Math 485, Section 1, Spring 2026. MWF 2:00-2:50 EGRA 0420

Instructor: David Olive Prereq: Math 483. A little linear algebra is used.

Course Webpage: http://parker.ad.siu.edu/Olive/M485.html

Text: Agresti, A. (2007), *An Introduction to Categorical Data Analysis*, 2nd ed., Wiley, Hoboken, NJ. ISBN: 978-0471226185 ≈ $15. You may also use the 1st or 3rd edition. The 1st edition is under $10 at www.addall.com. Also see www.amazon.com.

Also see 1) Olive, D.J. (2010, ch. 10–11), *Multiple Linear and 1D Regression*, (http://parker.ad.siu.edu/Olive/regbk.htm); and 2) Olive, D.J. (2025, chs. 2, 4), *Prediction and Statistical Learning*, (http://parker.ad.siu.edu/Olive/slearnbk.htm).

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I am also available by appointment and on a walkin basis, e.g. before class.

This course covers simple random samples, stratified and cluster samples, and ratio estimation. Categorical data techniques include the chi-square test, logistic regression, generalized linear models and loglinear models. Machine Learning ≈ Statistical Learning techniques include training data and test data, logistic regression, the bootstrap, forward selection, and lasso. We will use the software packages SAS, Minitab, ARC, and R. The four packages are in the Necker's computer lab, where class will be held several times to demonstrate the software. ARC and R are free programs and can be downloaded on a PC.

Cumulative Final: day TBA week of May 4–8, time TBA

The grading and syllabus below are tentative. Last day to drop: Friday, March 27.

Students receive a WF if they stop attending class and fail. An INC is given if for reasons beyond their control, students engaged in *passing* work are unable to complete all class assignments. One HW may be turned in one class period late with 25% penalty except for the last week of classes. One or more sheets of notes are allowed on quizzes, more for exams. A calculator is permitted. Grades of A−, B+ are sometimes given.

Grading:

HW	300	drop 1 HW	Quizzes	100	
exam1	100	exam 2	100	exam 3	100
final	300			total	1000
min. grade	points	min. grade	points	min. grade	points
A	900-1000	B	800-899	C	700-799
D	550-699				

Week of	MON	WED	FRI
Jan 12	SRS	SRS	SRS
Jan 19	no class	stratified random sample	strat ... sample, HW1, Q1
Jan 26	cluster	sample,	ratio HW2, Q2
Feb 2	estimation	1.1, 1.2, Q3	1.3, 1.4, HW3
Feb 9	2.1, 2.2,	Exam1	2.4
Feb 16	lab?	2.4,4.1,Q4	4.1,4.2,HW4
Feb 23	4.2,4.4	4.4,Q5	5.1, 5.2,HW5
Mar 2	5.2	5.2	4.3, HW6
Mar 9	no class	no class	no class
Mar 16	4.3	Exam2	4.3, 4.4
Mar 23	lab?	4.4, Q6	4.4, HW7
Mar 30	3.1,3.2	3.3,Q7	GAM?,2.3,HW8
Apr 6	2.3	2.3,Q8	2.7,HW9
Apr 13	lab?	Exam3	2.7
Apr 20	2.7	7.1,Q9	7.1, HW10
Apr 27	7.2, Q10	7.2, HW11	review

Survey Sampling: There are many books on survey sampling at the library. A good survey sampling text will refer to Cochran many times.

Mendenhall, W., Ott, L. and Scheaffer, R.L. (1971), *Elementary Survey Sampling*, Wadsworth, Belmont, CA. (my favorite reference, cheap) 311.21M537e, 311.21M537e in the library. Many later editions.

Kalton, G. (1982), *Introduction to Survey Sampling*, Sage Publications, Beverley Hills, CA. (ok and cheap) ISBN: 0803921268   519.52k14i1983

Cochran, W.G. (1963, 1977), *Sampling Techniques*, 2nd and 3rd ed., Wiley, New York, NY. 311.21c6635 (classic, proofs, 400 to 500 level)

Bart, J., Fligner, M.A., and Notz, W.I. (1998), *Sampling and Statistical Methods for Behavioral Ecologists*, Cambridge University Press, New York, NY. 590.15195 B283s 1998.

Cyert, R.M. and Davidson, H.J. (1962), *Statistical Sampling for Accounting Information*, Prentice Hall, Englewood Cliffs, NJ. (good)

G.T. Henry *Practical sampling,* 1990, 300.723 H522P

P.R. Krishnaiah, C.R. Rao (editors), *Handbook of statistics. v. 6 Sampling*, 519.52s192

Levy, P.S., and Lemeshow, S. (2008), *Sampling of Populations,* 4th ed., Wiley, New York, NY. (good), 2nd ed: 304.60151952L668s1991

Lohr, S.L. (2010), *Sampling: Design and Analysis*, 2nd ed., Brooks/Cole, Boston, MA. (standard text)

Thompson, S.K. (2002), *Sampling*, 2nd ed., Wiley, New York, NY. (standard text)

Categorical Data = Discrete Multivariate Analysis:

Agresti, A. (2013), *Categorical Data Analysis*, 3rd ed., John Wiley and Sons, Hoboken, NJ. $60

Simonoff, J.S. (2003), *Analyzing Categorical Data*, Springer-Verlag, NY.