



## Pharmacoeconomic, Epidemiology, and Pharmaceutical Policy and Outcomes Research (PEPPOR) Graduate Program

Front from left: 2010 Graduates Rupali Nail, PhD & Pallavi Jaiswal, MS; Back from left: PEPPOR faculty: Dr. Ludmila Bakhireva, Dr. Matthew Borrego, Dr. William Troutman, Dr. Nasreen Khan, Dr. Melanie Dodd; not shown: Dr. Dennis Raisch, 2010 graduates Heather Campbell, MS & Vishal Bali, MS

### Curriculum & Suggested Plan of Study

### MS Program with a PEPPOR Emphasis

#### FIRST YEAR-FALL

Core	For international students and/or no pharmacy background	<b>PHRM 707 - Pharmacy and Health Care Delivery (Borrego)</b>	3
		<b>PHRM 591 - Seminar in Administrative Pharmacy (faculty alternate)</b>	1
		<b>PHRM 546* - Pharmacy and Its Environment (Raisch)</b>	3
	Select one statistics course from the following:		EDPY 511 - Introductory Educational Statistics
		STAT 538 - Biostatistical Methods I for Public Health & Medical Sciences	3
		STAT 527- Advanced Data Analysis I	3
Suggested electives	Strongly recommended	PH 502 - Epidemiologic Methods I	2
		MGMT 504 - Microeconomics for Managers	3
		HED 506-Health Behavior	3

#### FIRST YEAR-SPRING

Core	Select one statistics course from the following:	<b>PHRM 591 - Seminar in Administrative Pharmacy (faculty alternate)</b>	1	
		<b>PHRM 545* - Pharmacy and Its Environment* (Borrego)</b>	3	
			EDPY 603 - Applied Statistical Design and Analysis	3
			STAT 539-Biostat Meth II	3
Suggested electives	Strongly recommended	PH 520 - Epidemiologic Methods II	3	
			EDPY 515 - Survey and Questionnaire Design and Analysis	3
			MGMT 504 - Microeconomics for Managers	3
			HED 506-Health Behavior	3
			PH 507 Health care systems	3

\*Offered every other year

**Courses taught by the Pharmacy Administration faculty are in bold font.**

## SECOND YEAR-FALL

Core		<b>PHRM 591</b> - Seminar in Administrative Pharmacy (faculty alternate)	1
	Select one statistics course from the following:	<b>EDPY 604</b> - Multiple Regression Techniques as Applied to Education	3
		STAT 540-Regression Analysis	3
Suggested electives		STAT 525 - SAS Programming (currently not offered)	
		PH 534-Epidemiologic data analysis	3
		ECON 410 - Health Economics	3

## SECOND YEAR-SPRING

Core		<b>PHRM 591</b> - Seminar in Administrative Pharmacy	1
		<b>PHRM 547*</b> - Pharmacy Practice Research (Bakhireva)	3
		<b>PHRM 599</b> – Master’s Thesis	
Suggested electives	Select one statistics course from the following:	STAT 528-Advanced Data Analysis II	3
		STAT 574-Biostatistical Methods: Survival analysis & logistic regression	3
		STAT 445./545. Analysis of Variance and Experimental Design	3
<b>Required Credit Hours</b>			<b>32</b>

\*Offered every other year

**Courses taught by the Pharmacy Administration faculty are in bold font.**

### Available Courses in Statistics by the Difficulty Level

#### Level I (beginner)

EDPY 511 - Introductory Educational Statistics  
 STAT 527- Advanced Data Analysis I (fall course)  
 STAT 527- Advanced Data Analysis I (fall course)

#### Level II (intermediate)

EDPY 603 - Applied Statistical Design and Analysis  
 EDPY 604 - Multiple Regression Techniques as Applied to Education  
 STAT 528-Advanced Data Analysis II  
 STAT 539-Biostat Meth II (spring course)

#### Level III (advanced)

STAT 540-Regression Analysis (fall course)  
 STAT 574-Biostatistical Methods: Survival Analysis & Logistic Regression

#### Level III (advanced) recommended for PhD students

STAT 481./581 Introduction to Time Series Analysis (alternate spring)  
 EDPY 607. Structural Equation Modeling.  
 EDPY 606. Applied Multivariate Statistics.  
 STAT 445./545. Analysis of Variance and Experimental Design (spring course)

[back to top](#)

## Course Descriptions

### **ECON \*410. Topics in Health Economics. (3, no limit)**

Specialized topics in health care economics including medical education, national health insurance, comparative systems, drug industry and other contemporary issues. Emphasis on empirical applications in the study of health care issues. For course content, consult the economics department.

Prerequisite: 300 and 335.

### **EDPY 511. Introductory Educational Statistics. (3)**

Foundations of statistical methods for research producers. Covers sampling methods, descriptive statistics, standard scores, distributions, estimation, statistical significance testing, t-tests, correlation, chi-square and effect size using SPSS® for Windows and computation.

Pre- or corequisite: 505.

### **EDPY 515 - Survey and Questionnaire Design and Analysis (3)**

Covers survey research from item writing and survey development to sampling, administration, analysis and reporting. Emphasizes applications and interpretations in educational and social science research and use and interpretation of statistical software for survey research

### **EDPY 603 - Applied Statistical Design and Analysis (3)**

Includes factorial analysis of variance (ANOVA), planned comparisons, post hoc tests, trend analysis, effect size and strength of association measures, repeated measures designs. Emphasis on solving applied problems using statistical analysis with computer software.

### **EDPY 604 - Multiple Regression Techniques as Applied to Education (3)**

Includes bivariate regression, multiple regression with continuous and categorical independent variables and interactions, orthogonal and nonorthogonal designs and selected post hoc analyses. Computer analysis, conceptual understanding and applications to educational research are stressed.

### **EDPY 606. Applied Multivariate Statistics. (1-3, may be repeated twice) Δ**

Advanced statistical techniques including discriminant function analysis, multivariate analysis of variance, canonical correlation, principal components analysis and exploratory factor analysis. Emphasis on conceptual understanding and use and interpretation of computer software.

Prerequisite: 603. Grading Option: A+, A, A-, B+, B, B-, C+,C, F, CR/NC.

### **607. Structural Equation Modeling. (3)**

Theory, application, interpretation of Structural Equation Modeling (SEM) techniques. Includes covariance structures, path diagrams, path analysis, model identification, estimation and testing; confirmatory factor analysis, structural equation modeling and linear structural relations using latent variables.

Prerequisite: 604 or 606.

### **HED 506. Health Behavior. (3)**

This course explores multiple theories and models and their application in the development of health promotion programs to support change within individuals, families and communities.

### **MGMT 504 - Microeconomics for Managers (3)**

This is a course in microeconomics, which is the study of individual decision making in a world in which wants exceed the available resources.

**PH 502 - Epidemiologic Methods I (2)**

Provides an overview of the methods of epidemiologic research. Designed to provide students with the capability of understanding epidemiologic measures of disease occurrence, interpreting the findings of epidemiologic studies and integrating the results of epidemiologic research into public health practice.

**PH 507. Health Care Systems. (3)**

Provides an overview of how health care is delivered in the United States. A wide variety of delivery and payment methods are examined. In addition, the U.S. health care delivery systems will be compared to Native American, U.S. Mexican Border, Canadian and Cuban systems. Core option for students admitted any year; required for students year 2000 and later. {Spring}

**PH 520 - Epidemiologic Methods II (3)**

Provides a good understanding of the principles and methods involved in the design, conduct, analysis and interpretation of epidemiologic research.

**PH 534 - Epidemiology Data Analysis (3)**

Students will learn how to conduct a careful epidemiologic data analysis. The focus of the course is developing the practical and critical thinking skills to conduct an epidemiologic data analysis.

**PHRM 707 - Pharmacy and Health Care Delivery (3)**

Marketing and economic concepts of pharmacy practice, with a focus towards marketing of pharmaceutical services and products, pharmacy finance and economics in operations, pharmacoeconomics and decision-making.

**PHRM 545 - Pharmacy and Its Environment (3)**

Exploration of the cultural foundations of pharmacy. Development of the present state of practice. Social and psychological factors in drug use. Role of the pharmacist as a health practitioner.

**PHRM 546 - Pharmacy and Its Environment (3)**

Exploration of the cultural foundations of pharmacy. Development of the present state of practice. Social and psychological factors in drug use. Role of the pharmacist as a health practitioner.

**PHRM 547. Pharmacy Practice Research. (3)**

An introduction for graduate students in pharmacy administration to issues in pharmacy practice research. Research process, methods, measurement, tools, designs and ethics.

**STAT \*\*527./427. Advanced Data Analysis I. (3)**

Statistical tools for scientific research, including parametric and non-parametric methods for ANOVA and group comparisons, simple linear and multiple linear regression and basic ideas of experimental design and analysis. Emphasis placed on the use of statistical packages such as Minitab® and SAS®. Course cannot be counted in the hours needed for graduate degrees in Mathematics and Statistics.

Prerequisite: 145. {Fall}

**STAT 528./428. Advanced Data Analysis II. (3)**

A continuation of 527 that focuses on methods for analyzing multivariate data and categorical data. Topics include MANOVA, principal components, discriminate analysis, classification, factor analysis, analysis of contingency tables including log-linear models for multidimensional tables and logistic regression.

Prerequisite: 527.

**STAT \*\*538. Biostatistical Methods I for Public Health and Medical Sciences. (3)**

Covers basic statistical methods, including statistical summaries and inference. Methods of summarizing data include graphical displays and numerical summaries. Statistical inference includes hypothesis testing and confidence intervals. Methods for continuous and categorical data are studied.

Prerequisite: B or better in MATH 121. {Fall}

**STAT 539. Biostatistics Methods II–Introduction to Statistical Modeling. (3)**

Covers basic models used in the statistical analysis of studies in the medical sciences and public health field, with an emphasis on epidemiology. Linear regression, analysis of variance, logistic regression and survival models are studied.

Prerequisite: Biostat I. {Spring}

**STAT 540 - Regression Analysis (3)**

Simple regression and multiple regression. Residual analysis and transformations. Matrix approach to general linear models. Model selection procedures, nonlinear least squares, logistic regression. Computer applications.

**STAT 525 - SAS Programming (Currently not offered)**

A detailed introduction to the SAS programming language. Topics covered include reading data, storing data, manipulating data, data presentation, graphing, and macro programming. SAS software will be used.

**STAT 445./545. Analysis of Variance and Experimental Design. (3)**

A data-analytic course. Multifactor ANOVA. Principles of experimental design. Analysis of randomized blocks, Latin squares, split plots, etc. Random and mixed models. Extensive use of computer packages with interpretation, diagnostics. Prerequisite: 440.

**STAT 574. Biostatistical Methods: Survival Analysis and Logistic Regression. (3)**

A detailed overview of methods commonly used to analyze medical and epidemiological data. Topics include the Kaplan-Meier estimate of the survivor function, models for censored survival data, the Cox proportional hazards model, methods for categorical response data including logistic regression and probit analysis, generalized linear models.

Prerequisite: 528 or 540.