STATISTICS (STAT)

STAT F200X  Elementary Probability and Statistics  (m)
3 Credits
Descriptive statistics, frequency distributions, sampling distributions, elementary probability, estimation of population parameters, hypothesis testing (one and two sample problems), correlation, simple linear regression, and one-way analysis of variance. Parametric methods.
Prerequisites: A grade of B or better in DEV F105 or DEV F105N or in all three of DEV F105G and DEV F105H and DEV F105J; or placement; or permission of instructor.
Attributes: UAF GER Mathematics Req
Lecture + Lab + Other: 3 + 0 + 0

STAT F300  Statistics
3 Credits
Offered Spring; Fall Odd-numbered Years
A calculus-based course emphasizing applications. Topics include probability, joint and conditional probability, expectation and variance, parameter estimation (method of moments and maximum likelihood), one and two sample hypothesis tests, simple linear regression and one-way analysis of variance. A student may not use STAT F200X and STAT F300 to meet the requirement of a year’s sequence course in statistics.
Prerequisites: MATH F230X or MATH F251X or placement.
Lecture + Lab + Other: 3 + 0 + 0

STAT F401  Regression and Analysis of Variance
4 Credits
Thorough study of multiple regression including multiple and partial correlation, the extra sum of squares principle, indicator variables, polynomial models, model selection techniques and assessment of underlying assumptions. Analysis of variance and covariance for multifactor studies in completely random and randomized complete block designs, multiple comparisons and orthogonal contrasts. Matrix concepts for linear models are taught as needed. Special fees apply. Also offered in Juneau as demand warrants.
Prerequisites: STAT F200X [STAT S273-J] or STAT F300 or permission of instructor.
Lecture + Lab + Other: 3 + 3 + 0

STAT F402  Scientific Sampling
3 Credits
Offered Fall
Sampling methods, including simple random, stratified and systematic and one- and two-stage cluster sampling; estimation procedures, including ratio and regression methods; special area and point sampling procedures; optimum allocation. Adaptive and probability sampling; bootstrapping and basic mark-and-recapture.
Prerequisites: STAT F200X or STAT F300 or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0

STAT F454  Statistical Consulting Seminar
1 Credit
Offered Spring
Introduction to statistical consulting and data analysis. Emphasis on interaction with researchers and identification of scientific and statistical issues relevant to the research problem. Includes regular class meetings as well as supervised meetings with researchers. Designed to combine mathematical statistics with applications from a variety of fields. Students from any field of study with strong quantitative skills are encouraged to enroll. May be repeated for a total of three credits.
Prerequisites: STAT F200X or STAT F300; STAT F401; and completion or concurrent enrollment in MATH F408; or permission of instructor.
Stacked with STAT F654.
Lecture + Lab + Other: 1 + 0 + 0

STAT F461  Applied Multivariate Statistics
3 Credits
Offered Spring Even-numbered Years
Estimation and hypothesis testing, multivariate normality and its assessment, multivariate one and two sample tests, confidence regions, multivariate analysis of variance, discrimination and classification, principal components, factor analysis, clustering techniques and graphical presentation. Statistical computing packages utilized in assignments.
Prerequisites: STAT F401 or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0

STAT F602  Experimental Design
3 Credits
Offered Fall Even-numbered Years
Constructing and analyzing designs for experimental investigations; completely randomized, randomized block and Latin-square designs, split-plot design, incomplete block design, confounded factorial designs, nested designs, treatment of missing data, comparison of designs.
Prerequisites: STAT F401 or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0

STAT F605  Spatial Statistics
3 Credits
Offered Spring Even-numbered Years
Prerequisites: STAT F401; MATH F251X; MATH F252X; MATH F253X or equivalent; or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0

STAT F611  Time Series
3 Credits
Offered Spring Odd-numbered Years
Prerequisites: STAT F401 or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0
STAT F621 Distribution-Free Statistics
3 Credits
Offered Fall Odd-numbered Years
Bootstrapping, simulation, randomization tests and jackknifing. Classical
distribution-free tests and confidence intervals including the Wilcoxon
test, Kolmororov-Smirnov, Friedman test, Spearman’s and Kendall’s
correlations, Kruskal-Wallis test, Sign tests and Fisher’s exact tests.
The practice of non-parametric regression including methods such as
generalized additive models, polynomial and spline regression,
penalized splines, regression trees, neural nets, gradient boosting,
kernal regression methods, isotonic regression and kriging. Robust
and resistant estimation methods. Non-parametric density estimation.
Survival analysis including Kaplan-Meier and proportional hazards
regression.
Prerequisites: STAT F401 or equivalent.
Lecture + Lab + Other: 3 + 0 + 0

STAT F631 Categorical Data Analysis
3 Credits
Offered Fall Odd-numbered Years
Statistical methods designed for count and categorical data. Contingency
tables. Logistic and related models. Log-linear models. Repeated
categorical responses. Survival data.
Prerequisites: STAT F401; or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0

STAT F641 Bayesian Statistics
3 Credits
Offered Fall Even-numbered Years
Bayes’ Rule, Bayesian models for universal data, prior selection
(conjugate and non-conjugate, noninformative and objective priors).
Single parameter and multiparameter models. Hierarchical models,
general linear model and mixed models. Study of posterior simulation
techniques including Markov chain Monte Carlo. Model validation and
model selection. Emphasis on applications, using modern statistical
software packages.Prerequisites: MATH F252X; MATH F371-F408 or
STAT F651; or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0

STAT F642 Bayesian Decision Theory for Resource Management
4 Credits
Offered Spring Even-numbered Years
Application of decision theory to problems in natural resources
management. Students will learn to perform Bayesian calculations and
uncomplicated decision analysis themselves.
Prerequisites: FISH F621 or FISH F630; or permission of instructor.
Cross-listed with FISH F642.
Lecture + Lab + Other: 2 + 2 + 0

STAT F651 Statistical Theory I
3 Credits
Offered Fall
Probability and distribution of random variables. Conditional probability
and stochastic independence. Distributions of functions of random
variables. Expected values. Limiting distributions. Distributions derived
from the normal distribution. Designed to combine mathematical
statistics with applications from a variety of fields. Students from any
field of study with strong quantitative skills are encouraged to enroll.
Prerequisites: MATH F253X; MATH F314; previous statistics course; or
permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0

STAT F652 Statistical Theory II
4 Credits
Offered Spring Odd-numbered Years
Estimation of parameters. Efficiency and sufficiency. Hypothesis
testing. The Neyman-Pearson paradigm and likelihood ratio tests.
Data summaries. Bootstrap. Comparison of two samples. Linear least
squares. Analysis of categorical data. Bayesian inference. Designed
to combine mathematical statistics with applications from a variety of
fields. Students from any field of study with strong quantitative skills are
couraged to enroll.
Prerequisites: STAT F651.
Lecture + Lab + Other: 4 + 0 + 0

STAT F653 Statistical Theory III: Linear Models
3 Credits
Offered Spring Even-numbered Years
Best linear unbiased estimation, Gauss-Markov theory and applications,
maximum likelihood estimation for linear models, multivariate normal
distributions, linear regression and analysis of variance, weighted
regression, robust and nonlinear regression, logistic regression, Poisson
regression, autoregressive models and the General Linear Model.
Designed to combine mathematical statistics with applications from a
variety of fields. Students from any field of study with strong quantitative
skills are encouraged to enroll.Student must take 651 or all the other
courses listed.
Prerequisites: STAT F651 or STAT F401; MATH F251X; MATH F252X;
MATH F253X; MATH F314.
Lecture + Lab + Other: 3 + 0 + 0

STAT F654 Statistical Consulting Seminar
1 Credit
Offered Spring
Introduction to statistical consulting and data analysis. Emphasis
on interaction with researchers and identification of scientific and
statistical issues relevant to the research problem. Includes regular class
meetings as well as supervised meetings with researchers. Designed
to combine mathematical statistics with applications from a variety of
fields. Students from any field of study with strong quantitative skills are
couraged to enroll. May be repeated for a total of three credits.
Prerequisites: STAT F200X or STAT F300; STAT F401; and completion or
concurrent enrollment in MATH F408; or permission of instructor.
Stacked with STAT F454.
Lecture + Lab + Other: 1 + 0 + 0

STAT F661 Sampling Theory
3 Credits
Offered Juneau As Demand Warrants
Statistical theory for sampling and sample surveys. Choice of method,
power and sample size considerations, treatment of sampling and non-
sampling biases. Sampling methods based on detectability. Adaptive
sampling. Spatial sampling. Mark and recapture methods. The jackknife,
the bootstrap and resampling plans.
Prerequisites: STAT F200X [STAT S273-J]; STAT F401; or permission of
instructor.
Lecture + Lab + Other: 3 + 0 + 0

STAT F692 Seminar
1-6 Credits
Lecture + Lab + Other: 0 + 0 + 0

STAT F692A Seminar
1-6 Credits
Lecture + Lab + Other: 0 + 0 + 0
STAT F692P   Seminar
1-6 Credits
Lecture + Lab + Other: 0 + 0 + 0

STAT F698   Non-Thesis Research/Project
1-6 Credits
Lecture + Lab + Other: 0 + 0 + 0