

April 2012: The SIU Math department occasionally produces a **Ph.D. in Statistics**, but **many universities offer an easier path to a PhD in Statistics**. A good Ph.D. statistics degree would include a year in probability and measure (we have a semester 581), a year in inference (we have a semester: 580), a semester of large sampling theory, a semester of linear models and a semester of multivariate analysis. So **the SIU PhD stat degree is short by 5 courses**. Educational Psychology has a weak but formal PhD program in statistics. **You must meet the Math PhD requirements. My students need to take Math 581** which is offered every year, but may not run every year. **My students** should take the **qual in Math 580**. Math 501 and Math 581 should either be taken in the qual or as part of the **tested minor on the oral exam**. Taking Math 501 on the qual and having a tested minor including Math 581 is acceptable.

Theory: Math 501 (real analysis)

Math 480, Math 481, Math 581, Math 582 (probability)

Math 580 (statistical inference)

Math 575 (matrix computations, as a substitute for the theory of linear models)

Computer language: ECE 222 (FORTRAN or C) or CS 202 (JAVA)

Applied: Math 484 or EPSY 507 and 508 (multiple linear regression and experimental design) (design is taught in EPSY 508, ANS 500, ENGR 540 and PSYCH 522)

multivariate analysis (Psych 524, BA 575, sometimes Math 583 or EPSY 580)

Math 485 (sampling and categorical data analysis or nonparametric statistics)

Math 473 (reliability and survival analysis)

Math 474 (time series)

2 to 4 of Math 583 (advanced topics)

Electives: Advanced topics: Math 583, sometimes POLS 501 and 502, sometimes EPSY 580.

Math 473 (or MFGS 540 reliability and survival methods, **actuarial exam 3**)

Math 582 (advanced topics in probability)

Math 481 (or EE 551 stochastic processes)

Math 575 (numerical linear algebra)

Econ 567ABC and 575AB (econometric theory)

Psych 569 (statistical consulting)

CS 586 (pattern recognition)

IT 475 or MFGS 510 (quality control)

Psych 528 (decision theory)

EAHE 585 or MCMA 532 (survey research methodology)

Math 471 (nonlinear programming = optimization)

SAS Programming is taught in some sections of EPSY 507 and 508 and POLS 503AB.

GEOG 510 has regression and multivariate methods

EE 555 (information theory)

Geog 410 (spatial analysis)

ZOOL 557 (biostatistics)

ZOOL 558 (advanced biostatistics)

Math 502 or 551 (functional analysis)

Math 475 (numerical analysis)

The most important applied courses in statistics that are regularly given by most stat programs are 1) multiple linear regression, 2) (tie) experimental design, 2) (tie)

multivariate analysis, 4) categorical data analysis, 5) reliability theory and survival analysis, 6) quality control, 7) survey sampling, 8) time series, 9) distribution free statistics. Advanced topics like robust statistics, regression graphics, nonlinear regression, and non-parametric regression can be more important than 6)–9), but are not offered every year.