Research Design and Data Analytics:
Recommended Courses

Some of the best-paying and most satisfying jobs in today's economy demand data analysis in addition to analytical thinking and writing skills. This handout offers a suggested series of courses and opportunities to facilitate students in developing the skills that will make them competitive for those jobs. These recommendations are nothing more than that—*suggestions* for the kinds of coursework that may be interesting and useful for students who want to pursue post-graduation options that demand quantitative data analysis (grad school, policy and think tank jobs, consulting jobs, etc.) This list should not be considered neither mandatory nor comprehensive; if you have recommendations for other useful classes or opportunities, please contact Jaime Settle (jsettle@wm.edu) so that they can be added to this list.

Early Steps: Broad Exposure to Research Design, Methods, and Tools

The goal in your first three semesters is to take the prerequisites necessary for more advanced courses in a variety of disciplines, and to get a sense for the kind of things you could learn from various approaches to quantitative social science.

> INTR 100: Breaking Intuition – How Data has Changed Human Perception
> Computer Science (CSCI) 141
> Psychology (PYSC) 201 and 202
> Statistics
> - MATH 106 (for students without calculus background) *OR*
> - MATH 351 (for students with calculus background)
> Government (GOVT) 301
> Economics (ECON) 101 and 102 (recommended)

Subsequent Years: Specialization

The tracks listed below are suggestions for courses that work in conjunction with one another to develop a particular set of skills. Most of the courses below are not offered every semester and may have prerequisites not listed in the above section. It is important to plan ahead so that you are able to take the advanced coursework when it is available.

Data Analytics Track

This track combines solid knowledge of social science theory and research design with the sophisticated tools and analytic methods of computer science. This track would prepare you for a variety of post-graduation opportunities in consulting, campaign work, or academia that rely on computational social science or social analytics.

> CSCI 241 – Data Structures
> Additional CSCI courses related to your interests (web design and programming, software development, computer graphics, database management, etc.)
> GOVT 307—Polling and Analysis
> Demonstrated proficiency in coding languages and software appropriate to your interests (R, Python, Java, Javascript, ArcGIS, etc.)

Experimental Methods Track
Truly understanding how experiments aid our understanding of causal processes is critical for analytical reasoning in a variety of different fields. This track focuses on research design as it applies to experimental approaches in the social sciences

> PSYC 301 – Elementary Statistics (while this course material overlaps with a basic statistics course and GOVT 301, it is a prerequisite for advanced PSYC courses)
> PSYC 302 – Experimental Methods
> PSYC 314 – Social Psychology
> ECON 380—Experimental Economics
> GOVT special topics courses related to experimental design
> Demonstrated proficiency in R and SPSS

Statistical Modeling Track
The most traditional of data analysis tracks, this track will prepare you for jobs that require a solid foundation in econometrics and modeling-based approaches to understanding the social world.

> Advanced MATH courses related to your interests
> ECON 307—Econ Statistics (while this course material overlaps with a basic statistics course and GOVT 301, it is a prerequisite for advanced ECON courses)
> ECON 308—Econometrics
> GOVT 391—Quantitative Methods
> Advanced econometrics courses
> Demonstrated proficiency in R and Stata

Complementary Opportunities

Students are encouraged to identify at least two courses that complement each other in order to develop a substantive specialty in a topic, region, policy issue, etc. Example specialties could include but are not limited to:
- Social psychology
- Neuroscience
- Political institutions
- Political behavior
- Campaigns and elections
- Linguistics
- Policy/issue focus (healthcare, social policy, education, etc.)
- Regional focus, or a subfield of international relations
- Environmental science

Students are also encouraged to participate in at least two "outside the classroom" opportunities to connect their substantive focus with their data analysis skills:
- Internship
- Independent study
- Directed research, or participation in research lab or other data-intensive opportunity
- Summer research project
- Honors thesis
- "Breaking Intuition" teaching assistantship