**Manhattan College MBAC 617 Decision Modeling with Spreadsheets**

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## *The CIS-BUAN program @ M.C. is a member of*Microsoft’s Imagine Premium*Academic Initiative*

# Course Description

**T**his course formulates and solves problems to assist decision-making within organizations using optimization models. Students will develop the skills and practice the techniques to structure and analyze a wide range of complex business problems to support managerial decision-making in functional business application areas such as finance (e.g., capital budgeting, cash planning, portfolio optimization, valuing options, hedging investments), marketing (e.g., pricing, sales force allocation, planning advertising budgets) and operations (e.g., production planning, workforce scheduling, facility location, project management). Spreadsheets are used to assist in modeling and analysis.

# Learning Outcomes

While many view the tools of management science as important intellectual pursuits in and of themselves, the principal goal of this course is to improve and support decision making through the appropriate *application* of management science principles and practices. With that in mind, we expect that upon completion of this course you will be able to:

1. [Comprehend] Demonstrate knowledge of various modeling and rational data-driven approaches to managerial decision making, including both normative techniques and descriptive models, as well as their potential contributions to organizational effectiveness.
2. [Analyze] Design, construct, validate, and interpret appropriate spreadsheet-based models for the analysis of one-off and recurring managerial decision problems (application, analysis, synthesis).
3. [Evaluate] Utilize post-optimal solution information provided by those models to recommend appropriate actions and to evaluate the sensitivity of those recommendations to changes in environmental assumptions (evaluation).
4. {Communicate] Communicate analytical results to consumers of analytical products effectively.

1. [Develop] Describe the role of the analyst and the analytics process in the decision making context of complex organizations and their environments.

Learning outcomes from this course are strongly coupled with the programming goals of the School of Business:

1. Gain experience in analytical decision making
2. Develop an understanding of leadership
3. Demonstrate an understanding of ethical issues in business
4. Demonstrate an understanding of organizations and the competitive environment
5. Partake in experiential learning for career development

This course will support the attainment of these goals through various classroom, group, and individual activities throughout our time together this semester. Assignments and other evidence of your work and performance in this course directly align with these goals.

# Materials

**Text**

There is one text for this course available at on-line sources such as Amazon.com. .

1. Wayne Winston. 2020. *Data Analysis and Business Modeling (Microsoft Excel 2016)*. Redmond, WA: Microsoft Press. This paperback text is currently available for under $50 USD and as an e-book for immediate delivery to your computer at <https://www.microsoftpressstore.com/store/microsoft-excel-2019-data-analysis-and-business-modeling-9781509305889> . You can download the two part companion files also at this site (after you register your purchase). This book is an excel reference every analyst should possess.
2. William G. Foote 2021. *Notes on Decision Making with Spreadsheets.* These notes will provide the primary readings for the course. They will be issued as the class progresses to ensure that the class pace and direction may be reflected dynamically in the readings.

When reading materials in preparation for class it is essential that you take an active approach. This means that you build the spreadsheets that are being discussed in the notes and reference book and work through them as you read. When a new method is presented, first repeat the example in the book and then try two or three new examples on your own. In live sessions, as we discuss new applications of the methods presented in the notes and the reference book, I will assume you are familiar with the material in the readings. Finally, you should expect to return to the notes and the book after class or while reviewing, in order to refine and consolidate your knowledge. Your required notebook will document your preparation, questions, and successes.

**Articles and Presentations**

From time to time during the course I will assign articles and presentations to highlight concepts, practices, models, and approaches that have worked well for various organizations.

# Student Engagement

“I hear and I forget, I see and I remember, I do and I understand.” - Confucius, 551 B. C.

This course involves abstract thinking, practical decision making in organizational context, and significant interaction with technology and technique. You can expect that the material, content, process, and deliverables will be challenging and at times frustrating for all of us. Because the odds of success improve when you are actively engaged[[1]](#footnote-1), we will employ 3 distinct strategies to help ensure your success in this course:

1. Frequent hands-on assignments and projects related to course modules, to help ensure active learning;
2. Team-based collaborative learning, to foster the exploration of diverse ideas, views, opinions and feedback and to accelerate learning {not required but recommended}; and
3. Individual demonstrations/presentations that explain the set-up and solution of assigned reading questions and problems, intended to create an environment where you share your thinking processes and insights with your classmates (and incidentally practice presentation skills).

A frequently used peer-learning opportunity will employ regular communication and interactions with your peers. For example, the discussion board can be a vehicle for exchanging views, questions, models, issues, and issue resolution across the class. This will allow the entire class learning community to air differences and similarities in approaches, results, and the development of spread sheet models.

# Platform and Software

This course is delivered in a fully remote fashion. That means the course is online. Moodle is the primary platform to integrate the activities, schedules and communications required in the course. Live sessions will be scheduled, and recorded, for one-two hours per week and as needed all on Zoom.

The primary computer software platform will be Excel 2019 with the Solver add-in. The course platform consists of the companion files from Microsoft as well as any file in Moodle. I do not recommend the use of Google Spreadsheets. They often do not support some of the more basic structures of Excel, including the charting object (plots), the pivot table object, and macro recording.

You can access free downloads of spreadsheet software and a connection to remote desktops from this link:

<https://remotely.manhattan.edu/>.

In any case, all workbook submissions must use the Microsoft Excel platform.

# Assessment of Performance

Your grade in this course will depend are your aggregate performance on written homework exercises, two examinations, and your application presentations. These components are described below.

1. Graded Case Study Assignments: 3 worth 20% each or 60% of the final grade.
2. Participation (Discussions and Skill-Building Activities): 20% of the final grade.
3. Overall assessment: Final Case and Presentation: 20% of the final grade

**Graded assignments** (evaluative grade: 60%): Each student will be responsible for completing three (3) case assignments These exercises are designed to help you master decision context, data collection, analysis formulation, spreadsheet setup, problem solution and interpretation, and the lucid presentation of your recommendations to a managerial audience. Feel free to complete this assignment as a group. However, for each assignment, each of you are responsible to upload one copy of your case solution(s) / report in a supporting spreadsheet as appropriate by the date posted in the LMS. The first page of the report should show the name of each team member and the title of the assignment. Typically, a report will consist of responses to a set of questions which represent the analytical product for each case. A good solution will provide a well-organized, clearly-written, and well-supported answer for each question. I will assess your case reports and return them to you within one week. I reserve the right to incentivize you to respond to comments and answer questions I pose to you to complete your assignments.

**Note:** On occasion, an illness or a personal emergency may preclude you from turning in an assignment on time. In cases of extenuating circumstances, please work directly with me to manage the situation. To help avoid a late submission, I encourage to develop a support group, or team, of up to three students. You are always responsible to submit your own work into the LMS on time and in full.

**Participation (**formative grade: 20%**)** There will be several activities including maintenance of a current notebook of your work, spreadsheet construction, brief discussions on concepts and issues, skill-building reading exercises, final project case selections, and other formative activities in each class throughout this short 7 week semester. There is no practical way to make up for these activities. These frequent activities are also a measure of your active attendance and participation. If for reasons beyond your control you cannot participate it is your responsibility to alert me in a timely manner so I can help you manage the situation you face. Other possible contributions include responding to direct questions, presenting skill builder solutions, one-on-one office hours, etc.

**Note:** Most professionals maintain a hand-written notebook for personal reference and to recall and to reflect on content, participants, and outcomes of meetings, both virtual and in person. The online lectures, exercises and skill-building reading questions are such meetings. During office hours I may inquire about your notebook and if it is current and reflective of the online material. You may use your notebook to scribe information gleaned from the online discussion, your own reading and reflection outside of class, and discussions with your teammates.

**Overall assessment** (evaluative 20%): A comprehensive case analysis and presentation will cap the course work. You may choose one of several cases or devise your own based on your interests, background, and experience.

**Grades are A-F using the following scale: A: >95%, A- >=90%, < 95%; B+: <90%, >=85%; B: <85%, >=80%; C+: <80%, >=75%; C: <75%, >=70%; D: <70%, >=65%; F: <65%, > 60%.**

# students with Disabilities

If you feel that you are a student who may need academic accommodations due to a disability, then you should immediately register with the Director of the Specialized Resource Center (SRC). The SRC at Manhattan College authorizes special accommodations for students with disabilities. If you have a documented disability and you wish to discuss academic accommodations, please contact the me within the first week of class.

# Academic Integrity Policy and Analyst conduct

The Manhattan College Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the Policy and know that it is their responsibility to learn about instructor and general academic expectations with regard to proper collection, usage, and citation of sources in written work. The policy also governs the integrity of work submitted in exams and assignments as well as the veracity of signatures on attendance sheets and other verifications of participation in class activities. For more information and the complete policy, see the Manhattan College Catalog.

Here is an example compilation of guidelines for analyst conduct[[2]](#footnote-2) that follow an analytical cycle of activities we will regularly refer to in the course. To the extent possible we will apply these guidelines to our own work together.

1. Planning and Direction
   1. Ensure targeting and collection priorities are proportional to the organization’s interests at stake.
   2. Use organizational guidance considering potential outliers and anomalies.
   3. Consider the least intrusive methods first. Open source should be your first resource.
   4. Recommend that resources be used wisely and anticipate potential consequences in allocating collection requirements.
   5. Be objective in developing collection requirements.
2. Collection
   1. Provide honest and timely feedback to the collector.
   2. Act responsibly. Do not collect just to collect, collect within the scope of your mission.
   3. Take care to describe the source properly-be diligent and objective in the source description.
   4. Protect sources and methods.
   5. Appropriately scale collection to the immediacy and severity of the threat or opportunity.
3. Analysis
   1. Avoid abuse of access to information.
   2. Recommend but do not direct.
   3. Trust but verify-seek the truth, evaluate information, and do your best to corroborate information with other sources; however, do not immediately distrust single-source information.
   4. Maintain objectivity and avoid politicization.
   5. Always use alternative analysis and consider the widest possible range of hypotheses.
   6. Do not misrepresent or overinflate estimates and results in your analysis.
   7. Do not make policy decisions
   8. As an analyst, your job includes providing feedback to collectors, accurate and timely results to producers, and support for decision makers
4. Production
   1. Be cognizant of the weight that analytical products carry; understand that assessments have influence over policy and decisions, allocations of resources, deployment of resources, and strategic choices and tactical implementation and continuous improvement of strategy.
   2. Coordinate with the widest possible range of experts before disseminating analytical products.
   3. Strive to find a balance between quality and timeliness in production - an on-time C product is worth far more than an A product that is too late.
5. Dissemination
   1. Speak truth to power -- give the decision maker accurate information rather than what he or she wants to hear.
   2. Don't stovepipe -- disseminate to the widest possible audience; when in doubt about sharing or disseminating information, seek guidance.
   3. Always follow your organization's guidelines for appropriate dissemination and release of information.

# Weekly course Schedule

The course schedule is on Moodle. Here is a summary of the weekly topics.

| **Week** | **Topic** |
| --- | --- |
| Week 1 | Spreadsheet engineering I: Building simple decomposition models |
| Week 2 | Spreadsheet engineering II: Multi-variable sensitivity analysis |
| Week 3 | Optimization I: archetypal linear programming decision models |
| Week 4 | Optimization II: Multi-period planning and portfolio selection |
| Week 5 | Simulation I: Uni- and bi-variate simulation of a loyalty model |
| Week 6 | Simulation II: A multi-variate cyber risk model |
| Week 7 | Compendium: Final case preparation and presentation |

1. Educators and cognitive psychologists generally agree that learning in higher education is proportional to the *level of student engagement*. Experiments in cognitive psychology have shown that students who are *actively engaged* with their learning are more likely than passive learners to recall and demonstrate their understanding of a topic. Social learning experiences such as *peer teaching* have been found to be particularly effective in developing higher-order thinking, leadership, communication, and problem solving skills and techniques. Educational research shows that students who participate in *collaborative, problem-focused learning groups* often perceive a more meaningful learning experience. Finally, group projects, particularly those that promote *group construction of knowledge*, allow students to observe their peer’s models of successful learning and encourage them to emulate those approaches. [↑](#footnote-ref-1)
2. Based on the Ethical Intelligence Cycle in Christopher E. Bailey and Major Susan M. Galich, “Codes of Ethics: The Intelligence Community,“ *International Journal of Intelligence Ethics*, Vol. 3, No.2 ( FaIl/Winter 2012). [↑](#footnote-ref-2)