

Course Announcement MATH 580: Statistical Theory, Spring 2012, 10:00-10:50 MWF  
WHAM 0305

This course will cover the theoretical background for statistical procedures in the location model. Topics will include

- minimal sufficient and complete statistics,
- maximum likelihood estimation,
- method of moments,
- the Cramer-Rao lower bound and uniformly minimum variance estimators,
- estimators that minimize the mean squared error,
- uniformly most powerful tests, and
- likelihood ratio tests
- Central limit theorem, delta method and convergence in distribution.

The text for this course will be *A Course in Statistical Theory* by David J. Olive and will be available online or from the instructor for \$20.

To some extent, the course is the study of regular exponential families. Additional topics can be covered upon request. The prerequisites for this class are Math 483 or Math 480. You should be familiar with the normal, gamma, binomial, Poisson and exponential distributions, and there is a considerable amount of integration, differentiation, and optimization.

This type of course is taken by every student who is interested in obtaining a graduate degree in statistics. At SIU, Math 580 is one of the four courses from which Ph.D. students regularly take qualifying exams.

This course is also good for people who know that they are going to use statistical theory: for example, Econometrics, Psychology, Educational Psychology, and Electrical Engineers who are taking or plan to take ECE 563, ECE 551, ECE 552 and ECE 555. For actuaries, Math 580 is useful for CAS EXAM 3 Part A (statistics).

For more information contact David Olive, 261 Neckers.  
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Math 580, Section 001, Spring 2012. MWF, 10:00-10:50, WHAM 0305

*Instructor:* David Olive

*Text:* *A Course in Statistical Theory* by David J. Olive, available online or from the instructor for \$20.

*Office:* (J.W.) Neckers 261 (wing A) *Phone:* (618)-453-6566

*email:* dolive@math.siu.edu , *Office hours:* MWThF TBA

I am also available by appointment and on a walkin basis.

This course covers minimum sufficient and complete statistics, maximum likelihood estimation, method of moments, the Frechet-Cramer-Rao lower bound and uniformly minimum variance estimators, estimators that minimize the mean squared error, uniformly most powerful tests, likelihood ratio tests, confidence intervals, consistency, central limit theorem, convergence in distribution, and the delta method.

*Final:* 7:50-9:50 AM in the morning Monday, May 7 (emphasis is on the above topics: ch.4 - § 8.4).

The grading below is tentative. (Drop day in Friday, March 16 with advisor, Sunday, March 18 online.)

2 homeworks may be turned in one class period late (ie on Friday) with no penalty. A third late will be accepted with 25% penalty. 2 quizzes may be taken late before the next class period (ie on Monday). Two sheets of notes are allowed on quizzes but not on exams. A calculator is permitted.

*Grading:*

HW	300		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 16	no class	1.1-1.4, 1.5	1.5 1.6
Jan 23	1.6	2.1, HW1	2.1, 2.2, Q1
Jan 30	2.2, 2.3	2.4 HW2	2.4, 2.5, Q2
Feb 6	2.5	2.6 HW3	2.6, Q3
Feb 13	2.7, 2.8	EXAM 1: § 1.1-2.5	2.8, 2.9
Feb 20	2.9, 3.1	3.1, HW4	3.2, Q4
Feb 27	3.2, 4.1	4.1, HW5	4.2, Q5
March 5	4.2	EXAM 2	4.2
March 12	no class	no class	no class
March 19	4.2	4.2, HW6	5.1, Q6
March 26	5.1,	5.1, 5.2, HW7	5.2, Q7
April 2	5.2, 6.1	HW8	6.2, Q8
April 9	6.2,7.1	7.1, HW9	7.1, Q9
April 16	7.1, 7.2	7.2, HW10	7.2, Q10
April 23	7.2, 8.1	8.1	8.2, HW11
April 30	8.3,8.4, Q11	EXAM 3	rev