Economic, Political and Policy Sciences

**EPPS 6302** Methods of Data Collection and Production (3 semester credit hours) Course examines interview-based and self-administered data collection methods, including mobile web and SMS interviews, and newer data sources such as social media. Concentrates on the effects of different techniques on data quality, including error from measurement, nonresponse and coverage, and assesses trade-offs between these error sources when selecting a particular mode or survey design. (3-0) Y

**EPPS 6311** Research Practice in the Social Sciences (3 semester credit hours) Overview course that introduces students to methods used in the different applied social science disciplines. Reviews how data are commonly produced and analyzed within each, identifies recent methodological trends and areas of application, explores career pathways for social data analytics and research graduates, and indicates directions for more advanced study. (3-0) Y

**EPPS 6313** Introduction to Quantitative Methods (3 semester credit hours) This introductory graduate-level statistics course is geared to the consumption of statistical methods commonly used in social science research. Topics include creating and interpreting graphical and tabular summaries of data, descriptive statistics, basic probability theory, sampling distributions, basic hypothesis testing (t-tests, chi-square tests, and analysis of variance), estimation of population parameters, confidence intervals and correlation. An introduction to regression analysis will also be provided. Topics are supported by computer-supported data analyses. (3-0) Y

**EPPS 6316** Applied Regression (3 semester credit hours) This course provides a survey of the bivariate and multiple regression models estimated using Ordinary Least Squares (OLS), with an emphasis on using regression models to test social and economic hypotheses. This application-focused course presents examples drawn from economics, political science, public policy and sociology, introduces the basic concepts and interpretation of regression models, and basic methods of inference. Topics are supported by computer-supported data analyses. Prerequisite: EPPS 6313 or EPPS 7313. (3-0) Y

**EPPS 6320** Short Courses in Contemporary Social Science Research Methods (3 semester credit hours) This course is comprised of three tutorial sessions that each last two full days over the course of an academic year. Each session is an intensive survey of a different modern statistical methodology that is regularly used in the social sciences. In order to get credit, the student must attend all six days. Students will need to enroll for the course in the Fall semester. Pass/Fail only. (3-0) Y

**EPPS 6323** Knowledge Mining (3 semester credit hours) Introduces techniques to discover patterns and relationships in large and complex data sets, including web mining. Examines ways to explore, analyze and leverage data and transform them into useful and usable information, including decision trees, association rules, clustering, case-based methods, and data visualization. (3-0) Y

**EPPS 6324** Data Management for Social Science Research (3 semester credit hours) Covers the principles and practical techniques of data cleaning, data organization, quality control, and automation of research tasks. Topics covered will include data types, useful text and math functions, labeling, recoding, data documentation, merging datasets, reshaping, and programming structures such as macros, loops, and branching using Stata and R. The course will also discuss using LaTeX to automate outputting of results and graphics in publishable formats. Prerequisite: EPPS 6313 or EPPS 7313 or instructor consent required.
Research Design II (3 semester credit hours) This course is the second in a two-course sequence devoted to the study of data development strategies and techniques to facilitate effective statistical analysis. Topics generally covered include: the logic of causal inquiry and inference in the Economic, Political and Policy Sciences, the elaboration paradigm and model specification, anticipating and handling threats to internal validity, hierarchies of design structure (experimental, quasi-experimental and non-experimental): linking design structure to effect estimation strategies and analyzing design elements in published literature. Students will be required to select a research topic in consultation with the instructor and prepare a written comparative design analysis. Recommended: EPPS 6310 or EPPS 6316 or equivalent. (3-0) Y

Qualitative Research Methods (3 semester credit hours) This course provides an overview of qualitative research in the Economic, Political and Policy Sciences. Students will investigate the assumptions underlying qualitative research approaches and critically assess the strengths and weaknesses of such approaches. Possible topics may include participant observation, ethnographic interviewing, ethnomethodology, conversation analysis, case study, and the analysis of historical documents. (3-0) T

Evaluation Research Methods in the Economic, Political and Policy Sciences (3 semester credit hours) A review of research methods used in program evaluation, with an emphasis on public and nonprofit social programs. Issues to be addressed include research design, appropriate performance standards, measurement and selection of individuals, sampling, data collection, and data analysis. (3-0) Y

Ethics for Professionals, Academics, and Researchers (3 semester credit hours) This course examines issues of professional, academic and research ethics. Topics include theories of ethics, ethical motives, and case study applications. (3-0) R

Information Management (3 semester credit hours) Focus on design of database applications for commercial, public, and nonprofit organizations. Covers user requirement's analysis, logical database design, physical database design, database query languages, and distributed and client-server databases. Course emphasizes data definition and data manipulation languages for relational data modelling. (3-0) Y

Qualitative Data Analysis (3 semester credit hours) Course focuses on analysis of qualitative data with support of Qualitative Data Analysis software (ATLAS.ti, NVivo, Provalis, etc.). Introduces alternative interpretive analytic approaches, explores their use, and guides users in applying them to data. (3-0) Y

Data Visualization (3 semester credit hours) Presents technologies, techniques, and algorithms for creation of effective visualizations of social science data. Examines data wrangling, insight modeling, cognitive science, and graphical communication using SAP Lumira, Tableau, Excel Powerview and D3. (3-0) Y

Social Concepts and Measurement (3 semester credit hours) In this course students will learn the fundamentals of social concepts, measurement theory, and sensitivity analysis. We will study and implement methods and technologies for measuring social concepts, including the construction of scales and typologies, latent traits, content analysis, and survey design. For the course project, students will collect and present a new measure of a social concept. This requires students to justify the need to measure the concept on theoretical grounds, to survey the literature for existing measures of the concept,
to specify how their measure differs and the logic behind their operationalization, and to collect data according to their operational criteria using an appropriate data collection method. Prerequisites: (EPPS 63 13 and EPPS 6316) or (EPPS 7313 and EPPS 7316). (3-0) T

**EPPS 6360 (NATS 6360)** Research Methods (3 semester credit hours) There is a growing global awareness amongst the academic community that skills and competency training must now be included when preparing graduate students for the 21st century workforce needs. For Master's and PhD students the attributes most frequently referenced sought across a broad range of employment sectors, include critical and creative thinking, analysis and synthesis of data, research methodology, ethics, scientific writing, teamwork, and creative presentation skills. The aim of the course on Research Methods is to help graduate students develop the skills necessary to succeed professionally and academically in a way that they can develop and manage their careers across a broad range of employment sectors in both academic and non-academic settings. Prerequisites: Admission to the School of Natural Sciences and Mathematics or the School of Economic, Political and Policy Sciences graduate program and the student's departmental graduate advisor consent required. (3-0) T

**EPPS 7304** Cost-Benefit Analysis (3 semester credit hours) Examines methods for measuring costs and benefits of public projects and policies, and the application of cost-benefit analysis to areas such as economic development, water resources, recreation, transportation, regulation, and the environment. (3-0) R

**EPPS 7313** Descriptive and Inferential Statistics (3 semester credit hours) The course provides a thorough introduction to probability and statistics. Probability topics covered include random variables, expectations, and probability distributions. The heart of the course is a rigorous introduction to statistical inference: sampling theory, confidence intervals, and hypothesis tests. The final section of the course is an introduction to regression analysis, with an emphasis on interpretation of regression results, using examples from recent research. Recommended: one semester of calculus. (3-0) Y

**EPPS 7316** Regression and Multivariate Analysis (3 semester credit hours) This course provides a detailed examination of the multiple regression models estimated using Ordinary Least Squares (OLS), with an emphasis on using regression models to test social and economic hypotheses. Also covered are several special topics in regression analysis, including violations of OLS assumptions, the use of dummy variables, and fixed effects models. The course ends with an introduction to advanced topics in regression analysis, qualitative response models, and non-OLS approaches to estimation. Topics are supported by computer-supported data analyses using application-specific software. Prerequisite: EPPS 7313. (3-0) Y

**EPPS 7318** Structural Equation and Multilevel (Hierarchical) Modeling (3 semester credit hours) An introduction to structural equation modeling (SEM) and multilevel modeling (MLM), sometimes called hierarchical linear or mixed modeling. SEM represents a general approach to the statistical examination of the fit of a theoretical model to empirical data. Topics include observed variable (path) analysis, latent variable models (e.g., confirmatory factor analysis), and latent variable SEM analyses. MLM represents a general approach to handling data that are nested within each other or have random components. Topics include dealing with two-level data that may be cross-sectional, such as students within classes, or longitudinal, such as repeated observations on individuals, firms or countries. Recommended prerequisite: EPPS 7316 or equivalent. Prerequisite: ECON 6306 or ECON 6309 or EPPS 6316 or instructor consent required. (3-0) R

**EPPS 7344** Categorical and Limited Dependent Variables (3 semester credit hours) This course examines
several types of advanced regression models that are frequently used in policy analysis and social science research. The key similarity of these models is that they involve dependent variables that violate one or more of the assumptions of the Ordinary Least Squares (OLS) regression model. The main models examined in the course are binary logit and probit, multinomial logit, ordinal probit, tobit, and the family of Poisson regression models. All these models are estimated using maximum likelihood estimation (MLE). The Heckman correction for selection is also addressed. Recommended: EPPS 6316 or the equivalent. (3-0) Y

EPPS 7368 Spatial Epidemiology (3 semester credit hours) Examines the conceptual and analytic tools used to understand how spatial distributions of exposure impact processes and patterns of disease. Emphasizes the special design, measurement, and analysis issues associated with spatial patterns of diseases. Contemporary diseases of public health importance are addressed, and the statistical and inferential skills are provided that can be used in understanding how spatial patterns arise and their implications for intervention. Prerequisite: EPPS 6313 or equivalent. (3-0) R

EPPS 7370 Time Series Analysis I (3 semester credit hours) This course considers several important topics for applied time series analyses of social science and public policy data including the specification and testing of Box-Jenkins ARIMA models and dynamic regressions. Other topics include stationarity and unit root tests, cointegration and error correction models, autoregressive conditional heterogeneity (GARCH) models and introductions to vector autoregression (VAR) and state space models. Students learn how to use modern software such as Eviews, R, RATS and Stata to do time series analyses. Recommended: EPPS 7316 or equivalent. (3-0) R

EPPS 7371 Time Series Analysis II (3 semester credit hours) This course introduces intermediate and advanced methods for the analysis of social science time series data. After reviewing core time series concepts such as stationarity and cointegration, the course considers topics such as vector autoregression and vector error correction models, simultaneous equation and structural time series models, regime switching models, non-Gaussian and nonlinear models, and state space representations. Both frequentist and Bayesian approaches to modeling time series processes are employed. Data analyses are implemented using widely available software packages such as R, RATS and Stata. Prerequisite: EPPS 7370 or instructor consent required. (3-0) R

EPPS 7386 Survey Research (3 semester credit hours) This course exposes students to the use of survey methods in social science research. Emphasis is placed on interview and questionnaire techniques and the construction and sequencing of survey questions. Attention is also devoted to sampling theory, sampling and non-sampling errors, and the use of recent advances in fieldwork to reduce measurement error in surveys. Recommended: EPPS 6313 or equivalent. (3-0) R

EPPS 7390 Bayesian Analysis for Social and Behavioral Sciences (3 semester credit hours) This course covers the theory and application of Bayesian statistics for economic, political, and other social science data. Students will learn how maximum likelihood and Bayesian estimation are related and how the latter is used to develop decision based inference. Topics include subjective probability, general linear models, posterior simulation methods, model specification and averaging, and sensitivity analysis. Prerequisite: EPPS 7316 or equivalent. (3-0) R

EPPS 7V81 Special Topics in Social Science Research Methodology (1-9 semester credit hours) May be repeated for credit as topics vary (9 semester credit hours maximum). (3-0) R

EPPS 7V88 Workshop in Teaching Effectiveness (1-3 semester credit hours) Workshop will focus on
preparing students for positions as teaching assistants, lecturers, and those who expect to teach as a career in the social sciences. Emphasis will be placed on videotaped student presentations and feedback, guest presentations, and student visits to EPPS faculty classes. May be repeated for credit (3 semester credit hours maximum). ([1-3]-0) R

**EPPS 8V95** Frontiers of Social Science Research Methods (1-3 semester credit hours) Students working on dissertations or research papers receive feedback and advice on research methods, the discussion of methods in their writing, and presentation of results. Pass/Fail only. May be repeated for credit. ([1-3]-0) R