MONTGOMERY COLLEGE
Department of Mathematics and Statistics
Fall 2018

Course Outline: MATH 117-Elements of Statistics

MATH117 Course Outcomes

Upon course completion, a student will be able to:

- Calculate and interpret confidence interval estimates of population parameters (proportions and/or means)
- Demonstrate an understanding of the importance that random sampling and randomization play in producing data that allow one to draw conclusions about the underlying populations.
- Explain that statistical procedures have specific requirements necessary for their application and verify that the fulfillment of these requirements has been satisfied for the situation with which the student is dealing.
- Express in clearly written form, and always in the context of the particular problem situation, the results of statistical investigations and analyses
- Formulate and conduct tests of significance for population parameters (proportions and/or means) and interpret the results in the original context.
- Use a variety of graphical and numeric tools to explore and summarize categorical and quantitative data, including linear models of associations between two quantitative variables.
- Use statistical software (computer- or calculator-based) to explore and analyze data and interpret the results produced by that software in context.
- Use the results of the central limit theorems for sample proportions and sample means to predict the long-term patterns of variation of those statistics under repeated sampling based on an understanding of the normal distribution.

Datasets listed in the GAISE documents and from other sources
(The list below provides a few places where an instructor can get data).

- OzDASL - http://www.statsci.org/data/multiple.html Datasets categorized by statistical topic.
- Revolution Analytics R Data - http://mran.revolutionanalytics.com/documents/data/ Links to various data sources.
- Kaggle - https://www.kaggle.com/ Website that hosts data analysis competitions. Many datasets here are quite large and very messy. Establishing a free account is necessary for access to the data.
- Data and Story Library (DASL), http://dasl.datadesk.com/
- Nationmaster – http://www.nationmaster.com/ portal to international economic, demographic and social data.
- Public Data Sets - https://github.com/caesar0301/awesome-public-datasets by Xiaming Chen and other contributors
- WISE (Web Interface for Statistics Education) has a collection of demonstrations and tutorials. In addition, a list of data sources posted on their website under helpful links http://wise.cgu.edu/helpful-links/data-sources/
- https://public.enigma.com/ , apparently the world's largest collection of public data – free for non-commercial use under Creative Commons licensing www.enigma.com/blog/the-new-enigma-public
- Consortium for the Advancement of Undergraduate Statistics Education (CAUSE) - links to hundreds of locations for data. https://www.causeweb.org/ On the Home page in the upper right corner type "Datasets" in the Search field.
- Winner data - http://www.stat.ufl.edu/~winner/datasets.html Larry Winner from the Department of Statistics at the University of Florida has amassed hundreds of datasets. Each dataset includes a description.
- Lock5 have a site where you can obtain the datasets for all of their examples: http://www.lock5stat.com/datapage.html

Collection of Open Educational Resources:

OER's Link	Name/Description/Any cost associated?
http://lock5stat.com/statkey/	The Lock5 "StatKey" applets/used by Lock's book/free
http://www.rossmanchance.com/ISIapplets.html	The "ISI" Applets/ used by Tintle's book, authored by Beth Chance/free
http://www.rossmanchance.com/applets/	Rossman/Chance Applet Collection/ used by Rossman's book/free
http://homepage.divms.uiowa.edu/~mbognar/	Matt Bogner has a great site to view many distributions/free
http://www.wolframalpha.com	WolframAlpha/Computational Knowledge Engine/it depends
https://www.geogebra.org/	Geogebra/Dynamic mathematics for learning and teaching mathematics including probability and statistics/free
http://oli.cmu.edu/courses/free-open/statistical-reasoning-course-details/	Statistical Reasoning/Carnegie Mellon University Open Learning Initiatives/free online course
https://www.openintro.org/stat/	OpenIntro/Intro Stat with Randomization and Simulation/free online course
www.montgomerycollege.edu/statistics	Statistics Video Project/Videos/free
https://www.khanacademy.org/math/probability	Khan Academy/Videos/free
https://www.random.org/integers/?mode=advanced	Random Integer Generator/free

USG and UMD-CP Programs Requiring MATH117

Accounting and Accounting CPA Track
Business Administration
Communications and Communications Studies
Criminology and Criminal Justice
Exercise Science
Finance
Information Science and Information Systems
International Business
Kinesiology
Management and Management with a specialization in Entrepreneurship
Marketing
Nursing (RN to BSN) and Nursing (Traditional option)
Operations Management
Psychology
Public Relations
Rhetoric and Political Culture
Social Influence
Social Work

Supply Chain Management

Data Visualization

Topic	Data Visualization
Segregation	Segregation by Cities
Politics	How gerrymandered is your district?
Incarceration	Incarceration Rates – the PrisonPolicyInitiative
	World Incarceration Rates If Every U.S. State & Territory Were A Country
Drugs	The Opioid Epidemic
Immigration	US Immigration
	World Migration
Poverty	World Poverty Family Income and percent of children attending college
Gun Violence	US Gun Deaths
Police Violence	Police Violence
Obesity	Adult Obesity in the United States
Demographics	Racial Data Dot Map (US)
Human Trafficking	Human Trafficking
Life Expectancy Worldwide	Life Expectancy Visualized 25 Ways
	GapMinder
Education	Education Disparity
	International Adult Education Levels
Inequities	Gender pay gap in medicine
Environment	Global Beef Consumption
Imprisoned Journalists	Journalists Jailed Worldwide by Year (CPJ – Committee to Protect Journalists)
Global Health	Global Health - Malaria
LGBTQ	Regional support for same sex marriage
Climate Change	What's really warming the world?
	Global temperature spaghetti plot
	Artic sea ice volume: circles
	Global temperature by month (there hasn't been a cool month in 628 months)
	CO2 levels: a different visualization
	Global Greenhouse Gas Emissions
	CO2 levels: a video
	climate.gov data
	Global temperature
	Artic sea ice; Land ice; Sea level; CO2 levels
	Flowing data's collection of geographic data visualizations
	Temperature on a globe: video
	Climate change in US cities
	NOAA Global Data
	Global temperature: different data sources
	Global temperature
	Perception of global warming
	Oceans absorbing heat
	Weather lines
	Weather circles