QNT 2020 – Foundations of Predictive Analytics and Decision Modeling

Fall 2024 (QTRA – In-Person)

Instructor: Golbarg Roghani Araghi
Email: golbarg.roghaniaraghi@baruch.cuny.edu
Section: QTRA
Time: Tue&Thu 7:30 pm – 8:45 pm
Location: Baruch College, room 4-125
Office Hours: Tuesday 6 pm – 7 pm at office 9-290J**, OR** by appointment

Course Description:

Students will develop quantitative reasoning skills necessary for success in business. Proficiency in the foundations of predictive analytics and decision modeling is the central focus. Students will learn to model a wide range of business decisions through case studies, data analysis, spreadsheet modeling, and interpretation of business significance. Students will further develop their statistical thinking skills through the study of predictive modeling for business using multiple regression. Variation, interpretation of models and model output, model building with spreadsheets, and regression assumption checking are stressed. Throughout the course, students will build quantitative literacy skills through writing about analytics, model building, and interpreting quantitative information to understand and use data in managerial decisions.

Course Learning Goals:

Students will be able to do the following upon the completion of this course:

1. Use quantitative reasoning skills needed to interpret data and statistical analyses to solve business problems.
2. Employ statistical methods and multiple linear regression to analyze data and make predictions for business.
3. Design, build, and test quantitative models for business decision-making using spreadsheets and other technologies.
4. Interpret and communicate quantitative and statistical information to make data-informed managerial decisions.

Required Course Materials:

- "Baruch College CONNECT Access Card – Foundation of Predictive Analytics" 3th Edition by Doane and Seward. ISBN-13: 9781264739363. ISBN-10: 1264544928.
- Introduction to Management Science: A Modeling and Case Studies Approach with Spreadsheets, 6th ed. with Connect by Hillier & Hillier (McGraw Hill, 2019), **Chapters 1, 2, 3, 4, and 8 only**.
- Lecture notes and videos, which will be posted regularly on Brightspace.
- STA 2000 refresher. https://stats.proffriedman.net/lecture-notes

McGraw Hill has prepared a custom book for Baruch students. You can select between the two purchase options:

- **Connect with digital access to ebook + looseleaf print: $83.00.** Link to purchase the textbook is LSC BARUCH COLL COMBO POL QNT2020:LL ESS STAT B&E W/MGMT SCI; QNT2020:CONNECT AC (mheducation.com)

- **Connect with digital access to ebook: $73.00.**
  [QNT2020 Faculty: Link can be provided to students once your Connect account for the course is setup on McGraw Hill's Connect site.]

Grading Policy:

(a)	Pre-class LearnSmart Exercises on "CONNECT" (11)	110 pts (10 pts each)
(b)	Pre-exam #1 Assignment on "CONNECT"	110 pts
(c)	Pre-exam #2 Assignment on "CONNECT"	130 pts
(d)	Attendance	50 pts
INDIVIDUAL NON-EXAM TOTAL		*400 pts*
(e)	Predictive Analytics Project	100 pts
(f)	Prescriptive Analytics (Decision Modeling) Project	100 pts
(g)	Team Evaluation	50 pts
TEAMWORK NON-EXAM TOTAL		*250 pts*
(h)	Exam #1 on "CONNECT"	150 pts
(i)	Exam #2 on "CONNECT"	200 pts
EXAMS TOTAL		*350 pts*
TOTAL GRADE FOR THE COURSE		**1000 pts**
(j)	Review LearnSmart Exercises on "CONNECT" (5)	50 pts (10 pts each)
(k)	STA 2000 Review Assignment on "CONNECT"	50 pts
EXTRA CREDIT TOTAL		*100 pts*

Attendance Policy:

Attendance is mandatory in this class. In addition to the rules concerning Baruch College's "Verification of Enrollment" policy, the following scale will determine students' attendance grade:

- Attended fewer than 8 in-person sessions: 0 out of 50 pts.
- Attended more than 8 in-person sessions: 10 pts for each appearance after the 8th appearance up to a maximum of 50 pts.

Withdrawals:

Withdrawals must be done in accordance with Baruch College policies. Please visit http://www.baruch.cuny.edu/registrar/due_dates.htm for important due dates.

Projects:

These are group exercises which will be executed in assigned groups of 5 students. These two modeling projects require use of what students learn during the predictive analytics and the decision modeling parts of the course. Students are expected to make managerial recommendations based on their analyses. Emphasized in the two projects are (a) correct application of modeling techniques, (b) appropriate interpretation of the model results in words that are appropriate for managers or clients, (c) clear, concise, and appropriate written managerial recommendations. Details of the project assignments and grading rubrics will be posted on Brightspace.

After both rounds of the simulation are completed, student will fill out the **"QNT 2020 – Team**

Evaluation Form" and send it to me by e-mail. The form will be posted on Brighspace and will contain further instructions. A deadline to submit the completed form can be found in the **"Tentative Outline and Important Dates"** section of this syllabus.

Zicklin School of Business School BBA Learning Goals Addressed in This Class

The Zicklin School of Business have adopted seven "Learning Goals" for BBA students. The purpose of these goals is to create a common understanding between students, faculty and potential employers of the core objectives for a business education. The goals, together with assessment criteria, can be viewed at:

http://zicklin.baruch.cuny.edu/zk/resources/teaching/aol/undergraduate/bba

The following Zicklin BBA Program Common Educational Learning Goals will be addressed:

- Analytical Skills: Students will possess the analytical and critical thinking skills to evaluate issues faced in business and professional careers.
- Technological Skills: Students will possess the necessary technological skills to analyze problems, develop solutions and convey information.
- Communication Skills (Oral): Students will have the necessary oral communication skills to convey ideas and information effectively and persuasively.
- Communication Skills (Written): Students will have the necessary written communication skills to convey ideas and information effectively and persuasively.
- Civic Awareness and Ethical Decision-making: Students will have the knowledge base and analytical skill to guide them when faced with ethical dilemmas in business. Students will have an awareness of political, civic and public policy issues affecting business.
- Global Awareness: Students will know how differences in perspectives and cultures affect business practices around the world.
- Proficiency in a Single Discipline: Students will possess a deep understanding of and intellectual competence in at least one business discipline.

This course emphasizes the BBA learning goals as follows:

BBA Learning Goal	Significant Part of Course	Moderate Part of Course	Minimal Part of Course	Not Part of Course
Analytical Skills	X			
Technological Skills	X			
Oral Communication			X	
Written Communication		X		
Civic Awareness & Ethical Decision Making			X	
Global Awareness			X	
Proficiency in a Single Discipline		X		

Assurance of Learning:

The course requirements align with learning goals as follows:

Course Requirement	Course Learning Goals	BBA Learning Goals
Connect assignments	• Use quantitative reasoning skills needed to interpret data and statistical analyses to solve business problems. • Employ statistical methods and multiple linear regression to analyze data and make predictions for business. • Interpret and communicate quantitative and statistical information to make data-informed managerial decisions.	• Analytical Skills • Technological Skills • Proficiency in a Single Discipline
Projects	• Use quantitative reasoning skills needed to interpret data and statistical analyses to solve business problems. • Design, build, and test quantitative models for business decision-making using spreadsheets and other technologies. • Employ statistical methods and multiple linear regression to analyze data and make predictions for business. • Interpret and communicate quantitative and statistical information to make data-informed managerial decisions.	• Analytical Skills • Technological Skills • Written Communication • Oral Communication • Civic Awareness and Ethical Decision Making • Global Awareness
Exams	• Use quantitative reasoning skills needed to interpret data and statistical analyses to solve business problems. • Employ statistical methods and multiple linear regression to analyze data and make predictions for business. • Interpret and communicate quantitative and statistical information to make data-informed managerial decisions.	• Analytical Skills • Global Awareness • Proficiency in a Single Discipline • Civic Awareness and Ethical Decision Making

Academic Integrity:

All students in this course are expected to adhere to university standards of academic integrity. Please visit http://www.baruch.cuny.edu/academic/academic_honesty.html for resources that outline your responsibilities in greater detail. Not adhering to these standards has severe consequences.

Posting screenshots of online assignments and/or exams on web sites such as chegg.com, as well as using such material while taking exams are violations of the Baruch College Ethics Code, which will be subject to disciplinary action including suspicion and possibly expulsion.

Students with Disabilities:

Students with disabilities may be eligible for a reasonable accommodation to enable them to participate fully in courses at Baruch. If you feel you may be in need of an accommodation, please contact the staff at the Office of Services for Students with Disabilities, Newman Vertical Campus, Room 2-271, in person or by phone at (646) 312-4590; http://www.baruch.cuny.edu/studentaffairs/ossd/disabilityServices.htm.

Tentative Outline and Important Dates:

In-person meetings 7:30pm - 8:45pm are highlighted in green.

Self-Study: STA 2000 Refreshers.

IMPORTANT: All assignment due dates as well as other important dates are posted below.

WEEK-1

Readings: Syllabus, D&S Chapters 3, 4, 5, 6, 7.

Thu - 8/29/2024

- Syllabus, grading, course objectives.

Self-Study: STA 2000 Refreshers.

- Describing data visually.
- Descriptive statistics.
- Probability.
- Discrete probability distributions.
- Continuous probability distributions.

IMPORTANT: LearnSmart for D&S Chapters 3, 4, 5, 6, 7 are due at 7:30pm on 9/3/2024 (Tue).

IMPORTANT: STA 2000 Review Assignment is due at 7:30pm on 9/3/2024 (Tue).

WEEK-2

Readings: D&S Chapters 8 (up to and including 8.6) and 9 (all subsections).

Tue - 9/3/2024:

- Introduction to analytics: Descriptive, predictive, prescriptive.

Thu - 9/5/2024:

- Sampling distributions and estimation.

WEEK-3

IMPORTANT: LearnSmart for D&S Chapters 8, 9 is due at 7:30pm on 9/12/2024 (Thu).

Readings: D&S Chapter 11 (up to and including 11.2).

Tue – 9/10/2024, Thu – 9/12/2024:

- Hypothesis testing.
- Analysis of variance (ANOVA).

WEEK-4

IMPORTANT: LearnSmart for D&S Chapter 11 is due at 7:30am on 9/19/2024 (Thu).

Readings: D&S Chapters 12 (up to and including 12.8) and 13 (up to and including 13.5).

Tue – 9/17/2024:

- Analysis of variance (ANOVA).

Thu – 9/19/2024:

- Simple regression.

WEEK-5

Tue – 9/24/2024, Thu – 9/26/2024:

- Simple regression.
- Multiple regression

WEEK-6

IMPORTANT: LearnSmart for D&S Chapters 12, 13 are due at 7:30pm on 10/3/2024 (Thu).

Tue – 10/1/2024:

- Multiple regression

Thu – 10/3/2024: No class Scheduled.

WEEK-7

Tue – 10/8/2024

Thu – 10/10/2024:

- Review Session for Exam #1.

IMPORTANT: Pre-Exam #1 Assignment is due at 11:59pm on 10/16/2024 (Wed).

WEEK-8

Tue – 10/15/2024: Classes follow the Monday Schedule
Thu – 10/17/2024:

- EXAM #1: PREDICTIVE ANALYTICS 7:30pm – 8:15pm on CONNECT.
- Covers material from Doane & Seward (D&S) Chapters 8, 9, 11, 12, 13.

WEEK-9

IMPORTANT: LearnSmart for H&H Chapter 1 is due at 7:30pm on 10/24/2024 (Thu).

Readings: H&H Chapter 1 (all subsections).
Tue 10/22/2024, Thu – 10/24/2024:

- Introduction to mathematical modeling.

WEEK-10

IMPORTANT: LearnSmart for H&H Chapter 2 is due at 7:30pm on 10/31/2024 (Thu).

Readings: H&H Chapter 2 (all subsections except 2.4 and 2.6).
Tue – 10/29/2024, Thu – 10/31/2024:

- Linear programming applications.

WEEK-11

IMPORTANT: LearnSmart for H&H Chapter 3 is due at 7:30pm on 11/7/2024 (Thu).

Readings: H&H Chapter 3 (all subsections).
Tue – 11/5/2024, Thu – 11/7/2024:

- Linear programming applications (continued).

IMPORTANT: Project #1 (Predictive Analytics) is due at 11:59pm on 11/12/2024 (Tue)

WEEK-12

IMPORTANT: LearnSmart for H&H Chapter 5 is due at 7:30pm on 11/14/2024 (Thu).

Readings: H&H Chapter 5 (up to and including 5.5 except for 5.4).
Tue – 11/12/2024, Thu – 11/14/2024:

- What-if analysis for linear programming.

WEEK-13

IMPORTANT: LearnSmart for H&H Chapter 7 is due at 7:30pm on 11/21/2024 (Thu).

Readings: H&H Chapter 7 (all subsections except 7.3 and 7.4).
Tue – 11/19/2024, Thu – 11/21/2024:

- Binary (0-1) integer programming.

WEEK-14

Readings: H&H Chapter 8 (up to and including 8.2).
Tue – 11/26/2024:

- Non-linear programming.

Thu – 11/28/2024: *College Closed*

WEEK-15

IMPORTANT: LearnSmart for H&H Chapter 8 is due at 7:30pm on 12/5/2024 (Thu).
Tue – 12/3/2024, Thu – 12/5/2024:

- Non-linear programming.

WEEK-16

Tue – 12/10/2024, Thu – 12/12/2024:

- Review session for Exam #2.

IMPORTANT: Pre-Exam #2 Assignment is due at 11:59pm on 12/16/2024 (Mon).

WEEK-17 (Tue – 12/17/2024)

- EXAM #2: DECISION MODELING 7:30pm-8:30pm on CONNECT.
- Covers material from Hillier & Hillier (H&H) Chapters 1, 2, 3, 5, 7, 8.

IMPORTANT: Project #2 (Perspective Analytics) is due at 11:59 on 12/19/2024 (Thu)