IS 765 - Quantitative Methods in Information Systems Research (3 credits)

Fall 2025

Course Syllabus

Organizational

Instructor: Dr. Margarita Vinnikov, margarita.vinnikov@njit.edu
Class time and location: CKB 204, Tuesday and Thursday from 10:00 AM - 11:20 PM
Office hours: GITC, 3802. Thursday from 1:00 p.m. to 2:00 p.m. **By appointment only.**

Overview

This course introduces quantitative and qualitative methods in information systems (IS) research involving human subjects. The focus is on developing the capability to select and implement appropriate data collection and statistical analysis procedures for various research questions and to interpret the results of these procedures. The course is designed to provide students with the necessary background in information systems theory and qualitative and quantitative research methods to critically read and understand research articles published in leading IS journals such as MISQ, JMIS, Information Systems Research, ACM publications, and human-computer interaction journals. This foundation will enable students to keep up in the field after graduation and effectively conduct literature searches as the first step in future research projects.

Throughout the course, students will engage in hands-on projects that involve real-world data and research scenarios. The course emphasizes the practical application of quantitative methods, including statistical software such as Minitab, MATLAB, R, and SPSS. Additionally, students will gain skills in designing and conducting interviews, observational studies, surveys, and experiments, along with analyzing and presenting results. The course will cover ethical issues, IRB requirements, and the most common statistical tests used in IS research, focusing on when to use specific statistical procedures and how to interpret and report the results.

Material Covered During the Semester

- Introduction to Quantitative and Qualitative Research in Information Systems (Include Philosophical Perspectives and Theoretical Models)
- Research Process (Include IRB processes)
- Research Methods (Include Experimental Methods, such as factorial designs and quasi-experiments)

- Data Collection Methods (Include focus groups, surveys, interviews, and observational studies)
- Descriptive Statistics and Data Visualization
- Inferential Statistics
- Statistical Techniques
- Regression Analysis
- Analysis of Variance (ANOVA)
- Multivariate Analysis
- Structural Equation Modeling (SEM)
- Advanced Topics (Include time series analysis and big data analytics)
- Qualitative Methods (Include grounded theory, protocol analysis, and ethnographic research)
- Mixed Methods Research
- Research Ethics and Reporting (Include IRB requirements and ethical considerations)

Prerequisites & Co-requisites

- **Prerequisite:** IS 601 (or equivalent)
- **Co-requisite:** None

Course Materials

- **Required Software/Tools:**
    - **Python (Anaconda Distribution recommended)** – primary programming language for data analysis and research methods.
    - Access to **NJIT Canvas**, **Zoom**, and **Google Drive** (for course activities and submissions).
- **Optional Software/Tools (will be demonstrated in class, use if you wish):**
    - R (open-source, free download)
    - SPSS (available via NJIT license)
    - MATLAB (NJIT license)
    - Minitab (NJIT license)

- **Required Textbook:** None
- **Suggested Readings:** Weekly readings from IS and HCI journals will be provided via Canvas.

Course Outcomes

Upon completing this course, students will:

- **C1.** Be able to critically evaluate and apply both quantitative and qualitative research methods in information systems.
- **C2.** Gain proficiency in using statistical software for data analysis.
- **C3.** Develop the ability to design, conduct, and present research studies using mixed methods.

Grading

- Weekly Discussions – **25%**
- Topic of Interest Presentation – **10%**
- Research Project – **35%**
- Individual Assignments – **30 %**
- Participation in User Studies (Bonus) – **5%**

Bonus Points Opportunities

In addition to optional participation in UX/HCI user studies (up to **5 bonus percentage points**), you can earn extra credit through the following activities:

- **Course Blog Contributions**
  Write thoughtful **blog posts** on topics related to methods in IS research. Posts should be around 500–700 words and thoughtfully engage course themes or techniques. Each qualifying post earns up to **1 bonus percentage point**, contributing to your final course grade above the 95% base.
- **Course Service Activities**
  Volunteer for meaningful support roles in the course—such as assisting with class logistics, helping moderate discussions, or supporting lab demos—and earn up to **1 bonus percentage point** per activity.

Note: All bonus points are **extra credit** and counted separately from the main course components, which total 100%. Bonus points can raise your final grade up to 105%.

Weekly discussions (25%)

There are ten discussion sessions. Each student will:

- Lead **two sessions** (10%)
- Post an online discussion response before each session (7.5%)
- Participate live or asynchronously in all sessions (7.5%)

Online engagement is an acceptable substitute for in-class participation and supports deeper reflection and equitable contribution

Topic of Interest (10%)

During the semester, you will be asked to choose one topic not covered in class and give a 15-minute presentation + 5 minutes for a Q&A period. The project will be evaluated based on critical thinking and evaluation of the topic, as well as on oral presentation skills and PowerPoint presentation. Details about the project will be posted on Canvas. The mark would also include students' participation in the Q&A session for other presentations. You can choose to work in pairs or individually. The scope of the project will be proportional to the group size.

Research Project (35%)

Throughout the semester, you will engage in a Research Project that applies key concepts and methods from the course. Working in groups, you will choose from one of four project types: an empirical study, a qualitative study, a mixed-methods study, or a big data analytics project. The project will be completed in stages, including topic selection, literature review, research design, data collection, analysis, and final presentation. Your final deliverable will be a 10-15 page research paper and an in-class presentation. Each stage must be discussed with the instructor, and all milestones must be submitted on time for full credit. The project will be evaluated on the quality of research, analysis, and presentation skills, with participation in Q&A sessions during other presentations also contributing to your final grade.

Individual Assignments (30 %)

You will complete a set of individual assignments designed to strengthen both your technical and critical research skills. These include four Python-based exercises in Google Colab, where you will practice data analysis, visualization, and statistical techniques. In addition, you will write two short research article critiques that prepare you for weekly discussions by analyzing methodology, findings, and theoretical contributions. Collectively, these assignments account for 30% of your final grade and provide continuous practice in applying course concepts, both through hands-on programming and critical engagement with published IS research.

Grading Legend

Letter Grade to % Correspondence:

Grades	GPA	Percent Grade	Significance
A	4.0	90-100	Excellent
B+	3.5	86-89	Good
B	3.0	80-85	Acceptable
C+	2.5	76-79	Marginal Performance
C	2.0	70-75	Minimum Performance
F	0.0		Failure
I			Incomplete
W			Withdrawn
AU			Audited (no academic credit)

Late Grading Policy

- Late submissions will incur a 10% penalty per day. For instance, a one-day late submission will result in a maximum grade of 90%, two days late will result in 80%, and so on.
- Missed exams or presentations will result in a grade of 0 unless prior arrangements are made at least one week in advance. No make-up exams will be provided.

References

Suggested readings will be provided weekly on Canvas. No textbooks are required for purchase.

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 academic code of integrity policy that is found at:

http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdfLinks to an external site..

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 misusing any online software 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***

Generative AI Policy

In this course, students may use generative AI tools (e.g., ChatGPT, GitHub Copilot, etc.) for data analysis support, coding assistance, and brainstorming research ideas.

- AI tools may not be used to write graded assignments, research critiques, or presentations.
- Any use of AI tools must be acknowledged and cited following the guidelines in NJIT's AI-U Student Guide (updated 2025).
- Misuse of AI tools (e.g., submitting AI-generated work as entirely one's own writing) will be treated as an Academic Integrity violation.

Religious Observances

NJIT is committed to supporting students observing religious holidays. Students must notify the instructor in writing of any conflicts between course requirements and religious observances by the end of the second week of classes, or at least two weeks prior to the anticipated absence. Academically reasonable accommodations will be provided, and students will not be penalized for properly documented absences due to religious reasons. Confidentiality regarding religious observances will be maintained.

Storage / Archiving

In accordance with NJIT policy, this syllabus will be archived in NJIT's Digital Commons repository for accreditation and record-keeping purposes.

Illustrative Schedule

- 🔵 Weekly Discussions
- 🟢 Individual Assignments
- 🟣 Topic of Interest Presentations
- 🟠 Research Project & Milestones
- ⭐ Bonus

Week 1

Tue, Sept 2 – Course introduction; research process; syllabus review; defining research problems

Thu, Sept 4 – 🔵 Discussion 1: Introduction & research planning

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Week 2

Tue, Sept 9 – IRB processes and ethical considerations in research

Thu, Sept 11 – 🔵 Discussion 2: Reading and critiquing research papers

🟢 *Research Article Critique I due Thu, Sept 11*

Week 3

Tue, Sept 16 – Experimental methods (factorial/quasi-experiments)
Thu, Sept 18 – 🔵 Discussion 3: Data collection methods

🟠 CITI IRB Certification **due Friday, Sept 19**

Week 4

Tue, Sept 23 – Scaling techniques; questionnaire construction

Thu, Sept 25 – 🔵 Discussion 4: Survey design & measurement

🟢 Research Article Critique 2 **due Thur, Sept 25**

Week 5

Tue, Sept 30 – Descriptive statistics; data visualization

Thu, Oct 2 – No Class (Yom Kippur / Wellness Day) → Independent Work Period

🟢 *Python Data Analysis Exercise I* **due Friday, Oct 3**

Week 6

Tue, Oct 7 – Inferential statistics: hypothesis testing, confidence intervals, p-values

Thu, Oct 9 – 🔵 Discussion 5: Statistical reasoning in IS research

🟠 *Stage 1: Research Project Topic Proposal* **due Fri, Oct 10**

🟢 *Python Data Analysis Exercise II* **due Fri, Oct 10**

Week 7

Tue, Oct 14 – ANOVA: one-way, two-way, interaction effects; non-parametric tests

Thu, Oct 16 – 🔵 Discussion 6: Regression analysis & model interpretation

🟠 *Stage 2: Literature Review* **due Fri, Oct 17**

Week 8

Tue, Oct 21 –User participation & UTAUT; causal inference

Thu, Oct 23 – 🔵 Discussion 7: Multivariate analysis & factor analysis

🟠 *Stage 3: Experimental Procedure* **due Fri, Oct 24**

🟢 Python Exercise III **due Fri, Oct 24**

Week 9

Tue, Oct 28 – Advanced statistical methods; structural equation modeling (SEM)

Thu, Oct 30 – 🔵 Discussion 8: SEM in IS research + 🟣 Topic Presentations (Set 1)

🟠 *Stage 3: Research Design & Methodology due* ***due Friday, Oct 31***

Week 10

Tue, Nov 4 – Qualitative methods: protocol analysis, interviews, coding, grounded theory

Thu, Nov 6 – 🔵 Discussion 9: Mixed Methods & Ethics in IS research

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Week 11

Tue, Nov 11 – Time series, panel data, big data analytics in IS research

Thu, Nov 13 – 🔵 Discussion 10: Qualitative & Grounded Theory + 🟣 Topic Presentations (Set 2)

🟢 *Python Data Analysis Exercise IV* **due Friday, Nov 14**

Week 12

Tue, Nov 18 – Case studies & ethnographic research; designing research proposals/papers

Thu, Nov 20 – 🟣 Topic Presentations (Set 3) + Research project updates

🟠 *Stage 4: Data Collection & Initial Analysis* **due Friday, Nov 21**

Week 13

Tue, Nov 25 – Thursday schedule meets (class session) → Research synthesis & project work

Thu, Nov 27 – Thanksgiving Recess – No Class

🟠 *Initial Data Analysis & Results Draft* **due Friday, Nov 28**

Week 14

Tue, Dec 2 – Mediators & moderators; advanced scaling techniques

Thu, Dec 4 – 🟣 Topic Presentations (Set 3 continued)

🟠 Stage 5: Data Analysis, Results, Discussion, Conclusion **due Fri, Dec 5**

Week 15

Tue, Dec 9 – 🟠 Research Project Presentations (Group Session I)

Thu, Dec 11 – 🟠 Research Project Presentations (Group Session II)

🟠 *Final Paper & Presentation Slides* **due Fri, Dec 12**