Course Overview and Learning Outcomes

The nature of businesses in the modern world requires all of us to continually make decisions and solve problems with the goal of increasing opportunities for the organizations for which we work. But making good decisions is rarely an easy task. The problems faced by decision makers in today's competitive, data-intensive, fast-paced business environment are often extremely complex and can be addressed by numerous possible courses of action. Evaluating these alternatives and choosing the best course of action represents the essence of decision analysis.

The aim of this course is to introduce management science techniques for informed decision-making that can be applied in spreadsheet models to assist in the decision-analysis process. For our purposes, we will define business analytics as a field of study that uses data, computers, statistics, and mathematics to solve business problems. It involves using the methods and tools of science to drive business decision-making. It is the science of making better decisions.

Topics covered will include optimization models and its applications in workforce scheduling, manufacturing, network design, facility locations, sensitivity analysis, decision trees, and business simulation models. The spreadsheet is much more accessible to managers today. Consequently, spreadsheets have become indispensable tools of modern business analysis. In this course, we will use spreadsheets extensively to solve problems during the semester. However, if you are unable to model the problem, the tool (spreadsheet) will not be helpful.

After successfully completing this course you will be able to:
- Recognize management problems that can be addressed with models.
- Differentiate types of modeling tools most suitable to a given situation.
- Apply various techniques from the field of business analytics to selected models.
- Create and solve models using Excel Solver.
- Conclude on the best solution options for management problems.

Dr. M. Gisela Bardossy
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Class Meets
Mondays & Wednesdays
0506 Section
  3:30pm to 4:45pm
  VMH 1303
0507 Section
  9:30am to 10:45pm
  VMH1528

Office Hours
VMH 4350 (or Zoom)
by appointment here.

Teaching Assistants
TBA

Prerequisites
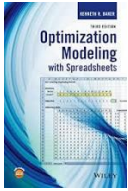Proficiency with:
- Algebra
- Statistics
- Spreadsheets

Course Communication
Time-sensitive information will be sent out using Canvas announcement feature. The best way to contact me is via Canvas Inbox. Please check these tips on writing professional emails (ter.ps/email).

Required Resources

Course website: **elms.umd.edu**

Optimization Modeling with Spreadsheets, 3rd Edition, Kenneth R. Baker.
ISBN:978-1-118-93773-0, June 2015

MS Excel and Excel Solver, available with Excel
@Risk, available in vSmith. (Only for Simulation.)
Solver Table, available at https://kelley.iu.edu/albrightbooks/Free_downloads.htm

Activities, Learning Assessments & Expectations for Students

The course combines various activities to enhance your learning.

- Class Participation (via Clicker): Students engagement during live sessions is necessary for enriching the learning experience. Students will be asked to provide input, answers, comments via Clicker during each class meeting.

- Quizzes: There are periodic quizzes aligned with each major topic in the course. The quizzes will take place before the last day designated for the topic. They will combine general conceptual questions about the topic and overall questions about the upcoming individual assignment.

- Practice Problems (aka Individual Assignments): Students will work on practice problems. The hands-on nature of the course content requires diligent practice with techniques in a multitude of situations. Besides the problems assigned, students are encouraged to complete as many additional problems as possible from the end of each chapter. Practice problems are individual assignments and all work submitted must be authored by the student. Students are allowed to consult the textbook, and class notes. Classmates are ONLY allowed to discuss problems, brainstorm ideas, and troubleshoot issues, if it is a balanced endeavor. Nobody is allowed to touch your computer while working on assignments! No sharing of files is allowed, neither the use of websites such as CourseHero.

- Team Assignment: Each team will be assigned a paper to read and to present. The paper will come from Interfaces, an academic journal that specializes in industry applications (every submitted paper to this journal must be accompanied by a letter from a company certifying that the research generated significant business value). The paper will give you an understanding of the applications of Decision Analytics in the real world including an appreciation for data challenges, business quantifications. A typical presentation includes 15-20 slides and lasts around 20-25 minutes (plus 10-15 minutes for questions and audience participation). A sample presentation deck will be published for reference.

- Midterm and Final Exam: These exams are take-home, summative assessments. Details on the scope/format of the exams will be provided during the course.

Grades

Grades are not given, but earned. Your grade is determined by your performance on the learning assessments in the course and is assigned individually (not curved). If earning a particular grade is important to you, please speak with me at the beginning of the semester so that I can offer some helpful suggestions for achieving your goal.

All assessment scores will be posted on the course ELMS page. If you would like to review any of your grades (including the exams), or have questions about how something was scored, please email me to schedule a time for us to meet in my office.

Late work will not be accepted for course credit so please plan to have it submitted well before the scheduled deadline. I am happy to discuss any of your grades with you, and if I have made a mistake I will immediately correct it. Any formal grade disputes must be submitted in writing and within one week of receiving the grade.

Learning Assessments	Weight
Class Participation (Clicker): in-class engagement	10%
Quizzes (Q): conceptual and application questions	10%
Individual Assignments (IA): application and model building problems	30%
Team Assignment (TA): paper review and presentation	10%
Midterm Exam (ME): in-class summative assessment	20%
Final Exam (FE): in-class summative cumulative assessment	20%

Final letter grades are assigned based on the percentage of total assessment points earned. To be fair to everyone I have to establish clear standards and apply them consistently, so please understand that being close to a cutoff is not the same thing as making the cut ($89.99 \neq 90.00$). It would be unethical to make exceptions for some and not others.

Final Grade Cutoffs									
+	97.00%	+	87.00%	+	77.00%	+	67.00%		
A	94.00%	B	84.00%	C	74.00%	D	64.00%	F	<60.0%
-	90.00%	-	80.00%	-	70.00%	-	60.00%		

Tips for Success

Attendance
Avoid missing class meetings – given the cumulative nature of most sessions, it is usually impossible to adequately make up a missed session. Regular attendance and participation in this class is the best way to grasp the concepts. However, in the event that a class must be missed due to an illness, please let me know via email in advance of the class (or as soon as it is possible) and make arrangements to complete

the assignments on time. If you need to miss multiple classes or any assignment due to illness, documentation signed by a healthcare professional is required to arrange for alternative assignments.

The University's policy on religious observances and classroom assignments and exams states that students should not be penalized for participation in religious observances and that, whenever feasible, they should be allowed to make up academic assignments that are missed due to such absences. Please let me know during the first week of class, if there is any time conflict with any of the scheduled application days and exams. In general, practice problems and quizzes are open during multiple days, so please establish your own deadline (ahead of the given deadline) so they don't interfere with religious observances.

Students are responsible for notifying the instructor of projected absences within the first two weeks of the term. In case of inclement weather, official University closures and delays will be available on the campus website at umd.edu and snow phone line (301-405-SNOW), as well as on local radio and TV stations.

Complete the readings on time
Complete the assigned reading prior to class. Otherwise, the pace of the class will seem too fast or you may find yourself overwhelmed. To provide an additional incentive, there will be periodic quizzes/class questions on the readings – not so much deep understanding of them, but evidence that you have read the material, know definitions and key areas covered, and other information that can easily be obtained by READING and thinking about the assigned pages.

Solving Problems
Reading the textbook and listening in class is necessary but not sufficient to be successful. To truly master the concepts (and software) it is essential to solve as many problems as possible on your own – the textbook has many problems at the end of each chapter. I strongly recommend that you do MORE problems than those assigned. Periodically I will suggest some problems from the text to try (that will not be graded directly, but indirectly prompt questions.) I will post solutions in a few days along with feedback based on the indirect assessment. Certainly, work through all examples in the text sections assigned, creating the spreadsheets yourself, deciding (as much as possible without referring back to the text what numbers to enter), and running the models and procedures yourself.

Be proactive
Form a study group. Ask questions and seek clarification when necessary. Attend office hours and schedule a meeting with the instructor and TA as necessary.

Communication
The best ways to communicate with me are via Canvas Inbox and during office hours (location and times shown above). If you e-mail me during the week, please allow 24 hours for a response. If you e-mail over the weekend, I will respond as soon as possible but most likely the next work day. If you do not hear back from me given these conditions, please e-mail me again with a kind reminder. Please include in the subject line the course code BUDT732

Campus Policies

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations

- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit www.ugst.umd.edu/courserelatedpolicies.html for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

Academic Integrity
The University's *Code of Academic Integrity* is designed to ensure that the principles of academic honesty and integrity are upheld. All students are expected to adhere to this Code. The Smith School does not tolerate academic dishonesty. All acts of academic dishonesty will be dealt with in accordance with the provisions of this code. Please visit the following website for more information on the University's Code of Academic Integrity: http://www.president.umd.edu/policies/iii100a.html

Academic dishonesty (see code above for definition) is not condoned or allowed in any way. In this course, the minimum penalty for giving or receiving unauthorized assistance is a zero on the assignment. Please note that sharing or letting others copy your work is giving unauthorized assistance and an act of academic dishonesty.

Tentative Course Schedule

Date	Date	Reading	Topic
8/30/2021	MO	Ch. 1	Intro to Optimization
9/1/2021	WE	Ch. 2	Linear Optimization
9/6/2021	MO		*Labor Day (no class)*
9/8/2021	WE	Ch. 4 and Handout	Linear Optimization and Sensitivity Analysis
9/13/2021	MO	Ch. 4 and Handout	Sentitivity Analysis
9/15/2021	WE	Ch. 3 and Handout	Introduction to Network Models
9/20/2021	MO	Ch. 3 and Handout	Network Models (continued)
9/22/2021	WE	Ch. 3 and Handout	General Network Models
9/27/2021	MO	Ch. 3 and Handout	General Network Models (continued)
9/29/2021	WE	Handout	Introduction to Integer Optimization
10/4/2021	MO	Handout	Integer Optimization (continued)
10/6/2021	WE	Ch. 6 and 7	Integer Optimization (binary decision variables)
10/11/2021	MO		Review for Midterm Exam
10/13/2021	WE		**Midterm Exam (no class meeting)**
10/18/2021	MO		Teams' preparation for presentation (no class meeting)
10/20/2021	WE		Teams presentations
10/25/2021	MO	Handout	Industrial Solvers for Optimization
10/27/2021	WE	Handout	Industrial Solvers for Optimization
11/1/2021	MO	Ch. 8	Introduction to Non-Linear Optimization
11/3/2021	WE	Ch. 8	Non-Linear Optimization
11/8/2021	MO	Ch. 9	Heuristic Methods in Optimization
11/10/2021	WE	Ch. 9	Heuristic Methods in Optimization
11/15/2021	MO	Handout	Additional Topics in Optimization
11/17/2021	WE	Handout	Additional Topics in Optimization (cont'd)
11/22/2021	MO	Handout	Additional Topics in Optimization (cont'd)
11/24/2021	WE		*Thanksgiving (no class)*
11/29/2021	MO	Handout (AW)	Introduction to Simulation (cont'd)
12/1/2021	WE	Handout (AW)	Introduction to Simulation (cont'd)
12/6/2021	MO	Handout (AW)	Inventory Simulation (cont'd)
12/8/2021	WE		Final Exam Review
TBD			**Final Exam**

Note: This is a tentative schedule, and subject to change as necessary – monitor the course ELMS page for current deadlines. In the unlikely event of a prolonged university closing, or an extended absence from the university, adjustments to the course schedule, deadlines, and assignments will be made based on the duration of the closing and the specific dates missed.

About Your Instructor: Dr. Gisela Bardossy

Dr. Bardossy is a Professor in the Decision, Operations, Information and Technologies Department at the Robert H. Smith School of Business. She is passionate about teaching statistics and quantitative methods for business decision-making. Dr. Bardossy joined the department from the Merrick School of Business, University of Baltimore, where she taught business statistics and operations research to undergraduate and graduate students. She designed Business Analytics courses and played a key role in the development of a Data Analytics specialization for business students. She is committed to student learning and teaching innovation. She is an active member of the Data, Analytics and Statistics Instruction group from the Decision Science Institute, and the Consortium for the Advancement of Undergraduate Statistics Education.

She earned her Ph.D. degree in Management Science from the Smith School of Business at the University of Maryland, College Park. Her research interest is in the application of decision science and the development of optimization methods to a variety of business issues. Most of her research involves linear programming, exact and approximate heuristics, network optimization, and simulation modeling. Her research has appeared in journals such as INFORMS Journal on Computing, Networks, and Discrete Applied Mathematics. She has served as a reviewer for journals such as Computers and Operations Research and European Journal of Operational Research.