BSOS Math Refresher

Summer 2018

Learning Outcomes

The purpose of this short course is to reintroduce new PhD students in BSOS to the logical, statistical, and mathematical tools that they are likely to use in their respective programs.

After successfully completing this course you will be able to:

- Feel comfortable with the basic algebra of statistical inference.
- Access data with the statistical program R.
- Conduct basic hypothesis testing and interpret the associated statistical output from R.
- Think about theory development from a logical foundation based on mathematics.

Resources

There are no required readings for this course. However, the following text may prove to be useful resources as you progress through your programs.

Moore, Will H., and David A. Siegel. *A mathematics course for political and social research*. Princeton University Press, 2013.

Dr. William Reed
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Class Meets
Monday, Tuesday, Thursday
9:00am – 12:00pm
Lefrak Computer Labs

Office Hours
By Appointment

Teaching Assistants
GVPT - Eric Dunford
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Course Communication
Please use our email addresses to communicate with the instructor and teaching assistants. Find notes on writing professional emails here (ter.ps/email).

Campus Policies

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit www.ugst.umd.edu/courserelatedpolicies.html for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

Course-Specific Policies

I expect you to make the responsible and respectful decision to refrain from using your cellphone in class. If you have critical communication to attend to, please excuse yourself and return when you are ready. For more information about the science behind the policy watch: http://youtu.be/WwPaw3Fx5Hk

Get Some Help!

You are expected to take personal responsibility for you own learning. This includes acknowledging when your performance does not match your goals and doing something about it. Everyone can benefit from some expert guidance on time management, note taking, and exam preparation, so I encourage you to consider visiting http://ter.ps/learn and schedule an appointment with an academic coach. Sharpen your communication skills (and improve your grade) by visiting http://ter.ps/writing and schedule an appointment with the campus Writing Center. Finally, if you just need someone to talk to, visit http://www.counseling.umd.edu.

Everything is free because you have already paid for it, and **everyone needs help**… all you have to do is ask for it.

Names/Pronouns and Self Identifications

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). The pronouns someone indicates are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

Course Schedule

Monday: Social Science Thinking
Topcis:

- Variables
- Measures of Central Tendency
- Measures of Dispersion
- Level of Measurement
- Cross Tabulations
- Mean Comparisons
- Statistical Control
- Hypothesis
- Theory
- Experiments
- Types of Research Designs
- Spurious Relationships
- Additive Relationships
- Interactive Relationships

Tuesday: Statistical Inference and Regression
Topics:

- Hypothesis Testing
- Central Limit Theorem
- Standard Errors
- Margins of Error
- Confidence Intervals
- Test for Sample Means
- Tests for Sample Proportions
- Correlations
- Regression

Thursday: Math for Theory Development
Topics:

- Game Theory Concepts
- Equilibrium
- Bargaining and Negotiation
- Asymmetric Information
- Optimization Examples
- Combining Game Theory and Statistics