PROFESSIONAL MASTER IN DATA SCIENCE (ANALYTICS) PROGRAM

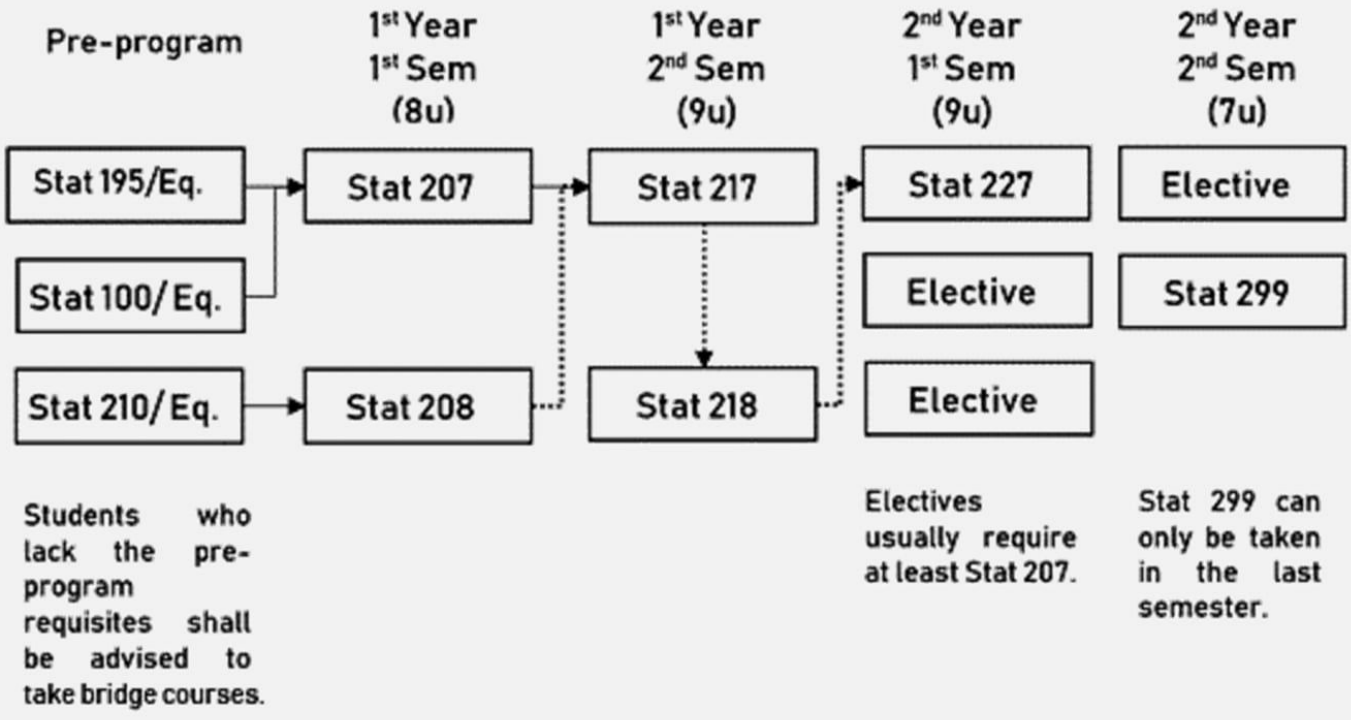
UP SCHOOL OF STATISTICS GRADUATE PROGRAMS

UNIVERSITY OF THE PHILIPPINES
SCHOOL OF STATISTICS

About the Program

The program is suited for professionals who have **quantitative background and are hands-on in data processing and analysis, or those who value the importance of empirical or evidenced-based decision making.** The program aims to equip professionals with a **solid foundation in statistical science and proficiency at statistical machine learning to solve real-world problems**.

Upon graduation from the program, students are expected to have strong technical aptitude and advanced skills in data science and analytics, and evidence-based decision-making.



CORE COURSES

Stat 207: Statistical Inference for Data Science

Concepts in probability, probability distributions, and sampling distribution; classical statistical inference; computational inference; principles of data science.

Stat 208: Programming for Data Analytics

Programming tools and software packages for analytics; modular and efficient programming; advanced data management; SQL; working with different data structures (e.g. time series, unstructured, big data); high-performance programming.

Stat 217: Computational Statistics

Random numbers; Monte Carlo methods; Markov chain Monte Carlo; resampling methods; optimization methods; approaches for classification and regression problems; methods for feature extraction.

Stat 218: Statistical Machine Learning

Applications of statistical machine learning; generalized linear models; supervised learning; unsupervised learning; kernel methods; support vector machines; neural networks; ensemble learning; contemporary topics.

Stat 227: Knowledge Discovery in Data

Frameworks and processes of knowledge discovery in data, common data issues, data cleansing procedures, feature engineering, data exploration, data mining, data journalism and storytelling.

Culminating Course

Stat 299: Special Project in Data Science

Integration and application of foundations, theories and methods of data analytics to address problems in industry, government, and other sectors; design and implementation of individual or group capstone project that is either project-oriented (engagement with and solution for a client) or research-oriented (work on own or client's agenda).

ELECTIVE COURSES

Stat 280: Forecasting Analytics

Time series graphics; Simple forecasting methods; Residual diagnostics; Exponential smoothing; ARIMA models; Forecasting hierarchical or grouped time series; Judgmental forecasts; Time series regression models; Time series decomposition; Practical forecasting issues

Stat 280: Bayesian Analytics

Fundamentals of Bayesian inference; Single-parameter models; Multiparameter models; Hierarchical models; Bayesian computation; Markov Chain simulation; Generalized linear models; Models for robust inference; Models for missing data; Parametric non-linear models; Gaussian process models; Finite mixture models; Dirichlet process models

Stat 280: Deep Learning

Basic perceptron algorithms; convolutional and recurrent neural networks (CNNs, RNNs), autoencoders, restricted Boltzmann machines (RBMs), and deep belief networks (DBNs); applications in the fields of business analytics, epidemiology, econometrics, agricultural metrics, climatology, and artificial intelligence, among others.

ELECTIVE COURSES

Stat 280: Analytics Deployment 101

Analytics end-to-end process; Common use cases and deployment examples; Analytics strategy and building a roadmap; Deployment planning and considerations; Deployment execution; Model monitoring reports; Campaign/ deployment monitoring reports; Business value realization

Stat 280: Practical Machine Learning for Business

End- to-end discussion of three machine learning use cases used in business namely: recommender systems, fraud detection and conversational chatbot; Discussion on concepts, processes, and hands-on analysis and modeling to address the business requirements for each use case; Use of python programming.

Stat 280: Advanced Time Series Analysis for Analytics

Nonstationarity; cointegration; interventions models; state space models; transfer functions; frequency domain; panel data; nonparametric methods for time series; nonparametric prediction; AR-Sieve; block bootstrap; applications in analytics

Stat 280: Domain Deep Dive for Data Science and Analytics (DSA) Practitioners

Deep-dive into selected business domains that lead to identification of DSA use cases or applications, following the framework on business analysis; focus on deep dive on the Financial Services Industry and Business Process Outsourcing Industry.