

ST 1121

Basic Mathematics and Statistics

3 credits

This course is to strengthen the students interest and ability to study the university level mathematics and statistics by giving them the basic foundation in algebra, trigonometry and the application of statistics in business, collection of data, tabulation and graphical presentation with elementary probability theory.

ST 2101

Calculus I

3 credits

Prerequisite: ST 1121 Basic Mathematics and Statistics

Study rates of change, limits, finding limits, continuity. Derivatives of function, the chain rule, implicate differentiation, applications of derivatives and L'Hopital's rule. Integration, some integration techniques and application of Integrals some integration techniques.

ST 2102

Calculus II

3 credits

Prerequisite: ST 2101 Calculus I

Study transcendental function and differential equations, integration techniques, improper integrals, infinite series, multivariable functions and their derivatives, and multiple integrals. The course will cover the main things that students need to know to start calculus and statistic with an emphasize on the basics rather than on expensive exposure of fundamental topic.

ST 2103

Principles of Statistics

3 credits

(Student should pass ST 1121 Basic Mathematics and Statistics)

Introduction to application of statistics and major statistics' methods such as collection of data, tabulation, computation of various averages, introduction to probability, sampling distribution, statistical estimation and test of hypotheses for one population and two population, Analysis of Variance (ANOVA), and Chi-square test.

ST 2201	Linear Algebra	3 credits
Prerequisite:	ST 2102 Calculus II	

Study systems of linear equations, matrix and determinants, vector in the plane and vector spaces, polar coordinate and graph, inner product spaces, eigenvalues and diagonalization, quadratic forms, linear transformations.

ST 2202	Calculus III	3 credits
Prerequisite:	ST 2102 Calculus II	

Study vectors, curves and surfaces, partial derivatives, gradients maxima and minima, multiple integration and vector analysis.

ST 2203	Probability and Statistical Inferences	3 credits
Prerequisite:	ST 2103 Principles of Statistics	

To study basic probability concepts, Bayes' theorem, random variables and distribution functions, discrete and continuous distributions, joint distribution, methods of estimation and tests of statistical hypotheses of parameters, correlation analysis and regression analysis, non-parametric methods and statistical quality control.

ST 2204	Statistical Packages	3 credits
Prerequisite:	ST 2103 Principles of Statistics	

The structures and uses of languages and statistical analysis tools, design of statistical software, computation techniques for other topics of current interest and summarizing of data.

ST 3201	Fundamentals of Probability	3 credits
Prerequisite:	ST 2203 Probability and Statistical Inferences	

Probability space, combinatorial analysis, conditional probability and independence, special discrete and continuous distribution functions, joint distributions, expectations and variances of random variables, and limit theorems.

ST 3202	Statistical Inferences	3 credits
Prerequisite:	ST 2203 Probability and Statistical Inferences	

The philosophy of inferential statistics, point estimation theories such as maximum likelihood, Bayes' estimator, unbiased and minimum variance estimator, interval estimations, testing of hypotheses, Neymann and Pearson theory, testing of linear hypotheses.

ST 3204	Statistical Methods	3 credits
Prerequisite:	ST 2203 Probability and Statistical Inferences	

Multiple linear regression: estimation and prediction, stepwise, forward and backward regression, introduction to time series, introduction to survey sampling and nonparametric statistical methods.

ST 3302	Statistical Forecasting Techniques I	3 credits
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Polynomial regression, exponential smoothing, classical regression analysis, time series, application of statistical methods to industrial and business problems.

ST 3303	Nonparametric Methods	3 credits
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To study the several non-parametric statistical test in the case of one sample, two measures or paired replicates, two independent samples, the case of  $k$  related samples, the case of  $k$  independent samples, rank correlation and regression, and standard discrete & continuous distributions.

ST 3311	Experimental Designs	3 credits
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Introduction to ANOVA, multiple comparisons, randomized block design, factorial experiments, unbalanced designs, repeated measured, ANOCOVA. In addition, the students will also be trained in statistical packages such as MINITAB, SPSS.

ST 3312	Sample Survey Methods	3 credits
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Operations of sample survey, simple random sampling, cluster sampling, stratified random sampling, systematic sampling, estimation of sample size, computation of various average, simple stage and multi-stages sampling.

ST 3401	Multivariate Methods	3 credits
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Various multivariate techniques such as discriminant analysis, principal component, factor analysis, multidimensional scaling, graphical exploration and representation of multivariate data, analysis of multivariate categorical data, MANOVA and uses of multivariate statistical computer packages.

ST 3402	Data Analysis	3 credits
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The philosophy of exploratory data analysis, groups of numbers and multivariate data, time series data, multi-way tables including identification, transforming data, treatment of missing data, estimator and testing of hypothesis, indication and cross validation, graphical displaying, and summarizing of data.

ST 4299	Senior Project	3 credits
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Prerequisite: fourth-year student status with at least 100 credits completed

Each student must do a specific project that a student will apply the knowledge acquired to application of statistics in business, industry or science. The instructor will advise the student through out the project development. The student must have oral examination on his/her project.

ST 4301	Operations Research I	3 credits
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Prerequisite: ST 2103 Principles of Statistics

Application of quantitative techniques to the formulation and solution of economic and business problem. Topic include linear programming, transportation problem, PERT/CPM and grantt chart, inventory and game theory.

ST 4302	Operations Research II	3 credits
Prerequisite:	ST 4301 Operations Research I	

Queuing theory, Markov chain, dynamic programming and non-linear programming.

ST 4310	Statistical Forecasting Techniques II	3 credits
Prerequisite:	ST 3302 Statistical Forecasting Techniques I	

Problems in multiple-regression such as multi-correlation, time series, Box and Jenkins method and determining optimize forecasting statistic method.

ST 4311	Statistics for Quality Control	3 credits
Prerequisite:	ST 2103 Principles of Statistics	

Acceptance sampling by attributes and variables, graphical methods and control charts such as x-bar graph, R graph, sigma graph and p graph, advances in control chart and acceptance sampling techniques.

ST 4312	Introduction to Demography	3 credits
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The course covers the role and importance of demography. Methods of construction demography statistics, measurement of demography data and derivation of distribution rates from records.

ST 4313	Actuarial Science for Non Life Insurance	3 credits
Prerequisite:	ST 2103 Principles of Statistics	

This course begins with analysis and measurement of property and net income loss exposures of a family and a business firm, examines the major insurance policies and extensions available in the Thai market. Study of transportation insurance.

ST 4314	Actuarial Science for Life Insurance	3 credits
Prerequisite:	ST 2103 Principles of Statistics	

The course covers basic theory and practical techniques used in the measurement of human mortality, determination of exposure to risk, and derivation of mortality rates from records of insured lives. Also examined are graduation, elements of demography, and methods of construction and graduation in a problem area.

ST 4319	Introduction to Simulation	3 credits
Prerequisite:	ST 2103 Principles of Statistics	

Design and application of simulation for business or science by methods of queuing, models, Monte Carlo, stochastic process with application software package such as GPSS.

ST 4321	Applied Statistics for Decision Making	3 credits
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Decision making under certainty and uncertainty, utility theory, and group decisions. mini-max method, Bayes' method based on normal distribution.

ST 4330	Discrete Mathematics	3 credits
Prerequisite:	ST 2102 Calculus II	

Sets, logic, proof, functions and relations, mathematical induction, recursion, graphs and trees, Boolean algebra and applications such as logic gates, automator etc.

ST 4332	Numerical Methods	3 credits
Prerequisite:	ST 2102 Calculus II	

Errors analysis, numerical solution of nonlinear equations, interpolation, numerical differentiation and integration, system of linear regression, numerical solution of differential equations, and finding of terms of sum of series

ST 4333	Operational Calculus	3 credits
Prerequisite:	ST 2102 Calculus II	

Introduction to basic techniques for operational analysis. Properties of Fourier, Laplace, and Hillbert integral transforms. Introduction to Generalized functions, direct Delta function. Applications of integral transform Techniques.

ST 4380-5	Selected Topic in Applied Statistics	3 credits
Prerequisite:	The fourth-year students and by Department's consent	

Special topics that the department and instructors think appropriate for students for detailed study and research in Applied Statistics, the topic selected is in accordance with students and department.

ST 4390-5	Seminar in Applied Statistics	3 credits
Prerequisite:	The fourth-year students and by Department's consent	

Discuss will center on current applications of statistics in Applied Statistics, there may be experts in specialized areas from government or private sectors lecturing on specialized topics, each student will be required to present a paper for discussion.

ST 4401	Applied Statistics for Business Research	3 credits
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An introduction to the principles and methods of business research: securing the respondents, making a test investigation, sampling, collecting data, types and errors of collected data, tabulating and analyzing the information, interpreting the finding and stating the conclusion. Through a series of class projects, practical experience is offered to students on how research techniques and procedures are applied to the solution of business problems