow, whether in business or not. Remember that your audience (future bosses, customers, etc...) is generally busy, impatient, and WILL choose to read someone else's paper, job application, or business proposal at the very first sign of carelessness. I will not grade papers that reveal carelessness and/or lack of respect for the reader. Papers that are not graded for this reason cannot be resubmitted.

Class Conduct

I expect the highest level of professional conduct during office hours and in the classroom at all times. Laptops must be turned off in class unless used for note-taking. Reading of non-class materials must stop once class begins. Cell phones, pagers, MP3 players and any other electronic devices MUST be turned off during class and exam times. The fact that I do not always complain in class about non-professional behavior does not mean I condone it. It simply means I am more often than not embarassed to call attention to such

behavior in front of the class. Non-professional behavior during office hours and in class will have a strong negative effect on a student's participation grade.

Academic Honesty

I expect that you will abide by the University's Academic Honesty Policy. "Seattle University is committed to the principle that academic honesty and integrity are important values in the educational process. Academic dishonesty in any form is a serious offense against the academic community." Academic Honesty Policy 2004-01

If you are not sure about whether a particular action is acceptable according to the Academic Honesty Code, you should check with me *before* engaging in it.

As required by University regulations I will report the department's chair all verified instances of plagiarism, cheating and usage of unauthorized sources in exams, papers, projects, homework or any other academic assignment. Depending on the severity and circumstances of the violation I may recommend that the student receive a grade of D or F in the course. According to University policy, "a single instance of plagiarism can be the basis for suspension or expulsion from our programs." (Dean Joseph M. Phillips' letter to students, November 2003.)

Online Communications (Angel, Email, Discussion Forum)

Besides in-class and office hour opportunities for communication, I will often communicate with you via Angel and SU email. But online communications are not meant to substitute for class attendance. Some materials may be distributed *only in class*, and most course-related announcements will be made *only in class*. The fact that you did not receive materials by electronic means is not acceptable as a reason for failing to meet assignment deadlines.

The best way to get in touch with me is via email, but please send email to my Seattle University address, NOT just to the Angel website (if you are using Angel to email, there is a box at the bottom of the screen that needs to be checked so that your message also goes to my regular SU account.) Often I cannot check my telephone answering machine, but I check email several times a day on weekdays. *Do* write to me if you must miss class. *Please include the course title (ACCT 311) in the subject line of your messages to me.* Due to the threat of viruses, I delete without reading messages without a subject, or with a subject that I find suspicious. If regular email stops working, or becomes too slow, I will communicate with the class via Angel.

IMPORTANT: The course's Angel web site has a discussion forum. This forum is for questions related to the content, assignments, grading and conduct of the course. If you wish to ask a question, for example, about the meaning of *conservatism*, or about a course assignment, you should post your question on the discussion forum. ***I will not reply to such questions if they are asked via regular email.*** The discussion forum has several advantages over email: **(1)** all students get to observe and learn from the exchange; **(2)** I don't need to answer the same question several times; **(3)** someone else may be able to answer your question before I can. I will monitor the discussion periodically and intervene when necessary. **Answering** questions in the discussion forum contributes to the class participation grade. Of course I will always address questions of a personal nature by email.

Schedule

Session	Date	Topics	Readings and References
1	Apr 2	**Breaking the Ice** ▪ What is "systems thinking" ? ▪ Modeling as art and craft ▪ Introduction to Vensim ➔ Homework 1: ◆ Ch. 2: Exercise on influence charts (1) ◆ Ch. 2: Exercise on sketching graphs (2) ➔ In-class activity: Be prepared to explain your graph/influence chart.	✳ P&B, Ch. 2 [17-50] Sterman, J., "A Skeptic's Guide to Computer Models" Meadows, D., "System Dynamics Meets the Press"
2	Apr 9	**Excel** ▪ Effective, safe, friendly design of spreadsheets ▪ Visual Basic for Applications (VBA) ▪ Using controls ➔ Homework 2: ◆ Ch. 4: Follow steps in 4.7 to accumulate daily returns. ◆ Ch. 5: add *Spreadsheet Professional* to Excel. ✪ Ch. 5: Ex. 10 (retirement planning) ➔ In-class activity: Be prepared to discuss the retirement planning case.	✳ P&B, Ch. 3-5 [52-121] Mello-e-Souza, C. and S. Bee, "A Blueprint for Reliable Business Valuation" Mello-e-Souza, C., "Simultaneous Equations Crashes: Problem and Solution"
3	Apr 16	**Vensim** ▪ From CLDs to stock and flow diagrams (HO 2) ▪ Building a simulation model ▪ Analyzing results with Vensim ▪ Can Excel do what Vensim does? ➔ Homework 3: ◆ Download and install Vensim PLE ◆ Handout 3 (Academic Performance Model) ✪ Towards understanding the subprime crisis prepare a CLD depicting what you believe are the main variables at work and their relationships. ➔ In-class activity: Be prepared to explain your view of the subprime crisis.	✳ Vensim Manual, Chapters 2-4 Richmond, B., "Systems Thinking: Critical Thinking Skills for the 90s and Beyond"

Session	Date	Topics	Readings and References
4	Apr 23	**Analyzing Results and Data With Spreadsheets** ▪ Scenarios, what-if, sensitivity analysis ▪ Drawing effective charts (histograms) ▪ Using data tables effectively ▪ Sorting and filtering ➔ Homework 4: ◆ Compustat database: see handout ✪ Ch. 6: Ex. 10, items (a) – (e) ➔ In-class activity: Be prepared to discuss retirement planning case.	✳ P&B, Ch. 6 [123-137] ✳ P&B, Ch. 7 [140-159]
5	Apr 30	**System Dynamics** ▪ Feedback and delays ▪ Common types of system behavior ▪ Incorporating delays and table lookup in Vensim ▪ Application: a financial model ➔ Homework 5: ◆ Criticize the financial model (REF) ◆ Handout 9 ✪ Urban Dynamics Model (H/O 8) ➔ In-class activity: TBA.	✳ Coyle, G., "The Practice of System Dynamics: Milestones, Lessons and Ideas from 30 Years of Experience" ✳ Meadows, D., "Places to Intervene in a System"
6	May 7	**Nonlinear Optimization** ▪ Nonlinear optimization in Excel ▪ Application: the investment portfolio problem ➔ Homework 6: ◆ Install *Premium Solver* in Excel ✪ Ch. 10: Ex. 1, 4, 5, 12 ➔ In-class activity: Be prepared to explain solution to ex. 5 or 12.	✳ P&B, Ch. 10 [214-45] Conway, D. and C. Ragsdale, "Modeling Optimization Problems in the Unstructured World of Spreadsheets," *Omega* 25.
7	May 14	**Linear Programming / Midterm Exam** ▪ Linear programming in Excel ▪ Application: a production planning problem ➔ Homework 7: ✪ Ch. 11: Ex. 1, 3, 4, 15 ➔ In-class activity: Exam: test of Vensim & Excel skills	✳ P&B, Ch. 11 [246-77]

Session	Date	Topics	Readings and References
8	May 21	**Decision Analysis** ▪ Payoff tables and decision criteria ▪ Decision trees: construction & analysis ▪ Software: *TreePlan* in Excel ➔ Homework 8: ◆ Install TreePlan in Excel ✪ Ch. 14: Ex. 1, 10 (Penzoil-Getty Oil) ➔ In-class activity: Be prepared to discuss the Penzoil-Getty Oil problem.	✳ P&B, Ch. 14 [342-65] Ulvila, J. and R. Brown, "Decision Analysis Comes of Age," *Harvard Business Review*.
9	May 28	**Monte Carlo Simulation I** ▪ Review of basic probability concepts P. 494-04 ▪ The simulation process ▪ Application: business valuation ▪ Application: option pricing ➔ Homework 9: ✪ Ch. 15: Ex. 1, 5 ✪ Prepare a powerpoint presentation about the M.C. simulation process. Use your solution to exercise 1 as an example in your slides. ➔ In-class activity: Be prepared to present your slides to the class.	✳ P&B, Ch. 15 [370-417] P&B, App. 15.1 [423-435] P&B, App. [494-504] Kritzman, M., "What Practitioners Need to Know…About Monte Carlo Simulation," *Financial Analysts Journal*, Nov/Dec 1993.
10	June 4	**Monte Carlo Simulation II** ▪ Selection of parameters for simulation ▪ Selection of probability distributions ▪ Analysis of results ▪ Application: value at risk ➔ Homework 10: ✪ Ch. 15: Ex. 9, 12, 17 ➔ In-class activity: Be prepared to explain results for ex. 12 or 17.	✳ Linsmeier, T. and N. Pearson., "Value At Risk," *Financial Analysts Journal*, Mar/Apr 2000. Martin, R., "How Successful Leaders Think," *Harvard Business Review*, June 2007.
11	June 11	**Project Presentations**	

✪ : Indicates assignments that will be collected and graded.
✳ : Indicates the most important readings for each class.

Links: Academic Calendar ; Final Exam Schedule (TBA)

Important dates:

March 31 (Mon)	Classes Begin
April 6 (Sun)	Last Day to Register, Add/Drop or Change Grading Options
April 24 (Thurs)	University Mission Day
	Classes that meet 4:30 p.m. or later will meet as scheduled
May 9 (Fri)	Last Day to Withdraw
May 12-14 (Mon-Wed)	Advising: Summer 2008
May 12-16 (Mon-Fri)	Advising: Fall 2008
May 14 (Wed)	Advance Registration Begins: Summer 2008
May 19 (Mon)	Advance Registration Begins: Fall 2008
May 26 (Mon)	Memorial Day: No classes
June 9 (Mon)	Last Class Day
June 10-14 (Tues-Sat)	Final Examinations
June 15 (Sun)	Commencement
June 18 (Wed)	Grades posted on SU Online by 6 p.m.