W MEASUREMENT & STATISTICS + *Quant Friends*

College of Education

Quant Research Methods Courses

FOCUS/AGENDA	RECOMMENDED COURSES
Master's in education (in general)	EDPSY 490, 538, 517 *and potentially 513 + EDSPE/EDLPS courses (this page)*
Design, implement, analyze a **small-scale survey project**	EDPSY 490, 538, 513, 539 *and potentially 517 and 575/576/591*
Analysis of **education policy** data	EDPSY 490, 538 *and EDLPS courses (this page)*
Educational **measurement**-oriented cognate (doctoral students)	EDPSY 490, 538, 539, 591 *and potentially 558/559/561 or 592/593/594*
Educational **statistics**-oriented cognate (doctoral students)	EDPSY 490, 538, 539, 575 *or* 576 *and potentially 588/595 or 596/597*

Note. For doctoral students who have taken regression, we also recommend advanced quant courses through CSSS/STAT and PUBPOL, as appropriate. Please refer to OnCourse for future College of Education offerings of courses listed below.

TIER 1: INTRODUCTORY COURSES

Basic Educational Statistics - EDPSY 490	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** all levels, including undergraduates, graduates, and post-doctoral researchers *(Note: course meets QSR requirement for undergraduates)* • **Prepares** students to critically evaluate statistics encountered in everyday life, and serves as a pre-requisite for more advanced courses *(Note: course can be waived as pre-req. to other courses if student passes online screener exam or has a degree in Statistics; for info email: lizz@uw.edu)* • **Covers** language, logic, ethics, and computations associated with hypothesis testing, including measurement assumptions, sampling distributions, 1- and 2-goup z, t-, and χ^2 tests, and simple regression; *SPSS* workshop offered at end of course	None (Basic Algebra Recommended)	**EDPSY** 490	3	AUT WIN SPR SUM	All M&S Faculty & M&S Doc Students

Applied Behavior Analysis (Single-Case Research) - EDSPE 511	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in special educ and school psych, but all graduates welcome • **Prepares** students to design, implement, and evaluate the effects of interventions for individuals or small groups in home, school, and communities • **Covers** single-case research design logic, appropriate research questions, critiquing research, and writing a research proposal	EDSPE 571 or equivalent preparation	**EDSPE** 511	3	WIN	Spaulding

Policy Evaluation - EDLPS 568	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in educational policy, but all graduates welcome • **Prepares** students to evaluate educational policies • **Covers** basic understanding of common qualitative and quantitative research designs related to education and other social sciences	None	**EDLPS** 568	3	SPR	Knight

Assessment & Evaluation in Higher Education - EDLPS 593	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** education policy graduates, but all graduates welcome • **Prepares** students to design program evaluation plans in school contexts, including quantitative and qualitative aspects • **Covers** basic program assessment and evaluation approaches; uses *Excel*	None (EDPSY 490 Recommended)	**EDLPS** 593	3	SPR	Bowen

Secondary Data Analysis - EDLPS 596	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** education policy graduates, but all graduates welcome • **Prepares** students to consume basic statistics, work with large-scale data, present statistical results, and utilize data to advance equitable educational practice • **Covers** descriptive/inferential statistics, and data visualization; uses *Excel, SPSS*	None (EDPSY 490 Recommended)	**EDLPS** 596		WIN	Gehrke

TIER 2: INTERMEDIATE COURSES (PRE-REQ: EDPSY 490)

Survey Instrument Design - EDPSY 513	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in education, but all graduates welcome • **Prepares** students to plan, design, and implement an online survey • **Covers** basic sampling plans, item writing best practices, and online questionnaire implementation using *Qualtrics*	EDPSY 490	**EDPSY** 513	3	WIN	Li

Applied Measurement in Ed Research - EDPSY 517	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in learning sci/school psychology, but all graduates welcome • **Prepares** students to review literature and plan research for measuring latent variable constructs (e.g., *belongingness*, *resilience*, *self-efficacy*, etc.) • **Covers** introductory measurement reliability and validity, critical quantitative perspectives, APA-style writing, and common quantitative research designs	EDPSY 490	**EDPSY** 517	3	SPR	Sanders

Multiple Regression - EDPSY 538	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in education, but all graduates welcome • **Prepares** students to understand and conduct multiple linear and logistic regression • **Covers** introductory matrix/linear algebra, and applied multiple regression analysis; *SPSS* and *R* used	EDPSY 490	**EDPSY** 538	3	WIN	Olvera Astivia & Sanders

TIER 3: ADVANCED COURSES (PRE-REQ: EDPSY 538)

Classic Test Theory: Reliability & Validity - EDPSY 539	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in education, but all graduates welcome • **Prepares** students to understand and conduct classic reliability and validity analyses for surveys and assessments measuring latent constructs • **Covers** in-depth understanding of true score theory and psychometrics, including all classic forms of reliability and validity analyses; uses *Excel*, *SPSS*	EDPSY 538	**EDPSY** 539	3	SPR	Li & Olvera Astivia

Structural Equation Modeling (SEM) I - EDPSY 575	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in education, but all graduates welcome • **Prepares** students to understand and conduct exploratory and confirmatory factor models, and latent structural regression models for metrical dependent variables • **Covers** factor analysis and structural regression models; uses *R*	EDPSY 538	**EDPSY** 575	3	SPR	Olvera Astivia

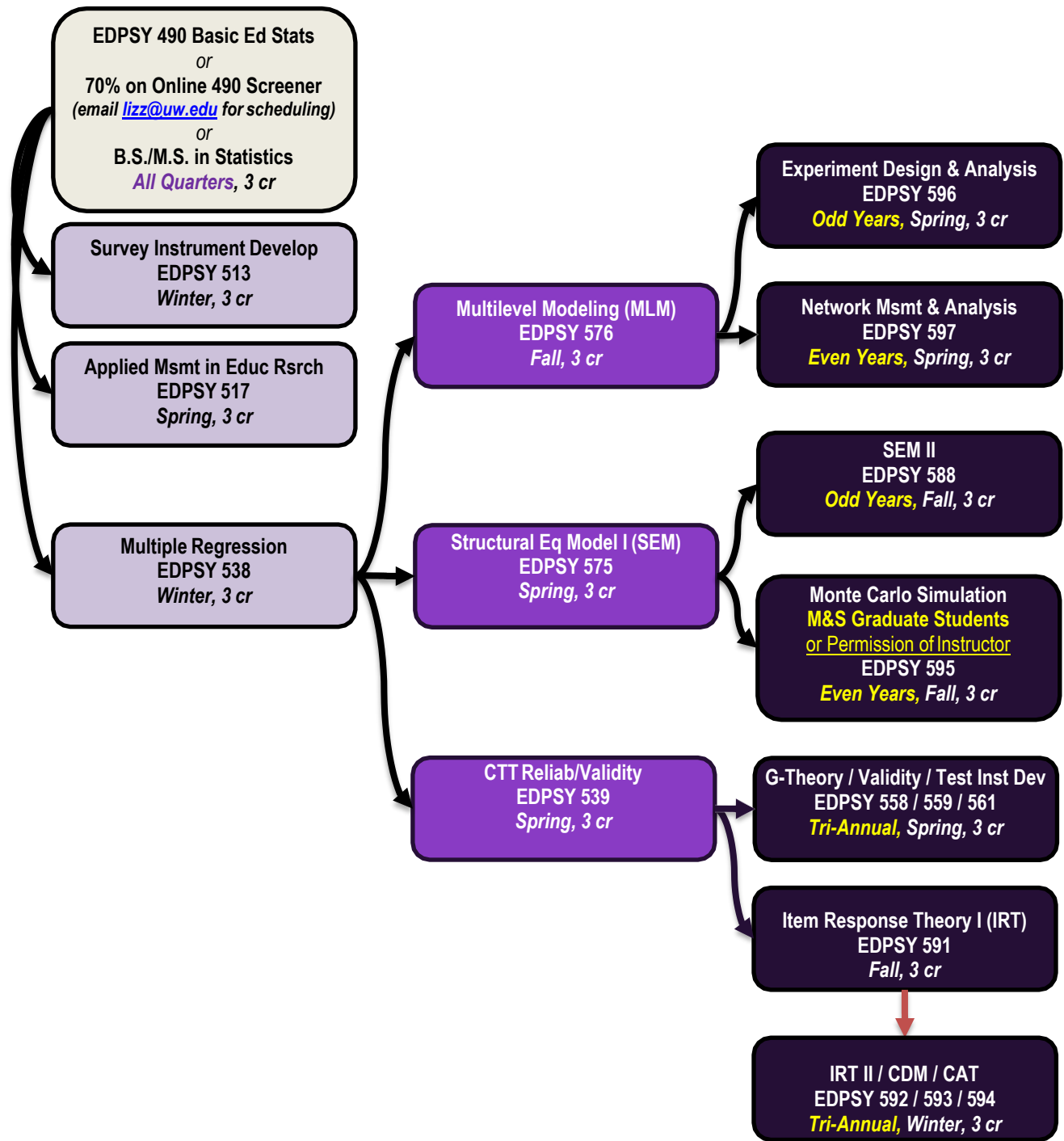| Multilevel Modeling (MLM) - EDPSY 576	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in education, but all graduates welcome • **Prepares** students to understand and analyze nested data (e.g., students in schools and measurements in people) using multilevel linear and logistic models • **Covers** 2- and 3L linear and logistic cross-sectional and longitudinal models; uses *R*	EDPSY 538	**EDPSY** 576	3	AUT	Sanders

TIER 4: MORE ADVANCED COURSES (more specific PRE-REQs)

Validity Theory - EDPSY 559	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in educational measurement, but all graduates welcome • **Prepares** students to rigorously evaluate *validity claims* about instruments (assessments, checklists, surveys), including consequential validity/criticality • **Covers** in-depth understanding of validity theory frameworks in evaluating validity claims about instruments	EDPSY 539	**EDPSY** 559	3	*Tri-annual* SPR	Li

Item Response Theory Modeling (IRT) I - EDPSY 591	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in education, but all graduates welcome • **Prepares** students to understand and analyze items from surveys and assessments to create modern measurement scales • **Covers** concepts and applications of IRT models, including Rasch, 2-, and 3-PL models; uses *R*, *flexMIRT*	EDPSY 539	**EDPSY** 591	3	AUT	Wang

Structural Equation Modeling (SEM) II - EDPSY 588	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in educational measurement, but all graduates welcome • **Prepares** students to understand and conduct factor models for categorical data • **Covers** higher-level SEM topics such as power analyses, factor models for binary outcomes, and latent class models; uses *R*, *Mplus*	EDPSY 575	**EDPSY** 588	3	*Odd years* AUT	Olvera Astivia

Generalizability Theory - EDPSY 558	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in educational measurement, but all graduates welcome	EDPSY 539	**EDPSY** 558	3	*Tri-annual* SPR	Li
• **Prepares** students to evaluate *measurement errors* associated with instruments (assessments, checklists, surveys), and optimize instrument designs					
• **Covers** in-depth understanding application of generalizability theory in G and D studies; uses *SPSS, Genova, urGenova*					

Test Instrument Develop - EDPSY 561	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in educational measurement, but all graduates welcome	EDPSY 539	**EDPSY** 561	3	*Tri-annual* SPR	Li
• **Prepares** students to rigorously evaluate and design *cognitive/learning assessments*					
• **Covers** measurement concepts, theoretical frameworks, and empirical findings for developing academic/cognitive assessment items individually and as a whole					

Item Resp Theory (IRT) II - EDPSY 592	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in educational measurement, but all graduates welcome	EDPSY 591	**EDPSY** 592	3	*Tri-annual* WIN	Wang
• **Prepares** students to understand and conduct advanced IRT methods, including multidimensional, multi-level, and equipercentile IRT models					
• **Covers** concepts and analysis models, as well as current issues, in advanced IRT IRT methods; uses *R, flexMIRT*					

Cognitive Diag Model (CDM) - EDPSY 593	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in educational measurement, but all graduates welcome	EDPSY 591	**EDPSY** 593	3	*Tri-annual* WIN	Wang
• **Prepares** students to carry out different cognitive diagnostic models (CDMs) for item-level data to create skill profiles for formative assessment					
• **Covers** in-depth exploration of CDMs including DINA and GDINA models; uses *R*					

Computer Adapt Tests (CAT) - EDPSY 594	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in educational measurement, but all graduates welcome	EDPSY 591	**EDPSY** 594	3	*Tri-annual* WIN	Wang
• **Prepares** students to design and evaluate adaptive testing for both latent measurement scales and classification					
• **Covers** in-depth exploration of CAT algorithms for unidimensional, multidimensional, categorical latent traits/profiles; uses *R*					

Monte Carlo Simulations - EDPSY 595	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in educational measurement, or with permission of instructor	EDPSY 575	**EDPSY** 588	3	*Even years* AUT	Olvera Astivia
• **Prepares** students to evaluate, design, and conduct a Monte Carlo simulation study					
• **Covers** simulation of univariate and multivariate normal and non-normal data, applying models to simulated data, saving simulation results, and assessing properties of simulated results; uses *R*					

Experim Design & Analysis - EDPSY 596	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in educational measurement, but all graduates welcome	EDPSY 576	**EDPSY** 596	3	*Odd years* SPR	Sanders
• **Prepares** students for design and analysis of experimental (randomized) research					
• **Covers** individual-, cluster-, and stratified-randomized designs and analyses, with some coverage of SMART (adaptive) designs; uses *R*					

Network Measure & Analysis - EDPSY 597	Pre-Req	Course	CR	Offered	Taught By
• **Geared for** graduates in educational measurement, but all graduates welcome	EDPSY 576	**EDPSY** 597	3	*Even years* SPR	Sanders
• **Prepares** students for measuring and analyzing network data (connections among individuals, rather than individuals)					
• **Covers** descriptive and inferential statistical applications, with emphasis on exponential random graph models (ERGMs); *R* used					

MEASUREMENT & STATISTICS

College of Education

EDPSY 490 Basic Ed Stats
or
70% on Online 490 Screener
(email lizz@uw.edu for scheduling)
or
B.S./M.S. in Statistics
All Quarters, 3 cr

**Survey Instrument Develop
EDPSY 513
*Winter, 3 cr***

**Applied Msmt in Educ Rsrch
EDPSY 517
*Spring, 3 cr***

**Multiple Regression
EDPSY 538
*Winter, 3 cr***

**Multilevel Modeling (MLM)
EDPSY 576
*Fall, 3 cr***

**Experiment Design & Analysis
EDPSY 596
*Odd Years, Spring, 3 cr***

**Network Msmt & Analysis
EDPSY 597
*Even Years, Spring, 3 cr***

**Structural Eq Model I (SEM)
EDPSY 575
*Spring, 3 cr***

**SEM II
EDPSY 588
*Odd Years, Fall, 3 cr***

**Monte Carlo Simulation
M&S Graduate Students
or Permission of Instructor
EDPSY 595
*Even Years, Fall, 3 cr***

**CTT Reliab/Validity
EDPSY 539
*Spring, 3 cr***

**G-Theory / Validity / Test Inst Dev
EDPSY 558 / 559 / 561
*Tri-Annual, Spring, 3 cr***

**Item Response Theory I (IRT)
EDPSY 591
*Fall, 3 cr***

**IRT II / CDM / CAT
EDPSY 592 / 593 / 594
*Tri-Annual, Winter, 3 cr***

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*Counts towards Psychometrics & Applied Analytics (PAA) graduate certificate
PAA info: https://education.uw.edu/academics/program/psychometrics-applied-analytics-certificate

CTT = Classic Test Theory
CDM = Cognitive Diagnostic Modeling
CAT = Computerized Adaptive Testing