MGMT 316 - Business Research Methods

Course Syllabus

Martin Tuchman School of Management

- Course Code: MGMT 316, Credits: 3.00

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Class Website: Canvas (select MGMT316) for course materials

Office Hours: Webex office by appointment.
Webex Office: Jim Shi Webex Meeting Room (by appointment)

Prerequisites:

MGMT 216 - Business Statistics;
MIS 245 - Management Information Systems.

Catalog Description:

This course covers business research methodologies with an emphasis on data collection/mining and data analysis. It offers the knowledge skills to conduct research in all applicable fields from

the traditional areas of business, such as, marketing, finance, human resources, operations and service management, as well as web-based e-commerce related research applications. Upon completion, students will be able to: (1) understand business research methodologies, (2) conduct business research studies, (3) present the results, analyses and recommendations to management.

Course Learning Outcomes (CLOs):

To demonstrate the application of models in support of decision making in an enterprise, using some of the most commonly used modeling approaches and principles. Upon completion of the course, you should:

- CLO1-Analyze and develop useful business models mathematically
- CLO2-Develop and visualize business problems and models graphically
- CLO3-Use a spreadsheet for analysis
- CLO4-Interpret model results in the context of the business situation, recommend business solutions, and explain in plain language

Textbook: Optional (the following might be helpful reference)

[1] Donald Cooper, Pamela Schindler, *Business Research Methods*,12th edition, McGraw-Hill, ISBN: 0073521507, ISBN-13: 9780073521503

[2] David R. Anderson, Dennis J. Sweeney, Thomas A. Williams, Jeffrey D. Camm, and James J. Cochran, *An Introduction to Management Science: Quantitative Approach* 15th Edition, Cengage Learning; (January 1, 2018), ISBN-10: 133740652X, ISBN-13: 978-1337406529

[3] Christian Albright and Wayne L. Winston, *Spreadsheet* Modeling and Applications: Essentials of Practical Management Science, 1st Ed., South- Western College Pub, 2004, ISBN-10: 0534380328, ISBN-13: 978-0534380328.

Software (Required):

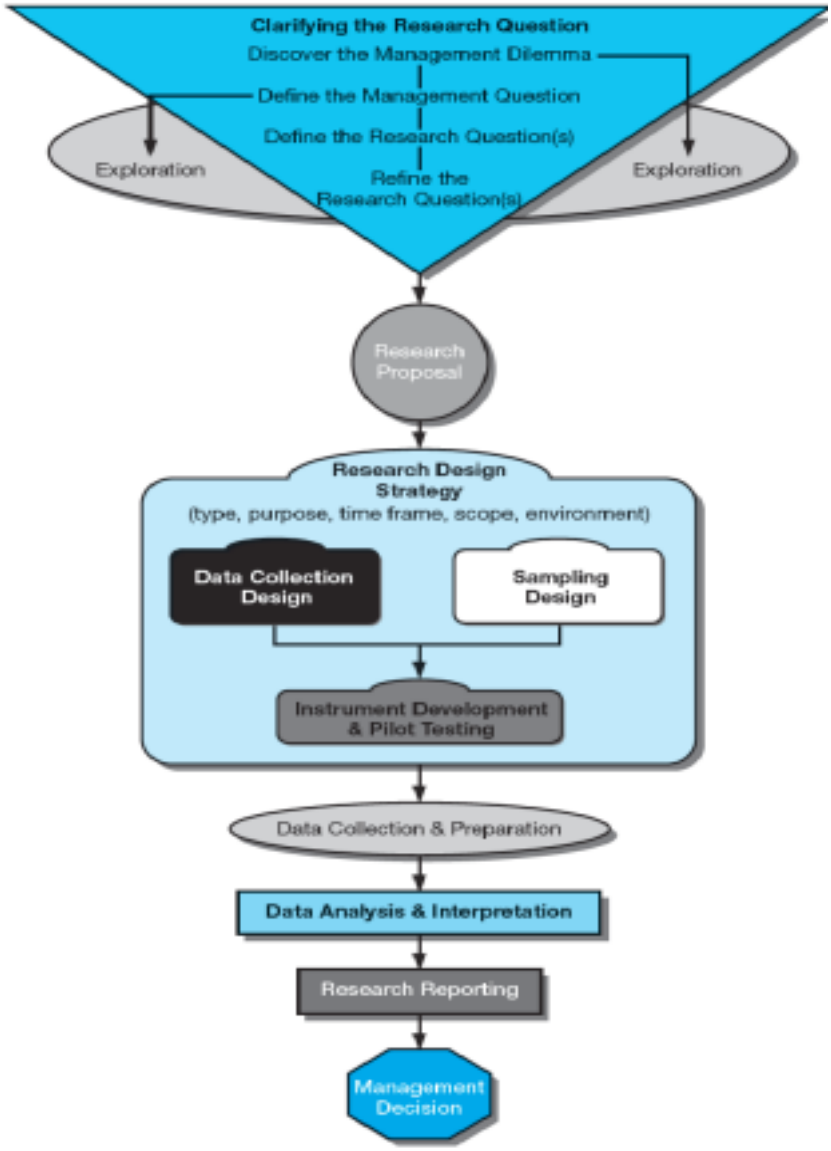
Microsoft Excel	Available as part of Microsoft Office 2019 or Excel 2021, Office 365 and subsequent; Office: Mac 2016 for newer version (Mac OS); Free download at NJIT Software Downloads.
	Please be aware of the differences among versions in features and layout. We shall use Excel 2019, or 2021, or Excel 365 for Windows OS. If needed, please take the advantage of on-campus computers.

Course Scope and Content:

Research is any organized inquiry carried out to provide information for solving problems. This includes reporting, descriptive, explanatory, and predictive studies. Business research is a systematic inquiry that provides information to guide decisions. More specifically, it is a process of determining, acquiring, analyzing and synthesizing, and disseminating relevant data, information, and insights to decision makers in ways that mobilize the organization to take appropriate actions that, in turn, maximize performance. The process of conducting a business research is depicted below in the Exhibit.

This course is focused on the research process and the scientific method. It covers how knowledge is generated, disseminated, and evaluated. We begin with a discussion of the philosophy of science, and then turn to the methods through which scientific theories are tested. These methods involve the use of statistics, and we will cover statistical analyses as applied to hypothesis testing.

Exhibit: General Process of Business Research



This course is designed to build the foundation skills necessary to design, conduct and evaluate business research. Successful completion of the course will provide the knowledge to master three activities that define a doctoral level scholar and/or practitioner:

- Learn a common language and develop values that are required to generate and disseminate business research in a manner consistent with the norms and expectations of a management professional. Remember that you are being educated to become a business analyst or manager, and it is necessary to act and think like one.
- Evaluate the methodological adequacy of empirical studies for yourself, peers seeking feedback, students, and journal editors.
- Design and conduct your own research while appreciating both its value and limitations.

Aligning with the prevailing business research, course content is geared toward emerging analytical methods and advanced analysis of existing methods. To this end, we introduce a variety of data-driven research topics, enriched with real business applications. In particular, this course covers the development, implementation, and utilization of business models for managerial decision making. Various techniques for analytical modeling, such as statistical analysis, forecasting, optimization, simulation, decision analysis, and classification, are discussed. Students gain mastery in developing complex financial models implemented in decision support systems that cover applications in strategic planning, financial management, operations/project management, marketing research, etc.

Course content is at times abstract and at times somewhat technical. This course is typically characterized as "difficult" or "challenging," and to some degree, these characterizations are accurate. There is no reason to approach the course with fear and trembling, and every student has the opportunity to excel. To so, however, requires commitment and dedication. This is not a course where you can let things slide and then "catch up."

Course Mechanics:

Each week we will cover an aspect of the research process. Core reading will be assigned one week in advance and students are required to be conversant with core material. Additional required readings that are relevant to the class will also be announced in advance.

Readings for discussion will also be announced in advance. It is imperative that you be prepared to discuss them in detail and link that discussion to course concepts. Coming to class unprepared (or not all) is not a good strategy for success.

Course Expectations:

This course is organized by weekly modules. Each week, students must watch a lecture video, complete exercises and assignments, and participate in a class discussion forum by **Sunday at 11:55pm**.

I will endeavor to respond to all emails/Inbox messages within a week. Assignments and discussions will be graded weekly.

Specific Course Contents:

Through multiple modules, the student will study the following content:

General Modeling:

- Define basic modeling terms, including (but not limited to) Physical model, Analog model, Symbolic model, Deterministic model, Probabilistic model, Decision Variable, Random Variable, Parameter, Performance measure, Objective function, Revenue, Fixed Cost, Variable Cost, Overhead Cost, Sunk Cost, Demand, Price, etc.

- Explain the modeling process, including model types, data collection, analysis, interpretation
- Analyze a business situation to identify revenues, costs, and other relevant parameters
- Draw an influence diagram to map the relationships between different variables of interest
- Build a basic profit model both with a spreadsheet and without
- Perform Breakeven and Crossover analysis algebraically and graphically, both with a spreadsheet and without, and interpret the results of each

Simulation:

- Compare and contrast simulation with other types of modeling
- Determine when simulation is an appropriate technique to use
- Use random numbers from a random number table or a spreadsheet function
- Apply simulation techniques to machine break-down, queuing, and inventory problems
- Graph and interpret the results of the simulations

Optimization (LP and NLP):

- Simple linear optimization models: objective function and constraints
- Use Solver to solve real business problems, e.g., maximizing profit or minimizing cost
- Sensitivity analysis for managerial insights, generating report by Solver
- Network optimization applications
- Non-Linear Programming Model applications
- Advanced business applications of Non-Linear Programming Model
- Real projects of business applications

Final Grade:

The final grade will be assessed based on the weighted sum as follows.

Grading Criteria	Weighted Percentage
Competency Exercise (Excel Spreadsheet Analysis)	5%
Projects- 3 Projects (15% each)	45%
Reflective Exercises-Weekly practice exercises with examples	10%
Discussion Forums-Weekly responses to prompts	10%
Weekly Assignments 6 Assignments (5% each)	30%
Total	**100%**

I will deliver feedback on each assignment using the comments feature in

Canvas. Please note that NJIT recommended grading scheme is as follows:

A:	for Superior performance (90% or higher)
B+:	for excellent performance (87 to 89.99%)
B:	for very good performance (82 to 86.99%)
C+:	for acceptable performance (76 to 81.99%)
C:	for fair performance (70 to 75.99%)
D:	for minimal performance (65 to 69.99%)
F:	Otherwise.

Professional and personal circumstances that preclude you from performing at satisfactory levels will not be considered in the determination of the course grade. The effect of your grade on overall GPA, eligibility for graduation, loss of scholarship, loss of a United States resident card, placement on academic probation, etc., are *not* considered in the determination of your grade. There are no extra credit assignments. Individual requests for alternative ways to improve your course grade will not be considered.

There will be no makeup, nor extra work for extra credit. So please make all your effort to attend the scheduled commitments. Your final grade is not subject to negotiation. After all the lectures, **please do not ask for extra work for extra credit**.

Individual Student Projects:

Individual class projects will be discussed in class. These are ***not*** group projects! Projects are to be submitted online to Canvas by each student by the designated date, including data output and formulas. Please make sure the uploaded document is properly reviewable.

Late projects will be penalized at a rate of 5% per calendar day. In addition, once the deadline has passed, no further feedback will be given. Students submitting spreadsheets that are not unique will receive ***a zero grade*** for the project! You may discuss projects with your classmates, but the work you turn in ***must be your own***!

PowerPoint Slides:

Copies of the PowerPoint slides for this course can be found on the class website (see page one of this syllabus). To minimize note taking, you should print the slides for each class in advance and bring them to class.

E-mail communication:

Students are to use their NJIT e-mail (ucid@njit.edu) in communicating with the instructor. It is also convenient to communicate on the Canvas platform.

Computer Requirement and Access to the Internet:

NJIT requires all students to have access to a computer at their place of residence. Details as to this requirement may be found on the college's website on the page describing NJIT's Undergraduate Student Computer Requirement.

Access to the Internet is required for this course. NJIT provides on campus access to the Internet to all students. Details as to how to access the Internet as well as other resources at NJIT may be found in the Student Quick Start Guide.

Deadlines/Late Work/Make-ups:

Specific policies concerning the acceptance of late work and make-ups are discussed in the sections covering course requirements. In general, work will not be accepted late, and make-ups will not be given. Exceptions will be made when extraordinary circumstances were responsible for work not being completed on time. Students may need to contact the Dean of Students' office and have it determine that the reasons given for not doing the work on time are valid.

Incompletes:

Incompletes will be given only to students who cannot finish the course on time due to major reasons outside of their control (e.g., illness, family tragedy, military service). Students may need to contact the Dean of Students' office and have it determine that the reasons given for not doing the work on time are valid.

Accessibility :

This course is offered through an accessible learning management system. For more information, please refer to Canvas's Accessibility Statement.

Requesting Accommodations:

The Office of Accessibility Resources and Services works in partnership with administrators, faculty, and staff to provide reasonable accommodations and support services for students with disabilities who have provided their office with medical documentation to receive services.

If you are in need of accommodations due to a disability, please contact the Office of Accessibility Resources and Services to discuss your specific needs.

Academic Integrity:

"Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the NJIT academic code of integrity policy.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu"

Resources for NJIT Online Students:

NJIT is committed to student excellence. To ensure your success in this course and your program, the university offers a range of academic support centers and services. To learn more, please review these Resources for NJIT Online Students, which include information related to technical support.

Schedule

Deviations may be necessary

Some supplementary assignments will be added as the course progresses

Week	Topic	Detailed Outline	Notes	Slides	Assignments
Introduction to Business Research Process					
Week 1	Introduction Excel Spreadsheet	Introduction of the Instructor and Peers Self-learning Excel Tutorial	Course Syllabus Posted on Course Website	1	Module 1: Discussion Forum-Peer Introductions
	Overview of Business Research Process	Systematically understand the process for business research, from beginning to the end, as described in the Exhibit: General Process of Business Research	Lecture of Introduction	1	
Module 1: General Modeling Fundamentals					
Week 1	Overview of Modeling for Decision Making	Introduction and overview of Business Research and Business modeling. The importance of Business modeling for decision-making. Creating Spreadsheet model for a basic business problem.		1-a, 1-b	• Module 1: Discussion Forum **(Part 1-Due Thursday)** • Module 1: Discussion Forum **(Part 2-Due Sunday)** • Module 1: Excel Competency Exercise**-Due Sunday** • Module 1: Assignment 1- Day-Care Center Analysis**-Due Sunday** • Module 1: Reflective Exercise**-Due Sunday**
	Business Modeling Spreadsheet Techniques	Effective use of spreadsheets for modeling; Sensitivity/what-if analysis. Review of key Excel functions; Financial Models; Influence diagrams Breakeven and crossover analysis		1-c, 1-d	

Week	Topic	Detailed Outline	Notes	Slides	Assignments
Module 2: Business Profit Analysis					
Week 2	Break Even and Cross Over	Breakeven and crossover analysis		Lecture 2-a	• Module 2: Discussion Forum **(Part 1-Due Thursday)** • Module 2: Discussion Forum **(Part 2-Due Sunday)** • Module 2: Assignment 2- Costco Cruise**-Due Sunday** • Module 2: Reflective Exercise**-Due Sunday**
	Optimal Pricing	Profit Optimization Optimal Price Pricing strategy	BE/CO lecture;	Lecture 2-b	
Module 3: Simulation					
Week 3	Monte Carlo Simulation: Introduction	Introduction to Simulation; Random numbers; Probability distributions; Machine breakdown problem; Queuing applications		Lecture 3-a	• Module 3: Discussion Forum **(Part 1-Due Thursday)** • Module 3: Discussion Forum **(Part 2-Due Sunday)** • Project (1): Inventory Management via Simulation**-Due Sunday** • Module 3: Reflective Exercise**-Due Sunday** • Mid-Semester Survey**-Due Sunday**
	Monte Carlo Simulation: Applications	Building a spreadsheet simulation; Inventory applications;		Lecture 3-b	
Module 4: Optimization and Linear Programming					

Week	Topic	Detailed Outline	Notes	Slides	Assignments
Week 4	Introduction to Optimization Modeling	Introduction to Optimization; A Two-Variable Model Sensitivity Analysis A Product Mix Model		Lecture 4-a	• Module 4: Discussion Forum **(Part 1-Due Thursday)** • Module 4: Discussion Forum **(Part 2-Due Sunday)** • Module 4: Assignment 3- Welte Mutual Funds via Linear Programming- **Due Sunday** • Module 4: Assignment 4- Computer Production Planning via Linear Programming- **Due Sunday** • Module 4 – Reflective Exercise- **Due Sunday**
	Linear Programming Models	Advertising Models Static Workforce Scheduling Models Aggregate Planning Models Blending Models Production Process Models Financial Models		Lecture 4-b	
Module 5: Network Models					
Week 5	Network Models	Transportation Models Assignment Models Minimum Cost Network Flow Models Shortest Path Models		Lecture 5	• Module 5: Discussion Forum **(Part 1-Due Thursday)** • Module 5: Discussion Forum **(Part 2-Due Sunday)** • Module 5: Reflective Exercise- **Due Sunday**
Module 6: Non-Linear Programming and Business Applications					
Week 6	Non-Linear Programming	NLP Introduction Production Application;		Lecture 6	• Module 6:

Week	Topic	Detailed Outline	Notes	Slides	Assignments
		Constructing an Index Fund; Markowitz Portfolio Model;			Discussion Forum **(Part 1-Due Thursday)** • Module 6: Discussion Forum **(Part 2-Due Sunday)** • Module 6: Assignment 5- ABC Investment**-Due Sunday** • Project (2): Supply Chain Design with Linear Programming**-Due Sunday** • Module 6: Reflective Exercise**-Due Sunday**
Module 7: Advanced Business Applications of Non-Linear Programming					
Week 7	Advanced Applications of Non-Linear Programming	Blending of the Pooling Problem; Forecasting Adoption of a New Product		Lecture 7	• Module 7: Discussion Forum **(Part 1-Due Thursday)** • Module 7: Discussion Forum **(Part 2-Due Sunday)** • Module 7: Assignment 6- J&J Refinery**-Due Sunday** • Project (3): iPhone Market Analysis**-Due Sunday** • Module 7: Reflective Exercise**-Due Sunday** • End of Semester Survey-**Due Sunday**