

Statistics Short Course for Incoming Graduate Students

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UW-Madison Sociology Department

August 20th-22nd 2019, 9AM-12PM

Ingraham Hall Room 214

Final Program Schedule

TUESDAY, AUGUST 20

- Breakfast (8:45-9am)
- Introductions** (9AM)
- Why Stats Is Useful** (9:20AM)
- Stats+ Sequence, SSCC, Short Course Overview, Questions** (9:30AM)
- Break (9:50AM)
- Building Blocks of Data** (10:05AM)
 - Cases and variables
 - Population (parameters) vs sample (statistics)
 - Practical activity*: Identifying pop vs. sample via article abstracts (~15min)
 - Level of measurement (nominal, ordinal, interval, ratio)
 - Graphs (pie charts, bar graphs, histograms, box plots, time series)
 - Long vs. wide form data structure
- Break (11AM)
- Data Exploration** (11:15AM)
 - Univariate distribution characteristics
 - Central tendency (mean, median, mode)
 - Spread (range, IQR, variance, standard deviation)
 - Practical activity*: Operationalizing via survey questions (~10min)
 - Survey question design
 - Practical activity continued*: Pilot/peer review survey questions (~10min)
 - Intro to bivariate relationships
 - Explanatory and response variables
 - Intro to two-way graphs (two-way scatter plots, two-way tables)
 - Self-assessments (~10 min)

WEDNESDAY, AUGUST 21

- Breakfast (8:45-9am)
- Cohort Bonding Activity** (9AM min)
- Applied Probability** (9:20AM)
 - Conceptual basics, sample space, probability rules
 - Practical activity*: Probability rules practice problems
 - Density curves & Normal distribution
 - Sampling distributions
 - Practical Activity*: Sampling distribution exercise
- Break (10:15AM)

- ❑ **Introduction to Inference** (10:30AM)
 - ❑ Confidence intervals
 - ❑ *Practical activity*: Confidence interval exercise
- ❑ Break (11AM)
- ❑ **Introduction to Significance Tests** (11:15AM)
 - ❑ Logic of Hypothesis testing
 - ❑ Formal hypotheses
 - ❑ Simulation from David Lane
 - ❑ *Practical activity*: Gender and biology practice problem
 - ❑ Think-Pair-Share: Effect of sample size
- ❑ *Take-Home Assignment*: Read 1 of 3 articles on statistical significance for tomorrow's discussion

THURSDAY, AUGUST 22

- ❑ Breakfast (8:45-9am)
- ❑ **Inference Continued** (9AM)
 - ❑ Review of sampling distributions
 - ❑ Test statistics and p-values
 - ❑ *Practical activity*: Poverty practice problem
- ❑ Break (9:45AM min)
- ❑ **Bivariate Relationships** (10AM)
 - ❑ Review of data visualization (two-way plots, two-way tables)
 - ❑ Two-way tables
 - ❑ Scatterplots and correlation
 - ❑ Intro to linear regression
 - ❑ *Practical activity*: Slope-intercept form practice problems
- ❑ Break (10:45AM)
- ❑ **“Significance,” Practically** (11AM)
 - ❑ Discussion of recent scientific debates
 - ❑ Issues with statistical significance
 - ❑ Is the null hypothesis meaningful?
 - ❑ Arbitrary thresholds
 - ❑ Misinterpretation and uncertainty
 - ❑ Solutions
 - ❑ Report uncertainty; explain indicators
 - ❑ Different approaches to asterisks
 - ❑ Mixed methods
- ❑ **Questions, Consultations and Wrap-Up** (11:45AM)
 - ❑ Recap Stats sequence & questions
 - ❑ Evaluations