



NYU

**TANDON SCHOOL
OF ENGINEERING**

**Department of Technology Management and Innovation
MG-GY 6373 & Human Capital, Big Data and Predictive Analytics
Fall 2019**

Professor: Paul Squires, Ph.D.

Contact Details: ps2937@nyu.edu, Ph. No. 973-809-2952

Office/Hours: TBD

Class Schedule: TBD

Course Pre-requisites: Graduate Standing

Course Description:

This course examines quantitative applications of human capital analytic methods, including its statistical and machine learning methods for creating value to an organization by leveraging big data. The course will take a systems view and integrate human capital perspectives, concepts, and methods from economics, finance, and psychology.

Competencies Addressed in this Course

Big Data Collection & Analysis	Regression & Predictive Analytics
Descriptive Statistics	Return on Investment Calculations
Inferential Statistics	Statistical Software Skills
Natural Language Processing	Machine Learning Methods

Course Objective:

Students will learn statistical and machine learning methods to build predictive models of human capital and the software tools (SPSS and R) to conduct predictive analytics with big data. They will learn how to determine the economic benefits of human capital and human capital interventions (e.g., monetary and non-monetary rewards, job re-design, engagement, etc.) and how to communicate these benefits to senior management and key stakeholders in support of important organizational decisions.

Course Structure:

This course is conducted entirely online, which means you do not have to be on campus to complete any portion of it. You will participate in the course using NYU Classes located at <https://newclasses.nyu.edu>. Participation is paramount to your success in this course. Be sure to log

into NYU Classes multiple times a week, read all announcements, complete all Active Learning Modules and assignments on time, and participate in Discussion Forums and Virtual Meetings.

- Lectures will become available at midnight each week and will be delivered through Active Learning Modules in NYU Classes.
- One on-hour Virtual Meeting will be used to supplement the course content

In addition to lectures and Virtual Meetings, Discussion Forums will play a key role in this course. Students are expected to participate in weekly discussion forums.

Readings:

Sprinthall, R.C. (2012). *Basic Statistical Analysis (Ninth Edition)*. Boston: Allyn & Bacon.
 Sesil, J.C. (2014) *Applying Advanced Analytics to HR Management Decisions*. Pearson Education, Upper Saddle River, NJ
 Howell, D.C. (2012) *Statistical Methods for Psychology, 8th Edition*, Cengage Learning, Farmington Hills, Michigan
 Winer, B.J. (1971) *Statistical principles in experimental design* McGraw Hill, NY
***Any statistics textbook that covers the topics included in this course is acceptable.**

Software

Statistical Package for Social Sciences (SPSS)
 R, R-Studio

Course Assignments and Grading:

Project Presentations – Present the results of the analysis of your dataset to class, including statistical methods, results, and graphical display of results.

Mid-Term Exam - will include multiple choice and short answer questions covering topics discussed in the classes 1 – 7, it is open book.

Final Exam– will include multiple choice and short answer questions covering topics discussed in the classes 8 – 13, it is open book.

Attendance & Participation – Attendance and participation in online discussions are important for student learning and teaching effectiveness.

Activity	Points
Project Presentations	15
Mid Term Exam	35
Final Exam	35
Attendance & Participation	15

Point Range	Grades
93 – 100	A

90 – 92	A-
87 – 89	B+
83 – 86	B
80 – 82	B-
77 – 79	C+
73 – 76	C
70 – 72	C-
60 – 69	D
Less than 60	F

Course Topic Outline

Class Date and Topic	Readings, Assignments, & Exams
Introduction to Big Data issues, examples of human capital, predictive analytics, and ROI	
Descriptive Statistics - Central Tendency, Dispersion, Samples, Representativeness	
Inferential Statistics, Hypothesis Testing, t-tests, Chi Square, & Power Analysis	
Hypothesis Testing & Power Analysis using SPSS and R	
Analysis of Variance (One Way), Correlation, Validity, and Reliability	
Analysis of Variance (One Way), Correlation, Validity, and Reliability using SPSS & R	
Analysis of Variance (Factorial)	Mid-Term Exam
Factorial ANOVA using SPSS & R	
Simple Regression, Multiple Regression, & ROI	
Multiple Regression & Regression Trees using R	
Introduction to NLP and Text Embedding using R	
Introduction to Neural Networks using R	Final Exam

Final Exam	
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Academic Integrity:

All students are responsible for understanding and complying with the NYU Statement on [Academic Integrity](#).

Academic Integrity for Students at NYU

This policy sets forth core principles and standards with respect to academic integrity for students at New York University. Each school at New York University may establish its own detailed supplemental guidelines for academic integrity, consistent with its own culture, and consistent with the University-wide general guidelines described in this document.

At NYU, a commitment to excellence, fairness, honesty, and respect within and outside the classroom is essential to maintaining the integrity of our community. By accepting membership in this community, students take responsibility for demonstrating these values in their own conduct and for recognizing and supporting these values in others. In turn, these values will create a campus climate that encourages the free exchange of ideas, promotes scholarly excellence through active and creative thought, and allows community members to achieve and be recognized for achieving their highest potential.

In pursuing these goals, NYU expects and requires its students to adhere to the highest standards of scholarship, research and academic conduct. Essential to the process of teaching and learning is the periodic assessment of students' academic progress through measures such as papers, examinations, presentations, and other projects. Academic dishonesty compromises the validity of these assessments as well as the relationship of trust within the community. Students who engage in such behavior will be subject to review and the possible imposition of penalties in accordance with the standards, practices, and procedures of NYU and its colleges and schools. Violations may result in failure on a particular assignment, failure in a course, suspension or expulsion from the University, or other penalties.

Faculty are expected to guide students in understanding other people's ideas, in developing and clarifying their own thinking, and in using and conscientiously acknowledging resources - an increasingly complex endeavor given the current environment of widely available and continually emerging electronic resources. In addition, students come to NYU from diverse educational contexts and may have understandings regarding academic expectations that differ from those at NYU. NYU values and respects all academic traditions; however, while at NYU, students are expected to adhere to the norms and standards of academic integrity espoused by the NYU community and will be assessed in accordance with these standards. Students should ask their professors for guidance regarding these standards as well as style guide preferences for citation of sources for assignments in their courses.

Following are examples of behaviors that compromise the academic and intellectual community of NYU. The list is not exhaustive. Students should consult the websites and guidelines of their individual schools for an extended list of examples and for further clarification.

1. Plagiarism: presenting others' work without adequate acknowledgement of its source, as though it were one's own. Plagiarism is a form of fraud. We all stand on the shoulders of others, and we must give credit to the creators of the works that we incorporate into products that we call our own. Some examples of plagiarism:

- a sequence of words incorporated without quotation marks
- an unacknowledged passage paraphrased from another's work
- the use of ideas, sound recordings, computer data or images created by others as though it were one's own

2. Cheating: deceiving a faculty member or other individual who assess student performance into believing that one's mastery of a subject or discipline is greater than it is by a range of dishonest methods, including but not limited to:

- bringing or accessing unauthorized materials during an examination (e.g., notes, books, or other information accessed via cell phones, computers, other technology or any other means)
- providing assistance to acts of academic misconduct/dishonesty (e.g., sharing copies of exams via cell phones, computers, other technology or any other means, allowing others to copy answers on an exam)
- submitting the same or substantially similar work in multiple courses, either in the same semester or in a different semester, without the express approval of all instructors
- submitting work (papers, homework assignments, computer programs, experimental results, artwork, etc.) that was created by another, substantially or in whole, as one's own
- submitting answers on an exam that were obtained from the work of another person or providing answers or assistance to others during an exam when not explicitly permitted by the instructor
- submitting evaluations of group members' work for an assigned group project which misrepresent the work that was performed by another group member
- altering or forging academic documents, including but not limited to admissions materials, academic records, grade reports, add/drop forms, course registration forms, etc.

3. Any behavior that violates the academic policies set forth by the student's NYU School, department, or division.

Moses Center Statement of Disability

If you are student with a disability who is requesting accommodations, please contact New York University's Moses Center for Students with Disabilities at [212-998-4980](tel:212-998-4980) or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 2nd floor.