August 2018: 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 3 courses**, and linear models and multivariate analysis rarely run. Quantitative Methods in Education has a PhD program roughly in Evaluation, Measurement and 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 584: Linear Models

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

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

Math 585: multivariate statistical analysis (QUAN 580c, Psych 524, BA 575, sometimes offered as Math 583)

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

Math 473 (reliability and survival analysis)

Math 474 (time series)

Math 486 (statistical computing)

2 to 4 of Math 583 (advanced topics)

Math 586: Statistical Computing and Learning

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

Math 473 (or MFGS 540 reliability and survival methods)

Math 582 (advanced topics in probability)

Math 481 (stochastic processes)

Math 575 (numerical linear algebra)

CS 586, ECE 568 (pattern recognition)

ECE 551=ENGR 521 (like Math 480 probability and stochastic processes)

Econ 567ABC and 575AB (econometric theory)

ENGR 540 (experimental design)

Psych 569 (statistical consulting)

IT 475, IT 470ab or MFGS 510 (quality control)

QUAN 533, EAHE 585 or MCMA 532 (survey research methodology)

Math 471 (nonlinear programming = optimization)

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

GEOG 510 has regression and multivariate methods

ECE 555 (information theory)

Geog 410 (spatial analysis)

ZOOL = PLB 557 (biostatistics, SAS)

ZOOL = PLB 558 (advanced biostatistics, SAS)

Math 502 or 551 (functional analysis)

Math 475 (numerical analysis)

Actuarial mathematics: Math 400 Interest Theory and Financial Derivatives

Math 401 Life Contingencies I, Math 402 Life Contingencies II

Math 403 Loss Models I, Math 404 Loss Models II

The most important applied coursed 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, nonparametric regression, and statistical learning can be more important than 6)–9), but may not be offered every year.