

COURSE OBJECTIVE

Problem analysis and solution using Excel is an essential skill in modern business. In this course students learn how to use five tools (problem modeling, decision analysis, linear programming, simulation, and waiting lines) in Excel to analyze and solve business problems in accounting, finance, human resources, marketing, and operations.

PREREQUISITES

Commerce 2QA3 and registration in any Commerce or Engineering and Management program; or one of Stats 2MB3, 3J04, 3N03 or 3Y03 and registration in any Engineering and Management program.

INSTRUCTOR AND COURSE INFORMATION

Section	C01 (12667)	C02 (12668)	C03 (12669)	C04 (12670)
Class times	TuWeFr 12:30 - 1:20	MoWe 11:30 - 12:20 Fr 1:30-2:20	TuWeFr 9:30 - 10:20	TuWeFr 3:30 - 4:20
Location	BSB-136	MDCL-1105	BSB-135	MDCL-1102

It may not be possible to synchronize lectures across the four sections so students should attend the section in which they are registered. A detailed schedule is given at the end of this course outline. This plan is likely to change somewhat because of circumstances and events during the term.

Instructor	Teaching Assistants
Dr. John Miltenburg, DSB-411 miltenb@mcmaster.ca Telephone: (905) 525-9140 ext. 22014 Office Hours: DSB 411 on We 1:45-3:15 and Fr 10:45-12:15; and in classrooms after class	Office Hours: Thursday 11:00am-5:00pm in DSB 411 Seyed Davod Hosseini, hosses8@mcmaster.ca Sophia Yao, yaol8@mcmaster.ca ? Ozbilge, ozbilgea@mcmaster.ca ? Emanuele, blasiola@mcmaster.ca undergraduate, ?@mcmaster.ca

Questions concerning course material must be posted on the Avenue Discussion board. These questions must not be e-mailed to the instructor or the TAs; these e-mails will not be answered. Questions posted on the Avenue Discussion board can be answered by the instructor or the TAs or other students. **Questions concerning exams and absences** must be discussed in person with the instructor or TAs during office hours or at the end of class times. These questions must not be e-mailed to the instructor or the TAs; these e-mails will not be answered.

COURSE ELEMENTS

Credit value: 3	Leadership: Yes	IT skills: Yes	Global view: Yes
WebCT: Yes	Ethics: Yes	Numeracy: Yes	Written skills: Yes
Participation: Yes	Innovation: Yes	Group work: No	Oral skills: No
Evidence-based: Yes	Experiential: Yes	Final exam: Yes	Guest speaker(s): No

COURSE DESCRIPTION

The course will study the five most widely used quantitative management science tools (problem modeling, linear programming, decision analysis, simulation, and waiting lines) used in business decision problems when conditions are reasonably certain or somewhat uncertain. All five tools are implemented in Excel. The course is taught through lectures, readings, practice problems, and computer work with Excel.

LEARNING OUTCOMES

- Upon completion of this course, students will be able to complete the following:
- Create Excel models of business decision problems in accounting, finance, human resources, marketing, and operations.
 - Formulate linear and integer decision problems. Use Excel Solver to solve these problems, perform sensitivity analyses, and determine the marginal value of the resources used.
 - Analyze business decision problems under uncertainty and risk using payoff tables and decision-tree models in Excel. Use utility functions to account for risk preferences.
 - Use Excel to model and analyze processes using simulation and waiting line/queuing models.

REQUIRED COURSE MATERIALS

Textbook (required): Balakrishnan, Render, B., Stair, R.M., Managerial Decision Modeling with Spreadsheets, Third edition, Pearson/Prentice Hall (2013). Any new book, used book, electronic book, etc. can be used. Different editions of the book should not be used. The (optional) textbook website is: http://wps.prenhall.com/bp_balakrishnan_mdms_3/

Course Website: <http://avenue.mcmaster.ca>

Software: 1. Excel: For PC's: Excel 2010, 2013 or 2016. For Mac's: Excel 2011 or 2016.

2. Excel Solver add-in and Excel Data Analysis add-in: Available in Excel on PC's and Mac's.

3. TreePlan: Excel add-in for building and analyzing decision trees. Available online.*

4. SimQuick: Excel add-in for building and analyzing simulation models. Available online.*

5. Queuing Model templates: 4 Excel templates for analyzing queuing problems. Available on Avenue.*

* Avenue > Content > Excel tutorial, software

PC users: All software runs on a PC. First completely update Microsoft Office. Then completely update Excel.

Mac users: First completely update Microsoft Office if you have it. **Then completely update Excel. If Excel is not completely updated the add-ins and templates may not work.**

Lecture Notes and Podcasts: Detailed lectures notes are posted on Avenue. All lectures are recorded and available (in m4v format) on Avenue for streaming or for download. Students can access this material at any time. This will help students who miss a lecture or want to review material from a previous lecture.

Practice Problems: There are no hand-in assignments. Practice Problems for self-study are assigned (see Schedule below). Additional problems may be assigned during the course. All Practice Problems and solutions are posted on Avenue.

EVALUATION

	Marks	Tentative Dates and Times
Quizzes	10	5 on-line on-Avenue quizzes; Sun. 12 noon to Mon. 12 noon; see schedule below
Exam 1	28	Sat. Feb. 11, 3 hours, 8:30 to 11:30; on-line on-Avenue exam
Exam 2	28	Sat. Mar. 25, 3 hours, 12:00 to 3:00; on-line on-Avenue exam
Final Exam (Cumulative)	34	2 hours*; regular written exam; day and time to be announced * there will be an additional one-hour on-line on-Avenue computer exam (immediately before the Final Exam) for students who miss Exam 1 or Exam 2 with an MSAF.
Total	100	

Quizzes: Five Quizzes help students keep up with their studies and prepare for the exams. At assigned times (see Schedule below) when selected lectures, chapters in the textbook, and practice problems should be complete, students take a 20-minute (approximately), 14-question (approximately), on-line on-Avenue Quiz. Students have 24 hours to complete the Quiz (between 12 noon on Sunday and 12 noon on Monday). Quiz questions are randomly assigned and are based on the textbook, the lecture notes, the lectures, and the practice problems. Questions are descriptive and short calculations. There are practice Quiz questions on Avenue and at the textbook website. Each Quiz question is worth one mark, so each Quiz has 14 marks (approximately). However the maximum mark is 10 (approximately). Students who correctly answer 10 or more questions get 10 out of 10. Students, for example, who correctly answer 8 questions get 8 out of 10. Marks are posted on Avenue. Quizzes are not returned. Students can review their Quiz with a TA during office hours within two weeks of the quiz marks being posted on Avenue. If a student misses a Quiz or receives a mark of zero on a Quiz, then the two marks for the Quiz are automatically added to the Final Exam (no MSAF is needed for a missed Quiz). In the Quizzes (and on the Exam 1 and Exam 2 below) students cannot 'go back'. This means students must answer the question when it appears on the computer screen; when students move to the next question they cannot return to a previous question to check their work or answer the question later. This is done to discourage students from sharing their answers.

Exams: There are three exams (see Schedule below). Exams 1 and 2 are on-line on-Avenue and can be done off-campus (e.g. at home) or on-campus (e.g. in a library or university computer lab). The Final Exam is a regular written exam scheduled and managed by the university in the same way as most other final exams.

Exam 1 and Exam 2: Exam 1 and Exam 2 cover material in the first-half and second-half of the course. Exam 1 and Exam 2 can be completed off-campus (e.g. from home) or on-campus (e.g. in a library or university computer lab). Students must work individually, not in groups. Answers are checked carefully to make sure students work individually. Students can use their textbook, notes, computer, computer files, and calculator. Each exam has several parts: e.g. randomly assigned descriptive questions, randomly assigned calculation questions, randomly assigned Excel worksheet questions. Exam 1 and Exam 2 (like the five Quizzes above) are set up so that students cannot 'go back' to previous questions. This means students must answer the question when it appears on the computer screen; when students move to the next question they cannot return to a previous question to check their work or answer the question later. This is done to discourage students from

sharing their answers. Students must use their own computer or a university computer in a library, computer lab (i.e. KTH, BSB, JHE), etc. Students must install the course software on their computer before the exam. A student's computer must have excellent internet access in order to quickly and easily access Avenue to download questions and data, and upload answers to Avenue dropboxes. If students have poor internet access from home, then they should write these exams on-campus. No extra time, help or marks will be given because of problems with computers, software, or internet access.

Final Exam: The Final Exam covers all the material in the course. The Final Exam is a regular written exam scheduled and managed by the university in the same way as final exams in most other courses. Students can prepare and use a one-page, two-sided crib sheet during the Final Exam. The crib sheet must be handed in at the end of the Final Exam. There are no restrictions on what can be put on the crib sheet (e.g. typed, hand-written, tables, Excel screenshots, etc. are all okay). Students can use a McMaster standard calculator during the Final Exam. See the McMaster calculator policy at: www.mcmaster.ca/policy/Students-AcademicStudies/UndergraduateExaminationsPolicy.pdf

Any student who misses Exam 1 or Exam 2 and has a valid MSAF (see p. 4 below) will (i) have the marks for the missed Exam added to the Final Exam, and (ii) have an additional one hour computer exam covering the missed computer material from Exam 1 or Exam 2. This computer exam will be on-line on-Avenue and begin two hours before the regular Final Exam. Students have one hour to complete this part of the Final Exam and then a one break before the regular Final Exam begins.

Marks: Marks are posted on Avenue. Quizzes and Exams are not returned. Students must first review their Quiz or Exam with a TA during office hours within two weeks of the marks being posted on Avenue. After this is done students can review their Quiz or Exam with the instructor during office hours.

Final Grades: At the end of the course, overall percentage grades are converted as follows to a letter grade.

<u>Percentage</u>	00-49	50-52	53-56	57-59	60-62	63-66	67-69	70-72	73-76	77-79	80-84	85-89	90-100
<u>Letter Grade</u>	F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A	A+

Communication and Feedback

1. Students who are uncomfortable directly approaching an instructor regarding a course concern may send a confidential email to the Operations Management Area Chair, Professor Parlar (parlar@mcmaster.ca) or the Associate Dean (adbusac@mcmaster.ca).
2. Students' e-mails to instructors or TAs must originate from their official McMaster University e-mail account. This protects the confidentiality of information and confirms the identity of the student. E-mails regarding course issues should NOT be sent to the Area Administrative Assistant.
3. If after speaking with the instructor students wish to have a course component (i.e. midterm exam) re-evaluated, then they should complete the following process.
 - Complete the form at http://www.mcmaster.ca/policy/Students-AcademicStudies/Form_A.pdf
 - The component must be worth 10% or more of the final grade in the course
 - Students pay a fee of \$50 in Gilmour Hall #209. The receipt is then brought to Student Experience - Academic Office (formerly the APO) in DSB 112.
 - The Area Chair will seek out an independent adjudicator to re-grade the component.
 - An adjustment to the grade for the component will be made if a grade change of three points or greater on the 12 point scale (equivalent to 10 marks out of 100) has been suggested by the adjudicator as assigned by the Area Chair
 - If a grade change is made, the student fee will be refunded

Academic Dishonesty

Students are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. It is the student's responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at www.mcmaster.ca/academicintegrity. The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

MISSED EXAMS/QUIZZES

1. Students may request relief from a regularly scheduled midterm, test, assignment or other course component in the following ways:

- a) For absences from classes lasting up to three (3) days, or
- b) For absences from classes lasting more than three (3) days, or
- c) For conflicts arising from Student Experience - Academic Office approved events.

1a) For absences from classes lasting up to three (3) days

Students must use the MSAF (McMaster Student Absence Form). This is an on-line, self-reporting tool, for which submission of medical or other types of supporting documentation is normally not required. Students may use this tool to submit a maximum of one (1) request for relief of missed academic work per term as long as the weighting of the component is worth less than 25% of the course weight. Students must follow up with their course instructors regarding the nature of the relief within two days of submitting the form. Failure to do so may negate the opportunity for relief. It is the prerogative of the instructor of the course to determine the appropriate relief for missed term work in his/her course. See * below.

Please visit the following page for more information about MSAF:

http://academiccalendars.romcmaster.ca/content.php?catoid=18&navoid=3204#Requests_for_Relief_for_Missed_Academic_Term_Work

If the value of the component is worth 25% or more, students must report to their Faculty Office (the Student Experience – Academic Office for Commerce students) to discuss their situation and will be required to provide appropriate supporting documentation.

1b) For absences from classes lasting more than three (3) days

Students cannot use the MSAF. They MUST report to their Faculty Office (the Student Experience – Academic Office for Commerce students) to discuss their situation and will be required to provide appropriate supporting documentation.

Students who wish to submit more than one request for relief of missed academic work per term cannot use the MSAF. They must report to the Student Experience – Academic Office and discuss their situation with an academic advisor. They will be required to provide supporting documentation and possibly meet with the Manager.

1c) For conflicts arising from Student Experience – Academic Office approved events

Students unable to write a mid-term at the posted exam time due to the following reasons: religious, work-related (for part-time students only), representing university at an academic or varsity athletic event, conflicts between two overlapping scheduled mid-term exams, or other extenuating circumstances, have the option of applying for special exam arrangements. Please see the DeGroot Missed Course Work Policy for a list of conflicts that qualify for academic accommodation <http://ug.degroot.mcmaster.ca/forms-and-resources/missed-course-work-policy/>

Such requests must be made to the Student Experience – Academic Office at least ten (10) working days before the scheduled exam along with acceptable documentation. Non-Commerce students must submit their documentation to their own Faculty Office and then alert the Student Experience – Academic Office of their interest in an alternate sitting of the midterm.

Adjudication of all requests must be handled by the Student Experience – Academic Office. Instructors cannot allow students to unofficially write make-up exams/tests. The MSAF cannot be used during any final examination period. If a mid-term exam is missed without a valid reason, students will receive a grade of zero (0) for that component.

Students who cannot write a test, and have advanced knowledge and permission as described above, will be given the opportunity to write an alternate version of the test at an alternate time.

Students who did not write a test, and subsequently provide an MSAF submission, or documentation for which they have been approved by the Student Experience – Academic Office, will have the weight of the missed work reallocated across other course components or an alternate evaluation. The student must follow up with the instructor to understand this process and decision. See * below.

*** Relief for missed work:**

In this course the relief for missed work is the following. If a student has a valid MSAF (from 1a) or permission (from 1b or 1c) then:

(i) The marks for the missed work are added to the marks for the Final Exam, and

(ii) If the student misses Exam 1 or Exam 2 then the student's Final Exam will have an additional one hour computer exam covering the missed computer material from Exam 1 or Exam 2. This computer exam will be on-line on-Avenue and begin two hours before the regular Final Exam. Students have one hour to complete this part of the Final Exam and then a one break before the regular Final Exam begins.

Students should not e-mail the instructor. Instead check Avenue > News where an up-to-date list of valid MSAF's and permissions will be maintained. There will be no exceptions to this policy.

STUDENT ACCESSIBILITY SERVICES

Student Accessibility Services (SAS) offers various support services for students with disabilities. Students are required to inform SAS of accommodation needs for course work at the outset of term. Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information, consult McMaster University's Policy for Academic Accommodation of Students with Disabilities; <http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf>

Potential Modifications to the Course

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

Acknowledgement of Course Policies

Your registration and continuous participation (e.g. on Avenue to Learn, in the classroom, etc.) to the various learning activities of Commerce 3QA3 will be considered to be an implicit acknowledgement of the course policies outlined above, or of any other that may be announced during lecture and/or on Avenue to Learn. It is your responsibility to read this course outline, to familiarize yourself with the course policies and to act accordingly.

Lack of awareness of the course policies cannot be invoked at any point during this course for failure to meet them. It is your responsibility to ask for clarification on any policies that you do not understand.

Commerce 3QA3 Course Schedule see Avenue > Content > 0a Course outline, schedule

	A	B	C	D	E	F	G	H	I	J	
1	Commerce 3QA3 Course Schedule - Winter 2017 - prepared in November 2016										
2											
3	Textbook Chapter and description of topic	Lecture/podcast number	Day	Date	Lecture Notes pages	Textbook pages	Practice problems				
4											
5		1	Wed	Jan 4	Course outline, Ch 1 Notes						
6							Ch. 1: Disc. quest. 2,12; Prob. 22,23,24; Solve all these problems using Excel;				
7	Ch 1, App B, Excel tutorial	2	Fri	Jan 6	Ch 1 Notes pp. 1-16	Ch 1, all pages; Excel tutorial	Bill Pritchett Practice Problem on p. 16 of Lecture Notes; Solve using Excel	}	Quiz 1	}	
8		3	Mon/Tue	Jan 9/10							
9		4	Wed	Jan 11							
10											
11		5	Fri	Jan 13	Ch 2 Notes pp. 1-3	Ch 2, pp. 19-40	Ch. 2: Disc. quest. 3,4,7; Prob. 13,17 (graphical solution only)				
12	Ch 2 - LP model, graphical, computer	Quiz 1: Sun. Jan. 15, 12 noon to Mon. Jan. 16, 12 noon									
13		6	Mon/Tue	Jan 16/17	Ch 2 Notes pp. 4-9	Ch 2, pp. 41-56	Ch. 2: Disc. quest. 10,11,12; Prob. 13,17,27,29,43; Solve these problems using Solver in Excel	}	Quiz 2	}	
14		7	Wed	Jan 18	Ch 2 Notes pp. 10-13						
15		8a	Fri	Jan 20	Ch 2 Notes pp. 13-15						
16		8b	Fri	Jan 20	Ch 3,5 Notes pp. 1-2	Ch 3, pp. 65,66,73-81	Ch. 3: Prob. 9,12,13,17; Solve these problems using Solver in Excel				
17	Ch 3,5 - Standard LP problems	Quiz 2: Sun. Jan. 22, 12 noon to Mon. Jan. 23, 12 noon									
18		9	Mon/Tue	Jan 23/24	Ch 3,5 Notes pp. 2-5	Ch 3, pp. 67-73,81-104	Ch. 3: Prob. 3,7,21; Ch. 5: Prob. 17; Solve these problems using Solver in Excel	}	Quiz 3	}	
19		10	Wed	Jan 25	Ch 3,5 Notes pp. 6-9	Ch 5, pp. 165-168					
20	11	Fri	Jan 27	Ch 3,5 Notes pp. 10-15							
21	Ch 4 - LP sensitivity	12	Mon/Tue	Jan 30/31	Ch 4 Notes pp. 1-5	Ch 4, pp. 119-123	Ch. 4: Disc. quest. 8; Prob. 13,21(except i),22,23; Solve these problems using Solver in Excel	}	Exam 1	}	
22		13	Wed	Feb 1	Ch 4 Notes pp. 6-9						
23		14	Fri	Feb 3	Ch 4 Notes pp. 10-16						
24		Quiz 3: Sun. Feb. 5, 12 noon to Feb. 6, 12 noon									
25		15	Mon/Tue	Feb 6/7	Ch 4 Notes pp. 17-22	Ch 4, pp. 138,139	Ch. 4: Disc. quest. 6; Prob. 21(i) solve using Solver in Excel	}	Exam 1	}	
26		16	Wed	Feb 8	Ch 4 Notes pp. 23-29						
27	Ch 6 - Integer LP	17	Fri	Feb 10	Ch 6 Notes pp. 1-5	Ch 6, pp. 211-223	Ch. 6: Disc. quest. 3; Prob. 13,19,37; Solve these problems using Solver in Excel				
28	Exam 1: Sat. Feb. 11, 8:30-11:30 am										
29	Ch 8 - Decision analysis	18	Mon/Tue	Feb 13/14	Ch 8 Notes pp. 1-3	Ch 8, pp. 319-330	Ch. 8: Disc. quest. 4,5,7,8; Prob. 14,15,19,20; Solve all these problems manually and in Excel	}	Quiz 4	}	
30		19	Wed	Feb 15	Ch 8 Notes pp. 1,4-7						
31		20	Fri	Feb 17	Ch 8 Notes pp. 8-10						
32		midterm break - no classes									
33			21	Mon/Tue	Feb 27/28	Ch 8 Notes pp. 11-13	Ch 8, pp. 331-337	Ch. 8: Prob. 26; Also solve using TreePlan in Excel	}	Exam 2	}
34			22	Wed	Mar 1	Ch 8 Notes pp. 14-18					
35		23	Fri	Mar 3	Ch 8 Notes pp. 19-22						
36	Quiz 4: Sun. Mar. 5, 12 noon to Mar. 6, 12 noon										
37		24	Mon/Tue	Mar 6/7	Ch 8 Notes pp. 23-26	Ch 8, pp. 337-355	Ch. 8: Disc. quest. 11; Prob. 27,37,38,39; Solve all these problems using TreePlan in Excel Prob 27 also solve in TreePlan using utility function: $U(X)=1.0-1.0 \times \exp(-X/25,000)$ Prob 39 also solve in TreePlan using utility function: $U(X)=1.0-1.0 \times \exp(-X/1,000)$	}	Quiz 5	}	
38		25	Wed	Mar 8	Ch 8 Notes pp. 27-31						
39		26	Fri	Mar 10	Ch 8 Notes pp. 31-35						
40		27	Mon/Tue	Mar 13/14	Ch 8 Notes pp. 36-48						
41	Ch 10 - Simulation	28	Wed	Mar 15	Ch 10 Notes pp. 1-5	Ch 10, pp. 407-420	Ch. 10: Disc. quest. 10, 13; Prob. 18 (i,ii,iii) as described on p. 11 of Lecture Notes	}	Exam 2	}	
42		29	Fri	Mar 17	Ch 10 Notes pp. 6-11						
43	Quiz 5: Sun. Mar. 19, 12 noon to Mar. 20, 12 noon										
44		30	Mon/Tue	Mar 20/21	Ch 10 Notes pp. 12-15	Ch 10, pp. 421-438	Ch 10: Prob. 18 (iv,v) as described on p. 11 of Lecture Notes Prob 23, 30; For each simulation do N=200 replications	}	Exam 2	}	
45		31	Wed	Mar 22	Ch 10 Notes pp. 16-21						
46		32	Fri	Mar 24	Ch 10 Notes pp. 22-25						
47	Exam 2: Sat. Mar. 25, 12:00 noon to 3:00 pm										
48		33	Mon/Tue	Mar 27/28	Ch 10 Notes pp. 26-29	SimQuick	SimQuick: Exercise 1b as described on p. 34 of Lecture Notes	}	Exam 2	}	
49		34	Wed	Mar 29	Ch 10 Notes pp. 30-34						
50	Ch 9 - Queuing	35,36	Fri	Mar 31	Ch 9 Notes pp. 1-6	none	none	}	Exam 2	}	
51		37	Mon/Tue	Apr 3/4	Ch 9 Notes pp. 7-9	Ch 9, pp. 367-398	Ch. 9: Disc. quest. 2,3,4; Prob. 13,22,23,27(use $\lambda=100$),28,29,30,33; Solve all these problems in Excel using the Queuing templates				
52		38	Wed	Apr 5	Ch 9 Notes pp. 10-17						
53	Final Exam: Day and time will be set by the University										