Graduate Programs in Statistics

Course Titles

STAT 100 CALCULUS AND MATR IX ALGEBRA FOR STATISTICS.
Differential and integral calculus; infinite series; matrix algebra
Credit: 3 units

STAT 195 INTRODUCTION TO MATHEMATICAL STAT ISTICS.
Probability distribution, sampling distribution, parametric and nonparametric inference.
Credit: 3 units

STAT 210 STATISTICAL SOFTWARE.
Database management and programming using statistical software.
Credit: 3 units

STAT 211 STATISTICAL COMPUTING.
Algorithms for statistical computing; numerical analysis for linear and nonlinear models; random number generation; Monte Carlo methods.
Credit: 3 units

STAT 221 INTRODUCTORY PROBABILITY.
Combinatorial analysis; sample space and random variables, probability distribution function; expectation; stochastic independence; common probability distributions.
Credit: 3 units

STAT 222 INTRODUCTION TO STATISTICAL INFERENCE.
Sampling distributions, point and interval estimation; tests of hypothesis.
Pre-requisite: Stat 221
Credit: 3 units

STAT 223 APPLIED REGRESSION ANALYSIS.
Model building; diagnostic checking; remedial measures; applications
Co-requisite: Stat 222 or equivalent
Credit: 3 units

STAT 224 EXPERIMENTAL DESIGNS.
Completely randomized designs; randomized complete block design; Latin square design; factorial experiments; incomplete block design; higher-order designs.
Pre-requisite: Stat 223 or equivalent
Credit: 3 units

STAT 225 TIME SERIES ANALYSIS.
Classical procedures; stationarity; Box-Jerkins modeling procedure: autocorrelation function, partial autocorrelation function; identification, estimation, diagnostic checking, forecasting; transfer functions; applications.
Pre-requisite: Stat 223 or equivalent
Credit: 3 units

STAT 226 APPLIED MULTIVARIATE ANALYSIS.

Multivariate normal distribution; principal components analysis; biplots and h-plots; factor analysis; discriminant analysis; cluster analysis; multidimensional scaling; correspondence analysis; canonical correlation analysis; graphical and data oriented techniques; applications
Co-requisite: Stat 223 or its equivalent
Credit: 3 units

STAT 230 SPECIAL TOPICS IN MATHEMATICS FOR STATISTICS.
Special topics in mathematics and their applications in statistics. To be arranged according to the needs of students.
Credit: 3 units
(may be repeated provided that the topics are different; topics to be indicated for record purposes)

STAT 231 PROBABILITY THEORY.
Probability spaces and random variables; probability distributions and distribution functions; mathematical expectation; convergence of sequences of random variables; laws of large numbers; characteristics functions.
Co-requisite: Stat 230
Credit: 3 units

STAT 232 PARAMETRIC INFERENCE.
Exponential family of densities; point estimation: sufficiency, completeness, unbiasedness, equivariance; hypothesis testing.
Pre-requisite: Stat 231
Credit: 3 units

STAT 233 LINEAR MODELS.
Subspaces and projections; multivariate normal distribution, non-central distributions, distribution of quadratic forms; the general linear model of full column rank, tests about the mean; tests about the variance; the general linear model not of full column rank; estimability and testability.
Pre-requisite: Stat 232
Credit: 3 units

STAT 234 MULTIVARIATE ANALYSIS.
Distribution theory for multivariate analysis; the multivariate one-and-two sample models; the multivariate linear model.
Pre-requisite: Stat 233
Credit: 3 units

STAT 235 SURVEY OF STOCH ASTI C PROCESSES.
Markov chains; Markov processes; Poisson processes; renewal processes; martingales.
Pre-requisite: Stat 221
Credit: 3 units

STAT 240 HIGH DIMENSIONAL DATA .

High dimensional data; high dimensional data visualization; high dimensional data analysis; dimension reduction; pattern search; clustering; applications

Pre-requisite: Stat 226/Equivalent, Stat 223/Equivalent

Credit: 3 units

STAT 241 NONLINEAR REGRESSION.
Classification of nonlinear models; iterative estimation and linear approximation; practical considerations: model specification, starting values, transformations; convergence; multiresponse model; models from differential equations; nonlinear inference regions; measures of nonlinearity; applications.
Pre-requisite: Stat 223 or equivalent
Credit: 3 units

STAT 242 ECONOMETRIC METHODS.
Distributed lag models; structural change; simultaneous equations; limited dependent variables; ARCH , GARCH, processes; cointegration; applications.
Pre-requisite: Econ 101, Stat 223 or equivalent
Credit: 3 units

STAT 243 CATEGORICAL DATA ANALYSIS.
Cross-classified tables, multidimensional tables; loglinear model; logit models, measures of association; inference for categorical data; applications
Pre-requisite: Stat 223 or equivalent
Credit: 3 units

STAT 244 DESIGN AND ANALYSIS OF CLINICAL EXPE RIMENTS.
Reliability of measurements; parallel groups design; control of prognostic factors; blocking and stratification; analysis of covariance; repeated measurements and crossover studies; balanced incomplete block designs; factorial experiments; split-plot designs; applications.
Pre-requisite: Stat 223 or equivalent
Credit: 3 units

STAT 245 SURVIVAL ANALYSIS.
Functions of survival time; estimation of survival functions; survival distributions and their applications; distribution fitting and goodness-of-fit tests.
Pre-requisite: Stat 222 or equivalent
Credit: 3 units

STAT 246 RESPONSE SURFACE METHODS.

Product design and development; optimal designs; response surface models; response surface optimization; applications.

Pre-requisite: Stat 223/Equivalent

Credit: 3 unts

STAT 247 DATA MINING AND BUSINESS INTELLIGENCE.

Principles of data mining; methods of data mining; themes of data mining; applications of data mining in business intelligence.

Pre-requisite: Stat 210/Equivalent, Stat 226/Equivalent,
Co-requisite: Stat 223/Equivalent, and Stat 225/Equivalent
Credit: 3 units

STAT 249 NONPARAMETRIC MODELING.

Smoothing methods; kernel smoothing; spline smoothing; regression trees; projection pursuit; nonparametric regression; cross-validation; scoring; high dimensional predictors; additive models; backfitting.

Pre-requisite: Stat 222/232 and Stat 223/Equivalent

Credit: 3 units

STAT 250 SAMPLING DESIGNS.
Concepts in designing sample surveys; non-sampling errors; simple random sampling; systematic sampling; sampling with varying probabilities; stratification, use of auxiliary information; cluster sampling; multi-stage sampling;
Co-requisite: Stat 222/Stat 232
Credit: 3 unts

STAT 251 SURVEY OPERATIONS.
Planning a survey; sample design and sample size, frame construction; tabulation plans; preparation of questionnaires and manual of instruction; field operations; processing of data, preparation of report.
Pre-requisite: Stat 222
Co-requisite: Stat 223
Credit: 3 uits

STAT 252 BOOTSTRAP METHODS.

Empirical distribution functions; resampling and nonparametric statistical inference; optimality of the bootstrap; bootstrap in hypothesis testing; bootstrap in confidence intervals; bootstrap in regression models; bootstrap for dependent data.

Pre-requisite: Stat 222/232 and Stat 223/Equivalent

Credit: 3 units

STAT 260 QUANTITATIVE RISK MANA GEMENT.

Market risk; financial time series; copulas; extreme value theory; credit risk models; operational risks.

Pre-requisite: Stat 223 and Stat 225

Credit: 3 units

STAT 261 STOCHASTIC CALCULUS FOR FINANCE.

Continuous-time model; Brownian motion; random walk; quadratic variation; Ito formula; Black-Scholes equation; risk-neutral measure; martingale representation theorem; fundamental theorems of asset pricing

Pre-requisite: Stat 221/231/Equivalent

Credit: 3 units

STAT 262 NONPARAMETRIC STATISTICS.
Distribution-free statistics; U-statistics; power functions; asymptotic relative efficiency of tests; confidence intervals and bounds; point estimation; linear rank statistics; other methods for constructing distribution-free procedures.
Pre-requisite: Stat 232
Credit: 3 units

STAT 263 BAYESIAN ANALYSIS.
Bayesian inference; empirical and hierarchical analysis; robustness; numerical procedures.
Pre-requisite: Stat 232
Credit: 3 units

STAT 264 ELEMENTS OF DECISION THEO RY.
Basic concepts, risk function, Bayes and minimax solutions of decision problems, statistical decision functions, formulation of general decision problems.
Pre-requisite: Stat 231
Credit: 3 units

STAT 265 ROBUST STATISTICS.
Breakdown point and robust estimators; M-, R-, and L- estimates; robust tests; robust regression and outlier detection.
Pre-requisite: Stat 232
Credit: 3 units

STAT 266 APPLIED NONPARAMETRIC METHODS.

Methods for single, two and k samples; trends and association; nonparametric bootstrap.

Pre-requisite: Stat 222 and Stat 223

Credit: 3 units

STAT 267 ADVANCED APPLIED MULTIVARIATE ANALYSIS.

Confirmatory factor analysis; multidimensional scaling; correspondence analysis; classification trees; CHAID; procrustes analysis; neural networks; structural equation modeling.

Pre-requisite: Stat 226 or equivalent/COI

Credit: 3 units

STAT 268 ADVANCED TIME SERIES ANALYSIS.

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

Pre-requisite: Stat 223/Equivalent and 225/Equivalent

Credit: 3 units

STAT 270 EXPLORATORY DATA ANALYSIS.
Graphical methods; single batch analysis and analysis of several batches; order statistics; resistant estimators; robust tests; robust regression; median polish; applications.
Pre-requisite: Stat 222 or equivalent
Credit: 3 units

STAT 271 STATISTICAL QUALITY CONTROL.
Overview of the statistical methods useful in quality assurance; statistical process control; control charts for variables and attributes, cusum chart, multivariate chart; process capability analysis; acceptance sampling; MIL STD tables and JIS tables; off-line quality control; introduction to response surface analysis; Taguchi method; applications.
Pre-requisite: Stat 222
Credit: 3 unts

STAT 272 RELIABILITY THEORY.
Coherent systems; paths and cuts, life distribution; dependent components; maintenance policies and replacement models; domains of attraction.
Pre-requisite: Stat 231
Credit: 3 unit

STAT 273 SIX SIGM A ST ATIS TICS.
DMAIC(define-measure-analyze-improve-control) methodology; statistical process control; process capability; failure mode and effects analysis (FMEA); measurement system analysis; optimization by experimentation; taguchi method.
Pre-requisite: COI
Credit: 3 units

STAT 274 MARKET RESEARCH.

The marketing research; data and data generation in marketing research; analytical methods; consumer behavior modeling.

Pre-requisite: Stat 223/Equivalent and Stat 226/Equivalent

Credit: 3 unts

STAT 275 ECONOMIC STATISTICS.

The Philippine Statistical System; surveys being regularly conducted by the system: questionnaire designs, sampling designs, estimators, issues; official statistics being generated: national accounts, consumer price index,input-output table, poverty statistics, leading economic indicators, seasonally adjusted series; statistical methods useful in generating official statistics.

Pre-requisite: Stat 222/232 and Stat 250

Credit: 3 units

STAT 276 STATISTICS FOR GEOGRAPHIC INFORMATION SYSTEMS.
Components of a geographical information system, data structures and elements of spatial modeling; exploratory spatial data analysis; quadrat analysis, tesselations and spatial autocorrelation; spatial modeling and prediction; some sampling theory; applications.

Pre-requisite: Consent of Instructor
Credit: 3 units

STAT 277 STATISTICS FOR IMAG E AN ALYS IS.
Radiometric enhancement techniques; geometric enhancement using image domain techniques; multispectral transformation of data; supervised classification techniques; clustering and unsupervised classification; applications.
Pre-requisite: Consent of Instructor
Credit: 3 units

STAT 280 SPECIAL FIELDS OF STATISTICS.
Courses in special fields, new areas or latest developments in statistics.
Pre-requisite: Consent of Instructor
Credit: 3 unts
(may be repeated provided that the topics are different; topics to be indicated for record purposes)

STAT 290 STATISTICAL CONSULTING.
Application of statistical concepts and methodologies to data of researchers seeking statistical consultancy services.
Pre-requisite: Consent of Instructor
Credit: 1 unit

STAT 298 SPECIAL PROBLEM.
The problem is on a subject involving the use of statistical methods and analysis.
Credit: 5 unts

STAT 300 THESIS.
The thesis may be on a subject involving original investigation, which in some respect modifies or enlarges what has been previously known and is recommended for approval by the major professor or adviser.
Credit: 6 units

STAT 301 THEORY OF PROBABILITY I
Measure theory; probability spaces; random variables; integration, expectation and moments; convergence.
Credit: 3 units

STAT 302 THEORY OF PROBA BILL ITY II
Conditional expectations; dependence; martingales.
Pre-requisite: Stat 301
Credit: 3 units

STAT 303 STOCHASTIC PROCESSES
The theory of stochastic processes; some stochastic processes.
Pre-requisite: Stat 302
Credit: 3 units

STAT 311 THEORY OF STATISTICAL INFERENCE I
Sufficiency, completeness, exponential families, unbiasedness; equivariance, Bayes estimation, minimax estimation; admissibility.
Pre-requisite: Stat 301
Credit: 3 units

STAT 312 THEORY OF STATISTICAL INFERENCE II
Uniformly most powerful tests; unbiased tests; invariance; linear hypothesis; minimax principle.
Pre-requisite: Stat 311
Credit: 3 units

STAT 313 DECISION THEORY
Recent developments and applications in decision theory.
Pre-requisite: Stat 311
Credit: 3 units

STAT 321 ASYMPTOTIC METHODS FOR STAT ISTICS
Limit theorems; U-statistics; M-, R-, and L- estimators; differentiable functionals; asymptotic tests.
Pre-requisite: Stat 311
Credit: 3 units

STAT 380 ADVANCED SPECIAL TOPICS
Advanced topics in statistics to be presented in lecture series as unique opportunities arise.
Credit: 3 units
(may be repeated provided that the topics are different; topics to be indicated for record purposes)

STAT 390 READING COURSE
Credit: 2 units

STAT 396 SEMINAR
Faculty and graduate student discussions of current researches in statistics.
Credit: 1 unit

STAT 400 DISSERTATION
Credit: 12