QMBE 1320: Quantitative Analysis and Data Management

COURSE SYLLABUS

Organizations have more data than ever before. While automated systems can store and categorize incoming data, well-educated individuals must apply analysis and interpretation – converting data into information – and successfully communicate findings to non-technical audiences.

Building on statistics, this course will develop knowledge of mathematical models and quantitative skills, useful for analysis-driven decision-making in business and management. To complement knowledge of models and analytical techniques, we will also focus on the use of technological tools (e.g., Microsoft Excel and Access) useful in data analysis.

As the first of a set of Hamline courses in Business Analytics, this class will provide a foundation of useful knowledge and skills, whether you become an analyst or are more broadly involved in organizational decision-making.

Instructor

Dr. Stacie Bosley (Assistant Professor, Economics)
Office: 237W Giddens/Alumni Learning Center
Phone: 651-523-2436
Email: sbosley@hamline.edu **preferred method of contact**

Office Hours

I encourage you to visit me to discuss any questions you might have. If these office hours conflict with your schedule, please communicate with me personally to schedule an appointment outside of these times.

Mondays	11:30-12:30
Wednesdays	8:30-10:00
Fridays	8:30-10:00 and 11:30-12:30
or by appointment	

Required Materials

- ***Essentials of Business Analytics*** *(2015),* Camm, Cochran, Fry, Ohlmann, Anderson, Sweeney and Williams, 1st edition. US edition only (ISBN-9781285187273)
- **Basic calculator** that includes square roots, exponents, and logarithms. You may prefer to use a statistical/mathematical/graphing calculator but it is not required. Calculators on mobile devices will not be allowed for exams and calculators cannot be shared between students during exam periods.
- Microsoft Excel and Microsoft Access **software** - note that all Hamline lab computers are equipped with the software needed so you are not required to have a personal laptop. If you have a Mac, please note that I am not a Mac-user so I encourage you to utilize the lab PCs or be sure you can perform analysis required on your personal computer. Lab exams will be performed on PCs in DSC 2.

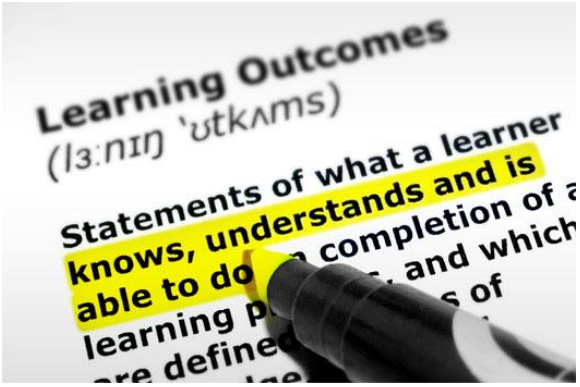
Course Topics (for specific order of topics, see daily schedule)	**Chapter/Resource**
Introduction to Model Development; Profit and Break-Even Analysis	Chapter 1
Time Value of Money (NPV and IRR)	Instructor Provided
Descriptive Statistics	Chapter 2
Data Visualization	Chapter 3
Linear Regression	Chapter 4
Time Series Forecasting	Chapter 5
Spreadsheet Modeling	Chapter 7
Linear Optimization Models	Chapter 8
Nonlinear Optimization	Chapter 10
Simulations	Chapter 11
Decisions under Uncertainty & Risk	Chapter 12
Data Management with Access	Instructor Provided and Appendix B
Additional Topics: Macros	Instructor Provided

Preparation for Class Sessions:

- Our class sessions will build on short **pre-class videos posted on Blackboard**. Before each class session (unless otherwise announced):
  (1) **view** the short video designed to prepare you for the upcoming class session posted on Bb under Content/Video Collection/Pre-Class Videos,
  (2) **read** the designated textbook sections, and
  (3) **respond** to a pre-class quiz in Blackboard.
- The pre-class video not a replacement for reading. The quiz can include questions based on the video and/or textbooks reading.
- Each quiz will close at 10:00 am on the day of that class session.

Class Session Protocol:

- Our class sessions will be a combination of problem demonstrations (interactive) and group problem solving.
- Be sure to **bring a calculator** and your **textbook** to **each class**. You are welcome to utilize your laptop/tablet during group problem-solving time, though we will do the vast majority of our computer-based problem solving in our lab sessions each Wednesday.
- Regular **attendance is critical** to learning this material and will be therefore a part of your overall grade. You will be responsible for all material presented in class, and some material will go beyond the coverage of your textbook.
- **Questions during class** are HIGHLY encouraged. I also hope/expect that you will visit office hours. While it is often easiest to discuss this content in person, I also welcome questions via email.
- There will be a **tutor** for this course – be sure to use this valuable resource in the basement of Bush Library! Your course tutor has been selected based on (1) outstanding performance in this course and (2) a desire to work with students on this subject.
- It is your responsibility to obtain notes, handouts, and assignments in the event that class is missed.
- There is a **Blackboard site** for this class. Check Blackboard for handouts that you might have missed as well as videos/problem sets/grades/data files/assignments for the course.
- Check your **Hamline email daily** as I will use this as a way to communicate information to you between class sessions.



Student Learning Outcomes

As part of an ongoing process, the Hamline School of Business is assessing various aspects of student learning to help improve our undergraduate majors, concentrations and minors. If the outcomes for this class are assessed during this semester, this assessment may be done by the course instructor and/or guest faculty. This assessment will not impact your grade for the course. Your grade is calculated based on the grading structure contained in the course syllabus. HSB will not be looking at your individual performance but will instead be analyzing the overall performance of its students, to identify potential program improvements.

Your instructor will provide you with the assessment rubric that will be used to evaluate student work so that you are aware of what is being assessed.

A Hamline graduate will be able to:

- serve, collaborate, and lead in a community
- solve problems in an innovative, integrative, analytical, and ethical way
- work and create understanding across cultural differences locally, nationally, and internationally
- use information and technology competently and responsibly
- communicate effectively in writing and in speaking
- apply theories and methods of a field of expertise
- engage independently and reflectively in lifelong learning

An HSB business undergraduate will be able to:

- write professional documents
- deliver professional formal presentations
- understand core concepts and demonstrate knowledge in accounting, business law, economics, finance, management, marketing and quantitative business analysis
- demonstrate proficiency in using analytical software tools
- use appropriate methodology to analyze and synthesize data

Quantitative Analysis and Data Management – Learning Outcomes *(think of these as Intellectual Promises to you…)*

~Of the University and Business learning outcomes described above, the following are most relevant to this course:

Hamline School of Business graduates will:	A Hamline graduate will be able to:	The learning outcomes for this course are to help you:	Applications and Assessment
Possess strong critical thinking and problem-solving skills.	(I) Solve problems in an innovative, integrative, analytical, and ethical ways. (II) Engage independently and reflectively in lifelong learning.	(I) Problem Solving i. Identify the model(s) and quantitative method(s) appropriate to a given business problem/context, ii. apply those methods and interpret results, and iii. formulate analysis-driven findings or recommendations. (II) Independent and Active Learning Develop a willingness to try new methods and problem-solving approaches, finding appropriate resources and supporting technological tools.	In-class problem solving Graded problem sets Exams (written and lab) Lab sessions
Have the ability to use state of the art technology within their professions. Specifically, students will demonstrate proficiency in using analytical software tools.	Use of information and technology competently and responsibly.	(III) Effectively use appropriate applications in Microsoft Excel (e.g., Data Analysis, Solver, and What-if Analysis, simulations) that assist in business-oriented quantitative analysis. Gain familiarity with MS Access database program at a beginning level.	Lab sessions Graded problem sets (Excel problems) Lab exams
Be effective communicators in professional settings (both in writing and presentational speaking).	Communicate effectively in writing and in speaking.	(IV) Professionally communicate analysis-driven findings/recommendations.	Oral: class participation Written: Problem sets and written exams, electronic communications
Understand concepts and demonstrate knowledge in core areas of their field of study.	Apply theories and methods of a field of expertise.	(V) Demonstrate knowledge of mathematics and corresponding analytical methods, useful in management.	In-class problem solving Graded problem sets Written exams Pre-class quizzes

Hamline Plan Learning Outcomes

The Formal Reasoning (R, *for reasoning*) & Quantitative Reasoning (M, *for math*) Hamline Plan Learning Outcomes apply to this course. While these learning outcomes are woven into the course as a whole, they will be specifically assessed on 4/10/15 (see class schedule). Corresponding rubrics are posted to Blackboard.

Formal Reasoning (R)
Inductive and Deductive Reasoning
Formal Representation
Logic Demonstration

Quantitative Reasoning (M)
Interpretation
Representation
Calculation
Application/Analysis
Assumptions
Communication

Class Schedule (Subject to Change – Please see Blackboard for updated versions)			
Week	**Monday**	**Wednesday**	**Friday**
1		Feb 4 Δ Course Intro & Fermi Problems	Feb 6 Model Development (Ch.1 and 7.1) and Break-Even Analysis
2	Feb 9 Time Value of Money: NPV & IRR	Feb 11 Δ Break-Even & Time Value of Money Lab	Feb 13 Begin Descriptive Statistics (Ch. 2)
3	Feb 16 Continue Descriptive Statistics (Ch. 2)	Feb 18 Δ Descriptive Statistics & Time Value of Money Lab	Feb 20 Begin Simulation (Ch. 11)
4	Feb 23 Continue Simulation (Ch. 11)	Feb 25 Δ Simulation Lab	Feb 27 Begin Linear Regression (Ch. 2.8 and Ch. 4)
5	Mar 2 Continue Linear Regression (Ch. 4)	Mar 4 Δ Regression Lab (Ch. 4)	Mar 6 Begin Forecasting (Ch. 5)
6	Mar 9 Review	Mar 11 Δ ‡ Lab Exam 1	Mar 13 ‡ Written Exam 1
7	Mar 16 Continue Forecasting (Ch. 5)	Mar 18 Δ Forecasting Lab	Mar 20 Wrap up Forecasting
8	Mar 23 Begin Linear Optimization (Ch. 8.1 and 8.2)	Mar 25 Δ Linear Optimization Lab	Mar 27 ∞ No class (conference) – video lecture on Linear Optimization (sections 8.3 & 8.4)
9	Mar 30 ∞	Apr 1 ∞	Apr 3 ∞
10	Apr 6 Group Problems on Linear Optimization	Apr 8 Δ Sensitivity Analysis (8.5)	Apr 10 Assessment Activity for Hamline Plan R & M (Formal and Quantitative Reasoning)
11	Apr 13 MS Access Introduction (Appendix B)	Apr 15 Δ MS Access Lab	Apr 17 Review
12	Apr 20 ‡ Written Exam 2	Apr 22 Δ ‡ ω Lab Exam 2	Apr 24 Decisions under Uncertainty (Ch. 12.1 and 12.2)
13	Apr 27 Decisions under Risk (Ch. 12.3-12.4)	Apr 29 Δ Decision Tree Lab	May 1 Multistage Decision Trees
14	May 4 Using Bayes' Theorem in Decision Trees (Ch. 12.5)	May 6 Δ Intro to Macros	May 8 Data Visualization (Ch. 3)
15	May 11 Review for Lab Exam	May 13 Δ‡ Final Lab Exam	May 15 Review for Written Final

Final Exam: 10:20 section-May 19th (10:00-12:00); 12:40 section-May 19th (2:45-4:45); 1:50 section-May 20th (2:45-4:45)

Δ Lab session in DSC 2 ∞ No class

‡ Exam Day ω Last Day to Withdraw

Assessments

Participation (6%)	Learning Outcomes I, II, & V
Pre-Class Quizzes (6%)	Learning Outcomes V
Problem Sets (20%)	Learning Outcomes I-V
Lab Exam 1 (8%)	Learning Outcome III
Written Exam 1 (12%)	Learning Outcomes I, IV &V
Lab Exam 2 (8%)	Learning Outcome III
Written Exam 2 (12%)	Learning Outcomes I, IV &V
Lab Exam 3 (8%)	Learning Outcome III
Cumulative Written Final (20%)	Learning Outcomes I, IV &V

Participation

Participation includes the following: regular attendance, timely arrival, and participation in in-class problem-solving. You will have two excused absences (for any reason, not required/expected to communicate reason). Attendance requires your presence during the full 60 minute class session. Any absences (outside of those for University-sanctioned events) beyond 2 will reduce participation points by 5 per absence (from a starting 100 points). Other points could be deducted if you are not present and participating in full class sessions. I will be sure to communicate with you if I am concerned about your participation in the course.

Pre-Class Quizzes

A pre-class quiz will be available on Blackboard at least 1.5 days prior to each class session (unless it is announced that there is no quiz for a particular class day). Each quiz will close at 10:00 am on the day of the applicable class and, while answers can be submitted at any time while the quiz is available, correct answers will not be displayed until 10:00 am when all student responses have been submitted. Quizzes will be very short (5 questions or less) and will be based on the pre-class video and any assigned readings. All students will be allowed multiple attempts – remember this is about supporting excellent class preparation so that our time together can be as productive as possible!

Problem Sets

- **Five to six** problem sets will be assigned throughout the term.
- You will have **one week to complete** a problem set after it is announced in class (and posted to Blackboard).
- If a problem set is not turned in at the beginning of the class period it is due, there will be an immediate 20% score reduction. Problem sets will not be accepted after the next class session begins. (For example, if a problem set is due on Friday at 10:20, a 20% reduction is taken if submitted after 10:20 and before Monday's 10:20 class start. No credit will be received if submitted after class start on Monday at 10:20.)
- You are encouraged to work on these problems in **small groups**. It is critical, however, that you individually learn the material represented in the problem sets as the exams will reflect these same concepts/skills.
- Each problem set may include one group problem that is solved in class. If so, it will be announced in advance.
- Some problems will require the use of Microsoft Excel. You can submit these problems in pairs (i.e., two – *but no more than two* - students can turn in one submission for these problems). ***Problems will receive no credit if your output reflects the work of more than two students.***

Exams

The exams include a set of problems/questions that are based on the graded problem sets and in-class problems we have covered (both written problems and Excel-based problems). The final exam will be cumulative. **Make-up exams will only be given in the event of unavoidable circumstances** (e.g., verified illness, participation in intercollegiate athletic or other university-sanctioned activity, jury duty, military service, and religious observances). If the circumstance is known in advance the student must provide, in writing, a note from a responsible university official documenting the reason for absence prior to the exam.

Tutor(s)

I will post information to Bb site regarding tutoring hours for this class as soon as they become available. Stop by the Center for Academic Services in the basement of Bush Library to see a schedule for all tutors available this semester.

Grading Policy

Final letter grades will be assigned using the following scale:

93% and above	A	73-76	C
90-92	A-	70-72	C-
87-89	B+	67-69	D+
83-86	B	63-66	D
80-82	B-	60-62	D-
77-79	C+	59 and below	F

Honor Code

The assumption that academic work is an honest reflection of one's knowledge and skills is fundamental to the integrity of the university and to the value of a Hamline diploma. If students at an institution of higher education develop a reputation for receiving grades based on honest work, GPA's and academic degrees held by all students from that institution are valued more highly. Every person in the university is responsible for adhering to the principles of the Academic Honor Code. Please see Hamline University Undergraduate Honor Code for a complete description of the Honor Code.

Course Evaluation

As a research and learning community, Hamline School of Business is committed to continuous improvement. The faculty strongly encourages students to provide complete and honest feedback for this course. Please take this activity seriously because we depend on your feedback to help us improve so you and your colleagues will benefit. Information on how to complete the evaluation will be provided towards the end of the course.

Disability Services

Students who have documented disabilities that may affect their work in the course and are registered with HU Disability Services should inform the instructor by no later than the end of the second week of the course so that appropriate course adjustments can be made. The sooner you inform your instructor(s) about the need for accommodations the easier it is to make appropriate adjustments in course materials. Please note that appropriate accommodations begin once the instructor(s) have received official notification and will not necessarily be applied retroactively. For more information about university policies and services regarding students with disabilities, please visit http://www.hamline.edu/disabilities/.

Undergraduate Policies

- Statement of Diversity and Inclusion
- Undergraduate Tutoring
- Writing Center
- Inclement Weather Policy

Students are strongly encouraged to consult Hamline University Policies at http://www.hamline.edu/policies/, the Academic Bulletin at http://bulletin.hamline.edu/ and the Center for Academic Services at http://www.hamline.edu/offices/academic-services/ for detailed information regarding the above items.