MASTER SYLLABUS
QANT201: STATISTICAL SAMPLING THEORY

1. Course Details

Semester:	
Course Code:	QANT201
Course Name:	Statistical Sampling Theory
Course Prerequisites:	MATH 151
Course Co-requisites:	
Credits Hours:	Three (3) credit hours
Classroom:	
Class Timing:	(45 contact hours)
Final Exam Period:	

2. Instructor Details

Professor:	
Office Location:	
Office Hours:	
Email:	
Course website:	
Phone (Office):	

3. Catalog Course Description
   This course introduces students to both descriptive and inferential statistics. Coverage includes applications to business and other disciplines and the use of technology as a decision support tool.

4. Course Overview
   This course introduces students to statistics and its use in business. During this course students will gain some concrete practical skills, e.g. how to apply selected techniques for collecting business data and use diagrams to present data, and apply selected, fundamental concepts of statistical analysis to solve business oriented problems.

5. Course-Level Learning Goals[1]

(A) Invariant Learning Goals (In support of the BSBA Programmatic Learning Goal(s)):

Upon the successful completion of this course, the student will be able to:

1. Integrate algebra and calculus tools into statistical calculations;
2. Collect data and conduct a statistical analysis on a real product or service;
3. Describe alternative perspectives concerning the development of a hypothesis test and their implications; work in teams to create an analysis and discuss the analysis orally;
4. Solve problems that involve risk and uncertainty; and
5. Develop power curves that assist decision making as it concerns type I and type II errors

Assurance of Learning Validations (Linked to the BSBA Programmatic Learning Goal(s))[2]:

A1. Problem on a Quiz: Student must demonstrate the ability to use integration or to find and interpret probabilities for a given continuous density function (e.g. normal, exponential). One score is given (M4O2).

A2. Graded Homework Problem: Students must collect data from a public source, related to an issue that is relevant to the localized business community, using technology (sources must be cited) for descriptive and statistical analysis useful for making management decisions. . Three scores are given: adequacy of data collection and relevancy (M2O1) and analysis (M2O2), including implications to management policy* (M4O1).

*This articulation of scoring criteria is included to facilitate student achievement of M4O1.

[1] A note on School of Management Course-Level Learning Goals: Learning goals are partitioned into those that are in support of the programmatic learning goals (Invariant), specific to the localized region of delivery (Contextualized), and specific to the domain expertise of the instructor (Instructor-Specific). The former two categories are required for all courses. Invariant "Assurance of Learning Validations" are specifically linked to the associated programmatic learning goal and objective, with course-level learning goals representing the programmatic goal as it applies to the context of the course. Learning goals that focus on knowledge acquisition (Bloom's Taxonomy) are not specifically or necessarily included into the course-level learning goals, although it is assumed that knowledge acquisition of all relevant business core fundamentals is addressed within each course. Examinations in class are used to provide feedback concerning knowledge and comprehension for the purpose of ensuring that students who have not mastered these will not advance through the curriculum. Attainment of knowledge within each core area is assessed by way of standalone testing of each student as a required part of the instructional program prior to graduation (e.g. ETS).

[2] A note on School of Management Assurance of Learning Scoring: Scores form the metric for the degree to which the validation (e.g. learning outcome) satisfies the associated learning goal or objective. Assurance of learning validation descriptions identify the criteria for each score that is to be given. All scores are scaled from 1-5 (1-poor, 2-fair, 3-good, 4-very good, 5-excellent). It must be noted that scores are to be differentiated from grades. Scores form a criterion from which an instructor will ascertain an overall grade for any instrument of assessment, and the overall assessment the student receives for an instrument is a "grade." A score is an extraction that specifically measures the degree of attainment of a learning goal and/or objective.

A3. Oral Team Project: Following a lecture where a discussion is held concerning "guilty until proven innocent" rather than "innocent until proven guilty," and other examples of how null and alternative hypotheses are created, as well as their implications, student teams must identify a relevant social issue, localized to the community where the course is delivered, where a hypothesis can be formed, take a position on why the null and alternatives are chosen in the manner decided, and discuss and defend their choice and the implications within the localized community. The groups present their material in class during the final exam period, with a resulting final project grade given. The final grade is based on four scores: influential and effective communication (G1O2); justification for the position relevant to the community that it addresses (G2O1); effective use of PowerPoint (M2O4); group dynamics of the presentation (G1O3); and the student team's ability to reflect on societal development and the impact that the structure of the hypotheses has had on particular outcomes regarding social, political, or global economic policies (G2O2).

A4. Individual Student Project: The students will be given a two-sided hypothesis test: H_0: $\mu=k$ versus H_A: $\mu\neq k$, together with a sample size n and a known standard deviation s. (k, n, and s are chosen by the instructor, who also chooses the context of the problem and the significant level α.) The students must each construct the power curve for this test for all potential values of μ over [k-5,k+5] and utilize excel for the calculations and the visual depiction of the curve. One score is given for the quality of the analysis and problem solving ability (M1O2).

(B) Contextualized (Globalized) Learning Goal(s):

Upon the successful completion of this course, students will be able to:

1. See Invariant Learning Goal 4 above.

Assurance of Learning Validation (In support of the Contextualized (Globalized) Learning Goal(s)):

B1. See A3 above. Students New York should choose their "localized" community from a non-U.S. culture. In addition to the scores in A3, one additional score is administered based on the students' ability to comprehend the difference in how a chosen culture addresses the issue relative to the U.S. (G3O1).

(C) Instructor Specific Learning Goal(s) (Optional):

None

Assurance of Learning Validation (In support of the Instructor Specific Learning Goal(s)):

None

6. Teaching and Learning Methodology

The School of Management's teaching and learning strategy is informed by contemporary indicators/sources that derive from its target market, specifically the millennial generation. In particular, behavioral traits for this generation are identified and form the basis of emphasis for the schools' teaching and learning methodologies. These methodologies are reflected in the school's mission statement by way of its TEMPOS

campaign[3]. In addition, teaching and learning strategies are informed by institutional indirect assessment results, periodically collected and reviewed by the Office of Planning and Assessment and the school's faculty[4]. Teaching and learning strategies are also externally referenced systematically (e.g., the Annual Stakeholder's Conference) through continuing consultations with non-board key stakeholder groups, including employers, business and community leaders, accreditation and ministerial agencies, alumni, students, peer institutions, and business and governmental agency representatives.

A component of all courses, as a part of the teaching and learning strategies, is to maintain academic rigor and to be intellectually challenging. This is validated in institutional survey results. However, School of Management faculty members utilize an overall collective portfolio of strategies/initiatives that obtain from the aforementioned sources in delineating those that are most appropriate or emphasized in the courses they lead.

In this course (QANT201), four (4) prioritized teaching and learning strategies focus on:
1. time management;
2. timely feedback;
3. independent learning; and
4. frequent feedback.

All faculty members that instruct this course should consider how to execute the course to emphasize these key components of the strategies considered. Following a review of learning outcomes, faculty members consider how re-orientation of teaching and learning strategies might result in strengthening these outcomes, and adjustments are made, accordingly. Faculty members also consider how the School of Management Triple Platforms of Excellence (Professional Enrichment, Experiential Education, and Student Advancement) might be leveraged as a part of this strategy, and provide recommendations to the Directors of those platforms. The school also reviews the distribution of identified teaching and learning strategies periodically to ensure comprehension and the integration of each (from the designated list of approximately 20-25 strategies) within the curriculum. Finally, results from student teaching evaluations also provide indications of how various teaching and learning strategies are integrated into the course delivery. The following issues (indicator number is provided) are among those in the evaluations that bear on this review and analysis:

7. The instructor was responsive to student questions.
8. The instructor was available for course related consultation and advice.

[3] Teaching and Learning Strategies: "TEMPOS and the Millennials," revised September 2008.

[4] E.g., Student Survey on Teaching Quality – Quantitative Data: School of Management.

9. The instructor graded and returned student work and exams promptly.
10. The instructor incorporated information technology (e.g. computer or the Internet) in the course.
18. The instructor was responsive to student needs and concerns.
21. The instructor assigned challenging course work.
22. The instructor provided helpful, constructive feedback on assignments and course work.
23. The instructor acknowledged cultural differences and diversity among students.
24. The instructor helped me understand the subject matter.

Along with teaching and learning strategies, the notion of student effort/time on task is also considered, although it is not necessarily driven by metrics. It is noted that the notion of student effort, specifically metric driven, is not a universally adopted approach[5]. However, if an instance occurs where student learning outcomes do not meet targeted academic standards, the School of Management utilizes indirect inputs in this area to explore the interdependencies between factors including the amount of work required in the course, the degree of challenge in the coursework, and level of critical analysis, among others[6].

This course is also Socratic in teaching style and relies on applications that are brought forward by both the instructor and the students. Use of formulas are demonstrated through Excel but reinforced through a discussion of the rationale underlying the methodology. This course is primarily a problem solving course.

7. Required Resource(s)

McClave, J., and Sincich, T. (2013). *A First Course in Statistics.* 11th Edition. Prentice Hall. ISBN: 9780321755957.

8. Reference Resource(s)

Bluman, A. (2007). *Elementary Statistics: A Step by Step Approach*. 7th Edition. McGraw-Hill. ISBN: 9780073305431.

[5] See the Victorian TAFE Association Response – Strengthening the AQF: Proposal, June 2009. East Melbourne, Victoria, Australia, retrieved from **http://www.vta.vic.edu.au/docs/PositionDiscussion%20Papers/VTA_Response_Strengthening_the_AQF.pdf on February 22, 2010.**

[6] Sample data regularly collected through the New York Institute of Technology Student Rating of Courses/Teaching Form.

9. Assessment Methodology and Grading Guidelines

Instrument	Points (i.e. weights)	Time on Task[7]
Tests (two administered in class, see A1)	200 points (100 points each)	24 hours (12 hours each)
Graded Homework Problem (see A2)	30 points	10 hours
Oral Team Project (see A3)	30 points	24 hours
Individual Student Project (see A4)	30 points	6 hours
Additional Formative Non-Graded Work: Homework	0 points	28 hours
TOTAL	290 points	92 hours

Assignments will be collected periodically and assessed. The comments from the assessments are returned to the student as a formative assessment, with the goal of improving student attainment of M1O2. The homework is not a part of the grading in the course.

10. Grading Guidelines: N/A

11. Attendance Policy: Students are expected to attend every class session. Instructors will inform students of the exact number of absences and late-arrivals permitted during the semester. Students who exceed these limits may be subject to failure. If a student misses any class or test, the instructor has the right to either grant or deny an opportunity to make up the work that was missed. In such cases, the instructor shall be the sole judge of the validity of a student's explanation for having missed the class or test.

12. Deductions for Late Arrival, Early Departure, and Unexcused Absences:

[7] An estimate of the period of time during which a student is actively engaged in a learning activity, excluding classroom contact hours.

13. Policy for Make-Up Assignments or Quizzes:

14. Classroom Behavior: Behavior that disrupts, impairs, interferes with, or obstructs the orderly conduct, processes, and functions within an academic classroom or laboratory violates the student code of conduct and may result in disciplinary action. This includes interfering with the academic mission of NYIT or individual classroom or interfering with a faculty member's or instructor's role to carry out the normal academic or educational functions of his classroom or laboratory, including teaching and research.

15. Students with Physical or Educational Challenges:
    - It is the policy of New York Institute of Technology to provide reasonable accommodations for students who are otherwise qualified but have disabilities, including learning disabilities, health impairments, and other disabling conditions. Possible accommodations include, but are not limited to, test schedule modifications, class relocation, and possible assistance in acquisition of necessary equipment.
    - The college has an interest in helping students with disabilities to be competitive in this academic environment. Therefore, reasonable accommodations will be made upon proof both of disability and need for the accommodations. It must be understood that accommodations are meant to facilitate educational opportunities. Admission to NYIT and accommodations do not guarantee success. Therefore, in addition to accommodations, the college encourages utilization of auxiliary services available to all students to maximize opportunities for success. Students whose disabilities may require some type of accommodation must complete a request for accommodations form and an intake interview with their campus services coordinator prior to the academic semester. Accommodations maybe requested at any time during the semester; however, accommodations cannot be applied to past failures, only to future academic endeavors. Appropriate modifications of accommodations will be worked out on a case-by-case basis and will not necessarily incorporate all requested changes.
    - Students for whom auxiliary services—such as readers, interpreters, note takers, etc.—have been approved should arrange these with their campus services coordinator. In addition to discussing appropriate educational modifications, the campus services coordinator will serve as a liaison with other college faculty and administration on behalf of students with disabilities.

16. Academic Integrity:
    - Each student enrolled in a course at NYIT agrees that, by taking such course, he or she consents to the submission of all required papers for textual similarity review to any commercial service engaged by NYIT to detect plagiarism. Each student also agrees that all papers submitted to any such service may be included as source documents in the service's database, solely for the purpose of detecting plagiarism of such papers.
    - Plagiarism is the appropriation of all or part of someone else's works (such as but not limited to writing, coding, programs, images, etc.) and offering it as one's own. Cheating is using false pretenses,

tricks, devices, artifices or deception to obtain credit on an examination or in a college course. If a faculty member determines that a student has committed academic dishonesty by plagiarism, cheating or in any other manner, the faculty has the academic right to 1) fail the student for the paper, assignment, project and/or exam, and/or 2) fail the student for the course and/or 3) bring the student up on disciplinary charges, pursuant to Article VI, Academic Conduct Proceedings, of the Student Code of Conduct. The complete Academic Integrity Policy may be found on various NYIT Webpages, including: http://www.nyit.edu/images/uploads/academics/AcademicIntegrityPolicy.pdf.

17. 15 Week Topical Class Schedule

Week	Topic	Chapter Section
Wk 1	Measures of Central Tendency & Dispersion	2.1-2.7
Wks 2-3	Combinatorics and Probability Theory	3.1-3.6
Wk 4	Contingency tables, Chi-Square Test & Bayes rule	8.4
Wk 5	Random Variables; Discrete Random Variables (Include Uniform and Binomial)	4.1-4.3
Wk 6	Continuous random Variables (include Uniform, Exponential)	4.4
Wk 7	Normal Distribution and Normal Approximation to Binomial	4.5
Wk 8	Exam 1 and Central Limit Theorem	4.8-4.9
Wk 9	Confidence Interval for Means and Proportions	5.2-5.5
Wk 10	Confidence Intervals for Variance and F test	Supplemental
Wk 11	Hypothesis Test (Single Mean/Proportion)	6.2-6.5
Wk 12	Hypothesis Test (Two Sample) and Power	7.2-7.3, 8.1-8.2
Wk 13	Analysis of Variance (One Way and Two Way)	7.6
Wk 14	Regression	9.2-9.4
Wk 15	Regression and Exam 2	
	Group Presentations	

18. Using the NYIT Library

All students can access the NYIT virtual library from both on and off campus at www.nyit.edu/library. The same login you use to access NYIT e-mail and NYITConnect will also give you access to the library's resources from off campus.

On the left side of the library's home page, you will find the "Library Catalog" and the "Find Journals" sections. In the middle of the home page you will find "Research Guides;" select "Video Tutorials" to find information on using the library's resources and doing research.

Should you have any questions, please look under "Library Services" to submit a web-based "Ask-A-Librarian" form.