

Department of Statistics

# Graduate Student Handbook

2009–2010 Academic Year



Department of Statistics  
Graduate Student  
Handbook

Brigham Young University  
2009–2010 Academic Year



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## Introduction

Welcome to the graduate program of the Brigham Young University Department of Statistics. We are glad to have you here and anticipate that your time here will be stimulating, challenging and rewarding.

The purpose of this Graduate Handbook is to help you complete the Master's Degree program in the Department of Statistics as smoothly as possible. We have included brief descriptions of the major stepping-stones leading to completion of the degree and a few stumbling blocks encountered by previous students. Since we intend to revise this handbook periodically, please let the Graduate Coordinator know if there are any additional topics that should be included or if any of the material is outdated.

Not all of the material in this handbook will be immediately relevant. Nevertheless, you should read the entire handbook now and refer to it later as needed. Familiarity with the contents of the handbook may also make it easier for department personnel to help you when problems arise. Additional information may be obtained from the BYU Graduate Studies Catalog, your Committee Chair, the Graduate Coordinator, the Graduate Secretary, or the Department Secretary.

## Department Mission Statement

The mission of the Statistics Department is to help students develop their intellect and faith, expand their understanding of the role of science in the objective, systematic pursuit of truth, demonstrate how sound statistical methodology strengthens scientific conclusions, cultivate the ability to understand and communicate the results from empirical research in an ethical manner, and develop and apply methods of modern statistical science.

To succeed in this mission, we will:

1. Offer the premier undergraduate educational experience to statistics and actuarial science majors that prepares them to pursue satisfying and productive careers and qualifies them to enter competitive graduate programs.
2. Offer an applied statistics graduate program that prepares outstanding students for successful and productive careers.
3. Provide superb teaching in general education and service courses to cultivate an understanding of the role of the scientific method in performing empirical research.
4. Contribute to the advancement of statistical science through peer-reviewed research, and collaborate on the pursuit of knowledge across scientific disciplines.

## Expectations

This program prepares men and women of character for statistical careers or top PhD statistics or biostatistics programs. Graduates can perform and will understand the theoretical foundation of advanced statistical methods. Graduates will be able to identify applicable statistical methods to collaborative research and consulting problems. The curriculum consists of a first year core curriculum and second year electives in advanced statistical methods reflecting faculty expertise.

Students who complete the Statistics MS program will:

1. Be employable in jobs with MS Statistics requirement or prepared for top PhD statistics or biostatistics programs.
2. Demonstrate a mastery of the theoretical foundations of statistics at the first-year level of top PhD statistics or biostatistics programs.
3. Demonstrate the ability to apply sound scientific and advanced statistical methodology to research situations.
4. Demonstrate competence in relevant statistical software.
5. Demonstrate good statistical consulting skills (teaching, problem solving, oral and written presentations).

### What you can expect from the faculty

The faculty members are experts in the department's traditionally strong areas of applied linear models and designed experiments, as well as recent developments in Bayesian methods, spatial and environmental statistics, reliability of industrial and computing processes, statistical genetics and bioinformatics, mixed models and longitudinal data, data mining, chemometrics, and issues in statistical computation.

### What is expected of you

We expect you to be committed to complete your degree and graduate in two years or less. The timeline on page 9 details the tasks and deadlines that you need to follow.

While it is tempting to create a schedule that meets the minimum degree requirements, we strongly encourage you to take four courses each semester. You will be better prepared and more competitive in the job market if you take advantage of as many of the 400- and 500-level courses as you can fit into your schedule.

## Sample Timeline to Graduation

- 1st Semester
- Stat 535, 624, 641, 590R, 591R
  - Complete admission provisions, if any
- 2nd Semester
- Stat 536, 642, 595R, 591R
  - Prepare and give a presentation on a class project, consulting experience, or the intent of your project or thesis research project (similar to the prospectus presentation) at Spring Research Conference
  - Comprehensive Exam
  - Summer Internship
  - Form a Graduate Committee—chair and 1–2 members
  - Choose a Project or Thesis Topic
- 3rd Semester
- Complete coursework listed on Study List
  - Schedule Prospectus Defense
  - Prospectus Defense
  - Complete Project or Thesis Research
- 4th Semester
- 2+ credit hour enrollment, register for 698R or 699R
  - Prepare and give a presentation discussing the results of your completed or nearly completed research project at Spring Research Conference
  - Apply for graduation
  - Complete and polish written Project or Thesis
  - Schedule Final Defense (2 weeks before defense)
  - Place a copy of Project or Thesis in 223F and give a copy to the Graduate Coordinator
  - Project or Thesis Defense
  - Submit approved Project or Thesis (ETD and to library); pay binding fees
  - Complete any remaining requirements



# Curriculum



## Prerequisites

Admission to the graduate program in the Department of Statistics presupposes that you have completed all of the prerequisites or suitable equivalents. Applicants must have a bachelor's degree from an accredited U.S. university or equivalent with a minimum 3.3 overall undergraduate GPA. We also require a methods course beyond introductory statistics and a calculus-based statistical theory course, multivariate calculus, and linear algebra with a B- or better in each course. A math minor is recommended. Students must also have taken the general GRE (Graduate Record Exam) and be proficient in written and spoken English (TOEFL iBT Score: Total score of 580, with a minimum score of 22 in Speaking and 21 in Listening, Reading, and Writing; Paper-based Score: 580; IELTS Score: Overall band score of 7.0, minimum band score of 6.0 in each module).

If you have not clearly satisfied these prerequisites, you have been admitted to the graduate program on a provisional basis. In such cases, you should discuss your situation with the Graduate Coordinator immediately. If necessary, appropriate remedial coursework will be added to your graduate study list and should be completed as soon as possible. The department will generally not provide tuition assistance for course work intended to remedy deficiencies in satisfying these prerequisites.

## Graduate Courses

The Department of Statistics offers a number of courses on various statistical concepts and specializations. Once you have entered the Master's program, you will have the opportunity to enroll in graduate-level courses. Stat 535, 536, 624, 641, and 642 are required core classes. Graduate students must also enroll in enough credit hours of electives to fulfill the minimum requirement of credit hours necessary to obtain a Master's degree in Statistics. You may choose the electives you would like to take based on your objectives and preferences. Courses are available for enrollment on a very specific schedule. Please plan accordingly and discuss your planned courses with your First-Year Committee Chair or Graduate Coordinator so you can complete the courses in a timely manner and with the appropriate advisement.

## Required Courses

- **Stat 535 Applied Linear Models**  
*Prerequisites: departmental consent*  
*Offered Fall Semester*  
 Analysis of full-rank model, over-parameterized model, cell means model, unequal subclass frequencies, and missing and fused cells. Estimability issues, diagnostics
- **Stat 536 Modern Regression Methods**  
*Prerequisite: Stat 535, 624; or departmental consent*  
*Offered Winter Semester*  
 Weighted least squares, measurement error models, robust regression, nonlinear regression, local regression, generalized additive models, tree-structured regression
- **Stat 624 Statistical Computation**  
*Prerequisite: departmental consent*  
*Offered Fall Semester*  
 Fundamental numerical methods used by statisticians; programming concepts; efficient use of software for statisticians; simulation studies
- **Stat 641 Probability Theory & Mathematical Statistics 1**  
*Prerequisite: departmental consent*  
*Offered Fall Semester*  
 Axioms of probability; combinatorics; random variables, densities, and distributions; expectation; independence; joint distributions; conditional probability; inequalities; derived random variables; generating functions; limit theorems; convergence results
- **Stat 642 Probability Theory & Mathematical Statistics 2**  
*Prerequisite: Stat 641*  
*Offered Winter Semester*  
 Introduction to statistical theory; principles of sufficiency and likelihood; point and interval estimation; maximum likelihood; Bayesian inference; hypothesis testing; Neyman-Pearson dilemma; likelihood ratio tests; asymptotic results including delta method; exponential family

## Graduate Electives

- **Stat 537**    **Generalized Linear Models**  
*Prerequisites: Stat 535, 652; or equivalents*  
*Offered Winter Semester*  
 Generalized linear models framework, binary data, polytomous data, log-linear models
- **Stat 538**    **Survival Analysis**  
*Prerequisite: Stat 441 or equivalent*  
*Offered Winter Semester*  
 Basic concepts of survival analysis, hazard functions, types of censoring, Kaplan-Meier estimates, Logrank tests, proportional hazard models, examples drawn from clinical and epidemiological literature
- **Stat 545**    **Stochastic Processes**  
*Prerequisites: Stat 441 or 470 or equivalent*  
*Offered Winter*  
 Conditional expectation and probabilities; Markov chains; solutions using time-reversible chains; modeling using hidden Markov chains; exponential waiting times; Poisson processes; Brownian motion with approximations
- **Stat 631**    **Advanced Experimental Design**  
*Prerequisites: Stat 431 or equivalent; 535, 642*  
*Offered Winter Semester*  
 Response surface methods, mixture designs, optimal designs, fractions of two-level, three-level, and mixed-level factorials, analysis of experiments with complex aliasing, robust parameter designs
- **Stat 635**    **Mixed Model Methods**  
*Prerequisites: Stat 535, 624, 642*  
*Offered Winter Semester*  
 Fixed effects, random effects, repeated measures, non-independent data, general covariance structures, estimation methods
- **Stat 643**    **Theory of Linear Models**  
*Prerequisite: Stat 642*  
*Offered Winter Semester*  
 Random vectors, multivariate normal distribution, quadratic forms distribution, full-rank and non-full-rank linear models, hypothesis testing, random predictors, estimability, Bayesian topics, mixed and/or generalized linear models

- **Stat 651 Bayesian Methods**  
*Prerequisites: Stat 536, 642*  
*Offered Fall Semester*  
 Basic Bayesian inference, conjugate and non-conjugate analyses, Markov chain Monte Carlo methods, hierarchical modeling, convergence diagnostics
- **Stat 666 Multivariate Statistical Methods**  
*Prerequisites: Stat 535, 624, 642*  
*Offered Fall Semester*  
 Inference about mean vectors and covariance matrices, multivariate analysis of variance and regression, canonical correlation, discriminant analysis, cluster analysis, principal component analysis, factor analysis

## Special Courses

- **Stat 590R Statistical Consulting**  
 This course has a section for first-year students on technical writing and communication as well as a section for students working in the Consulting Center for credit.
- **Stat 591R Graduate Seminar in Statistics (0.0)**  
 You must sign up for 0.0 credits of Stat 591R each semester you are enrolled as a full-time student (9.0 credit hours). If you are not a full-time student, do not register for Stat 591R. Whether registered for the class or not, all graduate students are expected to attend department seminars, which are viewed as an integral part of each student's education. Seminars provide students with an opportunity to see current scholarly research presented by leaders in academics, industry, and government. Further, they provide students with an opportunity to engage their minds in the challenging process of learning to glean and assimilate information presented at a high level. Avoid any scheduling conflicts that prevent you from attending the reception and seminar.
- **Stat 595R Special Topics in Statistics (1.0–3.0)**  
*Offered anytime with prior arrangement*
- **Stat 599R Academic Internship: Statistics (1.0–9.0)**  
*Offered anytime with prior arrangement*  
 For 3.0 credit hours, students should be working 20 supervised hours per week and must write a 10–15 page internship report describing the significant statistical work of the internship.
- **Stat 690R Advanced Special Topics (3.0)**  
*Offered anytime with prior arrangement*

- **Stat 695R Readings in Statistics (1.0–3.0)**  
*Prerequisite: departmental consent*  
*Offered anytime with prior arrangement*

## Project & Thesis Credit

- **Stat 698R Master's Project (3.0)**  
*Enroll in the section associated with your Committee Chair*
- **Stat 699R Master's Thesis (6.0)**  
*Enroll in the section associated with your Committee Chair*

When enrolled in this course, you should meet with your Committee Chair one hour each week and work three hours each week on your Project or Thesis for each registered credit hour. Registering for 698R and 699R cannot be done online. In order to register, you must have departmental approval and fill out an add/drop card for the registration office. Your committee chair and the Department Chair must both sign the add/drop card. Please make sure that you register well before the add/drop deadline, which is usually around two weeks after the beginning of the semester. The instructor for each section of 698R and 699R is different—you will need to register for the section taught by your committee chair.

## Undergraduate Electives

Although they are not required, we recommend these undergraduate courses to expand your career opportunities.

- **Stat 324 SAS Certification 2**
- **Stat 424 Statistical Computing 2**  
*Prerequisite: Stat 224*  
*Offered Fall*  
S Plus, statistical graphics, SAS macros, SAS Proc IML, and simulation
- **Stat 431 Experimental Design**  
*Prerequisite: Stat 337 or 511*  
*Offered Fall*  
Basic designs, power and sample size, Latin squares, incomplete blocks, change-over designs, factorials, fractional factorials, confounding, split-plots, response surface designs

- **Stat 434    Advanced Sampling**  
*Prerequisite: Stat 334; 421 or 441 or 470 or departmental consent*  
*Offered Fall Semester Even Years*  
 Estimation in systematic, simple random, stratified, cluster, and PPS sampling and mixtures of these; ratio estimation, sample size determination and principles of sample allocation
- **Stat 435    Nonparametric Statistical Methods**  
*Prerequisite: Stat 337 or 511 or equivalent*  
*Offered Fall*  
 Permutation tests, rank-based methods, analysis of contingency tables, bootstrap methods, curve fitting
- **Stat 462    Quality Control and Industrial Statistics**  
*Prerequisite: Stat 332 or 336; Stat 337 recommended*  
*Offered Fall odd years*  
 Six sigma tools with which to define, measure, analyze, improve, and control. Advanced concepts in control charts; applying experimental design for process and product improvement
- **Stat 466    Introduction to Reliability**  
*Prerequisite: Stat 332 or 361; 321 or 421 or 441*  
*Offered Winter*  
 Mathematics, distributions, management, and maintenance of basic reliability concepts; collection and analysis of test data; fault tree analysis; applying reliability in various areas
- **Stat 469    Applied Time Series & Forecasting**  
*Prerequisite: Stat 336*  
*Offered Winter*  
 Data mining, univariate ARIMA time series theory and application, seasonal models, spatial correlation models, conditional heteroscedastic models in financial time series, case studies

## Transfer Credit, Senior Credit, and Non-degree Credit

**Transfer Credit** from another university may be used toward a Master's degree in Statistics. However, the following restrictions apply:

- Only graduate-level credit will be considered for transfer
- Only credit from an accredited or certified (domestic or foreign) university will be considered for transfer
- The department must approve all transfer credit
- If the credits are to be earned after the student is enrolled in the Master's program at BYU, the courses must be pre-approved by the department

- A special examination by the Statistics Department may be administered before transfer credit is approved
- Transfer credit can only be used for elective requirements, not for core requirements
- A letter grade of B or better is required for all transfer classes
- The maximum number of transfer credits is 7.0

**Senior Credit** refers to credit taken while a senior at BYU. **Non-degree Credit** refers to credit taken after receiving the Bachelor's degree but before being admitted to the Master's program in Statistics. Senior and non-degree credit may be applied toward a Master's degree in Statistics under the following restrictions:

- Only credit which has not been applied toward another degree can be considered (there can be no double application of credit)
- The department must approve all senior and non-degree credit
- The total of senior and non-degree credits cannot exceed 10.0
- The total of transfer, senior, and non-degree credits cannot exceed 15.0

## Course Availability

		Availability of Courses							
		2009-2010				2010-2011 (tentative)			
		Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer
Required Courses	535	536	698R	698R	535	536	698R	698R	
	624	642	699R	699R	624	642	699R	699R	
	641	591R			641	591R			
	590R	590R			590R	590R			
	591R	591R			591R	591R			
Graduate Electives	651	538	599R		651	537	599R		
	666	545			666	538			
		635				545			
						566			
						631			
						635			
						643			
Undergrad Electives	431	424			431	424			
	435	466			434	466			
	462	469			435	469			
	469				462				

## Registration

### Minimum Registration Requirement

U.S. graduate students are required to register for at least 2.0 credit hours during any semester or term in which they use any university facilities, consult with faculty, or take comprehensive or oral examinations. The number of graduate credit hours for which they register must, in the judgment of the faculty advisor, accurately reflect the student's involvement in graduate study and use of university resources such as libraries, laboratories, and computer facilities. In no case will the registration be for fewer than 2.0 credit hours per semester. Students are required to register for at least 2.0 credit hours in the semester or term of admittance. Registering for two credits of 698R or 699R during spring term also allows for study during summer term. You must be registered for at least two credit hours of Stat 698R or 698R in the semester or term you graduate.

Your desire to work for the department may also influence your study list and graduation plans. You must be registered for at least two credits in a semester during which you receive a stipend from the department, and for at least one credit each during any spring or summer term (2.0 credits spring term will cover tuition for summer term). For graduate students who are not at an internship, Stat 698R or 699R may be the most appropriate course for spring and summer terms.

### U.S. Students, Academic Year

To retain active status and to qualify for subsequent registration, graduate students must register for at least 6 semester hours each school year and receive acceptable grades (no D, E, W, UW, NS, or I grades are allowed, nor are audits or correspondence courses). Students who do not fulfill this yearly requirement are dropped from their graduate programs; they lose their graduate status and must apply for readmission if they wish to continue.

### International Students

Nine credit hours constitutes a full course of study at BYU. Therefore, international students must register for at least 9 semester hours each Fall and Winter semester to satisfy U.S. Immigration regulations. Questions should be directed to International Services (1351 WSC, Provo, UT 84602-7917, (801) 422-2695).

### Full-Time Status

In order to maintain full-time graduate status, a minimum of 8.5 credits must be taken each semester or 4.5 credits each term. Any number of credit hours lower than this is considered part-time.

# Employment & Financial Assistance



## Financial Assistance

The department has limited funds to supplement students' financial resources. All admitted students receive teaching assistantships, and many receive full-tuition awards. A limited number of research assistantships are also available.

### Tuition Awards

A portion of the funds available to support the graduate program is set aside to provide partial tuition assistance for graduate students. Your acceptance letter to the MS Statistics program included a tuition scholarship for Fall and Winter semesters for your first year in the program. So long as you continue satisfactory progress toward a degree, we expect to offer you a comparable stipend for your second year of study. Due to University-wide budgetary uncertainty, tuition scholarships for the 2010–2011 academic year will be awarded on a competitive basis. There are limited funds for Spring and Summer Terms that will be distributed as available.

### Employment Opportunities

As part of the terms of the stipend you accepted upon admission, you are expected to work 20 hours per week. You can make arrangements for a reduced stipend if you would like a lighter work load. Graduate students are employed on contract, so you will not need to worry about clocking in and out to work. First year BS/MS Statistics students are not on contract and must report hours. You will be paid every other week. Your particular work assignments and stipend amount depend on your past performance within the department. The amount of each stipend is determined by the department chair. Your commitment is for fall and winter employment, but summer support is generally available if requested.

### Teaching Assistantships

Most graduate student funding supports the department teaching effort. Students may be assigned to conduct labs, grade papers, work as course assistants, or work in the Center for Statistical Consultation and Collaborative Research, among other things. Assignments are generally made by the Graduate Coordinator. Well before the start of each new term, you should give the Administrative Manager a completed employment application for the upcoming semester or term including your work preferences.

### Research Assistantships

Some graduate students may also be hired to assist designated faculty members with specific research projects. These research projects may be related to your project or thesis research, but this may not always be the case. If you are interested in working with a faculty member, you should arrange to meet with that faculty member to discuss your interest. Funding for such projects is made available through grants and other funding obtained by the department faculty.

## Health Insurance

### Mandatory Health Insurance

Health insurance is mandatory for all students. Students who do not provide proof of private insurance will be automatically enrolled in the BYU Student Health Plan each semester. Verification of private insurance must be provided at the beginning of each academic year for cancellation of enrollment. For more information about BYU's insurance requirements, visit <http://health.byu.edu/healthplan/req.php> or contact the BYU Student Health Center at (801) 422-2661. You can also send an email to [healthplan@byu.edu](mailto:healthplan@byu.edu).

### Student Health Plan

For details about the BYU student health plan, you can access the BYU Student Health Plan Handbook at:  
<http://www.dmba.com/nsc/handbooks/student/hbbyu2008.pdf#page=27>.

### Insurance Coverage After Graduation

Students who graduate and wish to continue coverage under the BYU Student Health Plan may enroll in Extended Coverage if they were enrolled in the Student Health Plan their last semester or term. To learn more about Extended Coverage, consult page 8 in the BYU Student Health Plan Handbook or contact the BYU Student Health Center at (801) 422-2661 or [healthplan@byu.edu](mailto:healthplan@byu.edu).

Also, the Alumni Association offers insurance for BYU alumni. You can reach them at 1-800-922-1245.

# Department Resources



## MS Student Offices

The Department of Statistics maintains several offices for graduate students. The Graduate Coordinator assigns students to these offices. You can expect to share the office with other students, but you will have your own desk and a reasonable amount of shelf space. If you have not already been assigned an office, are unsure about your assignment, or would prefer a different office, feel free to contact the Graduate Coordinator.

Some graduate offices have telephones. The cost to the department to install, maintain, move or remove a telephone is significant. Because of these costs, the department will not make *any* telephone changes in graduate student offices.

Office assignments are generally for the academic year, although we reserve the right to change office assignments as necessary. At times, the department may need to store pieces of equipment, computer manuals, etc. in your office. We will do as much as possible to minimize any inconvenience. In return, we expect you to be properly careful of any items that might be stored in your office. When you vacate an office, please take all personal property with you. We also ask that you not invite or allow unauthorized persons to take up residence in your office, even if a spare desk is available. Please notify the Graduate Coordinator if an unauthorized person is using your office.

All of the graduate student offices have recently been painted and carpeted. We request that you keep your office space and facilities clean and intact. Due to issues of cleanliness and office capacity, no private refrigerators, microwaves, other appliances, or large items of furniture are permitted in student offices. A microwave is available at the south end of the main floor lobby of the Talmage Building.

## Computers

All first-year students receive a department computer for first-year coursework. When available, additional computers are provided by the faculty. The computers in the SURCL, 205 TMCB, and provided by the faculty should be used for research. Personal computers and printers are allowed in student offices, but must be kept on individual desks. Internet wiring may not be modified or augmented in any way. When you are done using a department computer, please remember to log off. You are responsible for anything done on the computer while you are logged in.

Computers are not to be used for inappropriate purposes. As one specific example, access to pornographic web sites will not be tolerated. Computer use in labs and offices will be monitored. Any use of department or university computers for inappropriate purposes will result in dismissal from the graduate program in statistics and will be reported to the Honor Code Office. Also, department equipment and software are not to be used for private income-producing projects.

## Libraries

The Department has two department libraries located in rooms 223F and 223H TMCB. In room 223F, you will find general statistics books and archived statistical journals. Room 223H contains past projects and theses, current issues of statistical journals, and other materials that may be helpful. As you prepare your thesis or selected project, it may be helpful to look over past projects/theses for formatting and writing style help. Books may not be removed from the libraries, except for quick trips to the copy machine.

## Writing & Editing

The department has writing and editing books available for student use in 226 TMCB. These books can be checked out for day and overnight use and include Merriam Webster's Thesaurus, Dictionary, and Dictionary of English Usage; the *Chicago Manual of Style* (15th ed.); Ebbitt & Ebbitt's *Index to English*; the *Chicago Guide to Writing about Multivariate Analysis*, by Jane E. Miller; *Scientists Must Write*, by Robert Barrass; *Random House Writer's Reference*; and *Pocket Keys for Writers*, by Ann Raimes.

## Open Labs

Rooms 198 and 244 TMCB have been designated as open labs. Graduate TA meetings should be held here rather than in individual offices. The environment is more conducive to meeting with small groups of students and allows you to respect the space of your office mates.

## Spring Research Conference

The 24th annual Spring Research Conference, sponsored by the College of Physical and Mathematical Sciences, will be held Saturday, March 20, 2010. The conference consists of two 1½-hour sessions. During each block of time there are several presentations sponsored by the departments in the college. Each session consists of six fifteen-minute presentations by students describing their research projects and results. There is also a small cash award for the best presentation in each session.

The Department of Statistics expects each graduate student to make a presentation at Spring Research Conference. First-year graduate students generally make a presentation on a class project, consulting experience, or the intent of their project or thesis research project (similar to the prospectus presentation). Second-year graduate students generally make a presentation discussing the results of their completed or nearly-completed research project. Your Committee Chair and the Graduate Coordinator can also give you advice on how to prepare for and make this type of presentation. The department also schedules times for practice sessions to provide some suggestions for presenters.

## Internships

After your first year of coursework, you will be well prepared for a summer internship experience. An internship benefits both the organization offering the internship and the student. The student has the opportunity to work with practicing statisticians who are proficient in their fields and to learn what it is like to work in an industrial, laboratory, or office setting away from the academic environment. The organization obtains the benefit of the student's academic and other training, contributes to the further professional development of that student, and has a first-hand opportunity to evaluate the student's potential for future employment.

You should investigate internships in the field in which you'd like to work. We have many alumni willing to coordinate internships for highly motivated students. Each year a dozen organizations come to campus to recruit interns. The American Statistical Association publishes a list of internship opportunities in the December AmStat News. We also circulate all internship announcements. Be sure to have a well-prepared resume and begin looking in January for your internship. Many internship plans finalize in March. For counseling and information, please contact the Graduate Coordinator and your Committee Chair.

If you would like to receive credit for your internship, you must receive permission from the Graduate Coordinator and your Committee Chair before your internship. You will register for 599R to receive academic credit for the internship.

Several of our students worked at internships over the summer. Here is some information on what they did and what they learned.

Serena Baker worked in the Statistics Department Consulting Center. She assisted graduate students from various departments with the analysis of their data in SAS and with the interpretation of the results. Some of her projects included comparing the style of sprinters, middle-distance, and distance runners at different speeds; understanding how the menstruation and maturation of girls in Uganda affects their education; and investigating whether teacher collaboration reduces teacher attrition.

Tomohiko Funai also worked in the Statistics Department Consulting Center. His responsibilities were to analyze the data given by the clients and to interpret the results for clients, and to give advice on sampling methods and analytic methodology. His analyses were done primarily in, but not limited to, SAS. These responsibilities allowed him to apply and expand his statistical knowledge and computing repertoire. Tomohiko's projects ranged from determining the effect of a supplement on muscle size for a nutrition supplement company to identifying important factors for language acquisition.

Brenda Ginos worked on her master's project, with Dr. Grimshaw as her advisor. Her work includes estimating the parameters of the lognormal distribution and applying her findings to various data sets and applications from the real world, including the prediction of rainfall. Brenda also worked as a teacher's assistant for Dr. Nielsen's Statistics 105 course.

Erika Hernandez went to Denver and worked with professors Sam MaWhinney and Jeri Harwood in UC Denver's Biostatistics and Informatics Department. They

worked on a grant that assesses the effect of drug use on clinical HIV outcomes and risk and prevention-oriented outcomes. Erika managed the database and conducted sensitivity analyses on the new method that they used to account for non-ignorable dropout, namely the natural spline varying-coefficient method.

Tommy Leininger did research with Dr. Reese and was involved in mentoring the IMPACT lab's summer bootcamp. His research involved finishing his thesis work on dose-response modeling and analyzing biological agent detector data from Dugway's government testing grounds.

Scott Morris interned at Pacific Northwest National Laboratory in Richland, Washington in the National Security Internship Program with former BYU Masters graduates. Scott worked on a Bayesian spatial model to analyze how biotoxins move around buildings and interior structures. As part of his work, he wrote R packages to use with the model and the other research he worked on.

## Summer Institute of Applied Statistics

Each summer, the BYU Department of Statistics hosts Summer Institute of Applied Statistics. We invite a speaker to give lectures on certain statistical topics. We also provide activities and a couple meals for those in attendance. The cost for graduate students is \$60.00. This price includes conference attendance and "munch & mingle" breaks. The Department also hosts a dinner and luncheon that students can attend for an extra charge. If you wish to attend Summer Institute, speak to the Department Secretary about further details and registration, or visit [statistics.byu.edu](http://statistics.byu.edu) and click on "Summer Institute".

Last year's presentation featured Dr. Di Cook of Iowa State University. Dr. Cook presented "Exploring Data Visually," a course that taught participants about the process of extracting knowledge from data, using graphics as an integral part of the statistical analysis. Other past presenters include Scott M. Berry, R. Todd Ogden, Ray Carroll, David Ruppert, Donald Rubin, David Draper, Brad Carlin, Bruce Weir, Ron Hocking, Dave Higdon, Stuart Hunter, Gary Koch, Charles McCulloch, John Nelder, Terry Therneau, Russell Wolfinger, and others.

# Awards & Recognition



## Alvin C. Rencher Mentorship

The Alvin C. Rencher Mentorship is the department's most prestigious mentorship, awarded to outstanding students to support their research. Dr. Rencher is remembered by all for his concern for individual students. He was a constant source of encouragement to all with whom he came in contact. This year's Alvin C. Rencher Mentorship went to Thomas Leininger and Bradley Ferguson. Last year's mentorship went to Andrea Thomas and Thomas Leininger.

## National Scholarships

The following are graduate scholarships available from the American Statistical Association and American Society for Quality. For more information, please contact the Graduate Coordinator or Graduate Secretary.

- Gertrude Cox Scholarship: for female full-time graduate students of U.S. or Canadian citizenship or permanent residents. Women in or entering the early stages of graduate training (MS or PhD) are especially encouraged to apply. \$1000 cash award. Application deadline April 30. Statistics Department Alumni who have received this award include Stacey Evers, Kristen Piggott Shepherd, and Carly Pendleton.
- Ellis R. Ott Scholarship for Applied Statistics and Quality Management: scholarship recipient must be a student who is planning to enroll or is currently enrolled in a Master's degree- or higher-level U.S. or Canadian program that has a concentration in applied statistics and/or quality management. \$5000 cash award. Application deadline April 1. Jeff Lingwall was the 2005–2006 recipient.
- Edward C. Bryant Scholarship: for outstanding graduate students in survey statistics. Criteria: potential to contribute to survey statistics, applied experience in survey statistics, performance in graduate school. \$1500 cash award. Application deadline April 1.



# Requirements & Procedures



## Degree Requirements

- Stat 535, 536, 624, 641, 642
- 30.0 credit hours for thesis and 33.0 credit hours for selected project
- Pass the comprehensive exam
- Fulfill 2 semesters of full-time registration (8.5 credits/semester)
- Prospectus defense
- Oral defense
- 3.0 cumulative GPA for Program of Study
- Minimum Registration Requirement
- 2.0 credit hours of paid graduate tuition in final semester or semester in which oral defense is held

## Program of Study

A student's program of study (study list) is a carefully considered graduation plan, which includes all necessary elements for degree completion. It identifies the student's major, required courses, and graduate committee. It may also include a minor. You should complete the program of study under the direction of your First-Year Committee Chair during the first semester of your second year. You should keep this study list current; changes can be made when authorized by your current Committee Chair and the Graduate Coordinator.

Required courses to include on your program of study are Stat 535, 536, 624, 641, and 642. Your Committee Chair must approve all courses on your study list. Acceptable elective graduate and undergraduate courses in statistics for both the thesis and project options are described in the Curriculum section of this handbook. Your Committee Chair may also approve certain graduate courses in mathematics, computer science, economics, or sociology. For the program of study, the maximum number of 300- and 400-level credits that can count toward a graduate degree is 9 hours. No 100- or 200-level credit can count toward a graduate degree.

### Submitting a Study List

To officially submit a study list, fill out a Program of Study (ADV Form 3), available at <http://www.byu.edu/gradstudies/forms/>. The form is also available on the Statistics Graduate Program webpage. Once the form is filled out and the necessary signatures are obtained, give the form to the Graduate Secretary.

As you continue in the Master's program, you may want to modify your study list or add committee members to it. In order to do so, fill out a Program of Study Change

Form (Form 3b), also available at <http://www.byu.edu/gradstudies/forms> and on the Statistics Graduate Program webpage. You must officially make the changes by filling out this form in order to avoid future confusion and possible problems with graduation. Please fill out the form, obtain the necessary signatures, and return it to the Graduate Secretary so that the changes can be made officially.

## Study List Approval

When you first submit a program of study, you may not have a full committee or the necessary credit hours outlined at the time, but it is important that you obtain an approved study list as soon as possible. In order to get your study list approved, you must have a full course plan with the appropriate number of credit hours according to your project or thesis option. Your First-Year Committee Chair can approve your study list until you get a Project or Thesis Committee Chair and second committee member. You must turn in a completed study list to schedule your prospectus defense. Again, it is recommended that you obtain an approved program of study as soon as possible.

## Project or Thesis?

In order to fulfill the requirements necessary to obtain your degree, you must complete either a selected project or a thesis. It is your choice, in consultation with your Committee Chair, as to which option you complete. You will spend a significant amount of time in the program researching, preparing, writing, and presenting on a topic of real consequence.

In general, a **thesis** will make an intellectual contribution to the discipline of statistics, while a **project** involves the non-routine use of statistical methodology to make a contribution in another field. A thesis will generally lead to a paper submitted in a statistics journal. A project usually involves the application of statistics, and will often have a broader audience. It is recommended that you speak with your Committee Chair in making a decision as to which track to choose and which topic to work on.

A **selected project** program requires a minimum of 33.0 credit hours, with 30.0 hours in coursework and 3.0 project hours (Stat 698R). Most students require more than one semester to complete the project and the 3.0 credits of Stat 698R can be divided over multiple semesters.

The **thesis** program requires a minimum 30.0 credit hours, with 24.0 hours in coursework and 6.0 thesis hours (Stat 699R). No more than 6.0 credit hours of thesis work will count toward your minimum required 30.0 credit hours. Most students require two or more semesters to complete the thesis and the 6.0 credits of Stat 699R can be divided over multiple semesters.

## Choosing a Committee Chair and Committee Members

Upon admission to the graduate program, you will be assigned a First-Year Committee Chair. This advisor will assist you with registration questions until you choose a thesis Committee Chair and a committee. Once chosen, the Committee Chair becomes your advisor and director of your project or thesis research. The other members of the committee will assist the Committee Chair in advising you about coursework and in directing your project or thesis research.

You should investigate various possible research topics with several different members of the statistics graduate faculty. Many professors have ideas for projects waiting for student effort. In addition to speaking with the faculty members, you should look through recently completed projects/theses (available in the department library) for topics of interest. Most projects/theses contain a future research section that describes related questions which arose during the research project. These related questions frequently form the basis of subsequent projects and theses.

A project could be an outgrowth of an internship experience. You should discuss the feasibility of turning an internship project into a project suitable for this requirement with your Committee Chair.

The choice of Committee Chair must have the approval of the Graduate Coordinator. After obtaining this approval you should meet with your Committee Chair to discuss any suggested changes to your study list, select the other members of your committee and plan the course of the research project. This should take place no later than the third week of the second year of study in the graduate program. Delays in the formation of a committee can lead to significant delays in the completion of your graduate program.

Your Graduate Committee will ultimately consist of a Thesis Committee Chair and at least two other committee members. One of these committee members will be your First-Year Committee Chair. The Committee Chair must be a member of the Graduate Faculty of the Department of Statistics; other committee members are generally from the Graduate Faculty of the Department of Statistics but may be selected from the graduate faculty of other departments on campus.

## Comprehensive Exam

This test will assess your understanding of all important statistical concepts covered in Stat 535, 536, 624, 641, and 642, the required core courses of the program. You must have a 3.0 cumulative GPA or better in the required courses to take the exam. Grading is on a pass/fail basis, determined by the Graduate Faculty. You will be informed as to whether you passed or failed the exam by a letter sent through the mail.

The May Comprehensive Exam will be offered two weeks after Winter semester finals. You will sign up for the exam with the Graduate Coordinator or the Graduate Secretary.

If you do not pass the exam, you will receive an unsatisfactory rating Winter Semester and you will not be able to register for your second year of classes. The Gradu-

ate Faculty have the right, but not the obligation, to offer the Comprehensive Exam during the Summer Term. A student who failed the May Comprehensive Exam may petition the Graduate Faculty to retake the exam Summer Term. If you fail the exam a second time, you will receive an unsatisfactory rating Spring/Summer Semester, and with two semesters in a row of unsatisfactory departmental evaluations you will automatically be dismissed from the graduate program.

## Departmental Evaluations

The Department Chair, the Graduate Coordinator, and your Committee will evaluate your progress as a graduate student periodically. First-year students will be evaluated at the end of Winter semester and Summer term. Second-year students will be evaluated at the end of Fall and Winter semesters, and at the end of Summer term if necessary. The possible evaluations are satisfactory, marginal, and unsatisfactory. If you are rated as marginal or unsatisfactory, you will receive written notification to that effect from the Department via certified mail. This notification will detail the reason(s) for the rating and the steps that must be taken to return to satisfactory status. If you believe this classification to be unfair or in error, you may appeal the evaluation in writing to the Graduate Coordinator. If you are rated as making unsatisfactory progress two semesters in a row or as marginal followed by unsatisfactory, you will automatically be dismissed from the graduate program. Readmission to the graduate program is subject to university policies and procedures.

You must maintain at least a 3.0 GPA for all the courses during the current semester. If your GPA drops below this level, your academic performance will result in a marginal rating. If you fail the Comprehensive Exam, your academic performance will result in an unsatisfactory rating. If you were admitted provisionally and wish to maintain a satisfactory rating, you must satisfy all provisions during your first semester in the program. Failure to comply with the standards of The Church of Jesus Christ of Latter-Day Saints or the Brigham Young University Honor Code may also result in an unsatisfactory rating.

Other reasons for getting a marginal or unsatisfactory rating include, but are not limited to: failure to provide an approved study list, failure to form an approved Graduate Committee, failure to make satisfactory progress on a project or thesis, and failure to meet the requirements of a previous marginal or unsatisfactory rating.

## Readmission

Upon department and graduate dean approval to resume graduate study, former graduate students who were dropped for failure to meet the minimum registration requirement and who wish to resume their graduate studies must submit a Recommendation to Resume Graduate Study (available online at <http://www.byu.edu/gradstudies/>), pay a \$125 nonrefundable processing fee, and submit a Reapplication Honor Code Commitment Form. International students will also need to submit new Financial Certification forms (Form I1 and/or I2). Students should expect their previous course work to be reevaluated and their degree require-

ments to reflect current expectations of the program. Student applications for readmission will only be considered three times per year, in April, August, and December. The graduate faculty, in consultation with the applicant's former Project or Thesis Committee Chair and the Graduate Coordinator, will make the decision to accept or deny readmission.

## Time Limitations

The Statistics MS program is designed to be completed within two years. Graduate Studies stipulates that all master's degrees must be completed within five years of the first semester of enrollment in the program or from the first course taken, whichever comes first. Matriculation in the Statistics MS program may be terminated at any time for failure to make satisfactory progress toward the degree.

## Leave of Absence

You may request a leave of absence for the following reasons:

1. **Medical** You must present a letter from a doctor—up to one year at a time
2. **Military** You must present military orders—up to one year at a time
3. **Mission** You must present a mission call—up to three years

You will not be evaluated during a leave of absence, but the original five-year time limit in which to complete your degree will still apply.

## Graduation

There are several deadlines associated with the project or thesis and project or thesis defense, which you must meet to graduate in a timely fashion. Failure to meet any of these deadlines will generally result in delaying your graduation by one semester. The following list includes the recommended dates for these deadlines in relation to your desired graduation date. Official university graduation dates are in April, August, and December of each year. Steps to graduation are listed below.

1. **Apply for graduation**—complete Form ADV 8a (Application for Graduation) must be processed before your final defense can be scheduled.
2. **Schedule Defense**—complete Form 8c, Departmental Scheduling of Final Oral Examination. Scheduling must be completed at least two weeks before the defense date. When you schedule, you must also place a copy of your completed Project or Thesis in the Department Library (223H TMCB).
3. **Defend project or thesis**—project or thesis must usually be defended at least **six weeks** before your anticipated graduation date.
4. **Make final changes**—after the Graduate Secretary edits your document, make all necessary changes.
5. **Get department and college approval**—complete Form ADV 8d (Approval for Submission of Dissertation, Thesis, or Selected Project). This form, along with the signature pages of your document, must be signed by your Thesis Commit-

tee and the Graduate Coordinator, then by the College Dean.

6. **Submit ETD**—submit your electronic document at <http://etd.byu.edu> after your document and form 8d have been signed by the department. (The ETD should not include signatures.)
7. **Submit for Binding**—all copies of your project or thesis, with signed acceptance pages, and form 8d must be turned in to the library for binding. See ADV Form 11 (Minimum Standards for Submitting Dissertations, Theses, or Selected Projects) for details on submission.
8. **Minimum Registration**—remember that you must be enrolled in at least two credit hours your last term.

If you apply for a specific graduation date and do not meet the indicated deadlines, you will need to reapply for graduation. Please be aware of graduation deadlines—you should only apply for graduation if you think that you can meet all of these deadlines.

The University requires that you register for, or pay the equivalent of, two hours of graduate credit during the last semester of your graduate program. If you have already paid the registration fee requirement and fail to meet the above deadlines, the registration fee requirement will still be satisfied provided you complete all the requirements by the end of the semester for which you paid the fee. This means that *all* graduation requirements must be completed by the end of the semester during which you applied for graduation, including the ETD and library submission of your project or thesis. For April and August graduation, the official end of the semester is considered the day on which convocation is held. For December graduation, the official end of the semester is considered the last day of classes. Your official graduation date will be delayed one semester.

## Before Applying for Graduation

Before you apply for graduation, you will need to make sure that you have accomplished the following requirements:

- Course requirements complete or in process of completion
- Enrollment in at least 2.0 credit hours of Stat 698R or 699R
- Tuition paid for 2.0 credits in the final semester when your defense is held. If you graduate in August, you are only required to pay tuition for 2.0 credits in Spring term, or 2.0 credits total over both Spring and Summer terms.
- Prospectus complete
- Almost ready to defend
- Comprehensive Exam passed
- Program of Study approved

## Applying for Graduation

When you have fulfilled the above requirements, you can apply for graduation if you are ready. Be sure to apply by the deadline that is equivalent to the semester you would like to graduate. An Application for Graduation can be found on the Graduate Studies website or the Statistics Graduate Program webpage. Please fill out your personal information, diploma address, and mark whether or not you plan to attend graduation. Return the form to the Graduate Secretary no later than the appropriate deadline. It is recommended that you don't apply for graduation unless you are fairly confident that you are ready.

## Graduate Checkout List

- Return all keys to the Brewster Building
- Return any textbooks or other materials you used as a TA
- Leave computer in office and delete all unnecessary files; back up any files that you wish to keep on your own storage device
- Remove all belongings from your office—anything left will be thrown out.

## 2009–2010 Graduation Deadlines

<b>Dec 2009</b>	<b>Apr 2010</b>	<b>Aug 2010</b>	
Sept 25	Jan 29	May 28	Last day to apply for graduation. Submit the Application for Graduation (Form 8a) to your department.
Oct 30	Feb 19	Jun 18	Last day to schedule a final oral examination with your department using the Department Scheduling of Final Oral Examination (Form 8c) and to submit a copy of the work to your department. This copy will be made available for the university community in advance of your defense.
Nov 13	Mar 5	Jul 2	Last day to have a final oral examination.
Nov 20	Mar 12	Jul 9	Last day to submit project or thesis and Approval for Submission of Dissertation, Thesis, or Selected Project (Form 8d) to the dean of your college for signature. For ETDs, the document in PDF format must be submitted online by logging into the ETD submission site. After the department has approved the ETD, the dean's office will review and approve the ETD.
Dec 4	Mar 19	Jul 16	Last day to submit final printed copies and ETD with Form 8d to the Library Administration Office (2060 HBLL). Student should then bring validated Form 8d to Graduate Studies, B-356 ASB. Last day to complete any remaining requirements for degree including payment of fees.
None	Apr 22	Aug 12	Graduation—University Commencement
None	Apr 23	Aug 13	Graduation—College Convocation

# Prospectus & Project or Thesis



## Suggestions and Resources

- Start looking for a committee chair and a project or thesis topic early in your graduate program. Talk to faculty members; think about projects suggested by your coursework in statistics; become familiar with the current literature; attend seminars.
- Examine recent projects/theses in the department library (223H TMCB). You cannot remove these projects or theses from the library, but you can examine them there to get research ideas, format examples, writing examples, and so on.
- Some useful ideas for beginners in statistical research are given by Hamada and Sitter (“Statistical Research: Some Advice for Beginners,” *The American Statistician*, 2004, 58:93–101) and several others (“Discussion of ‘Statistical Research: Some Advice for Beginners,’” *The American Statistician*, 2004, 58:196–202).
- To get your literature review started, the Current Index to Statistics can be accessed through the department home page. The Encyclopedia of Statistics and Encyclopedia of Biostatistics in the department library (223H TMCB) may also be helpful.
- Set up regular meetings with your Committee Chair. Initially, weekly meetings should be held. More frequent meetings may be needed as you progress in your research.
- Get a hardbound research logbook with numbered pages. Use this to record all of your research work: your notes from meetings with your Committee Chair, derivations, results, ideas, literature reviews, etc. This way, your ideas won’t get lost or mixed up, you won’t have to deal with the curse of scratch paper, and your final write-up will be much easier to produce.

# Prospectus

The prospectus functions as a contract between you and the Department of Statistics indicating the scope and the extent of the research you will be required to complete to satisfy the project or thesis requirement. The prospectus includes a written document describing the work you will perform and a prospectus defense, during which you describe the topic of your project or thesis, clarify any ambiguities, and answer any questions that may arise.

## Document

In the prospectus document you should

1. Describe the basic problem to be considered and discuss why the problem is important
2. Review and discuss relevant material from the statistical literature
3. Indicate as completely as possible the approach and/or methodology to be used in addressing the problem
4. Clearly indicate any limitations or simplifying assumptions

The prospectus should follow the format and style required for the final project or thesis. With only minor modifications, the prospectus document can be the first few chapters of your project or thesis. Making sure that you follow the correct format at the beginning will save you numerous problems at the end of the project or thesis process. The department maintains LaTeX templates that we strongly encourage you to use. Before you defend, the Graduate Secretary will edit your document for grammar and style. All of the suggested changes need to be made before the defense. Depending on the length of your document and the Graduate Secretary's availability, it could take 1-7 days to edit, so make sure that you get the document turned in for editing at least two and a half weeks before you want to schedule your defense. After the Graduate Secretary has edited your document, make the changes that have been marked.

## Prospectus Defense

Once you have completed your prospectus, given it to the Graduate Secretary for editing, and made the changes the Graduate Secretary has marked, you are ready to schedule your prospectus defense. Print the "Prospectus Defense Checklist and Scheduling" Form (available on the department's Graduate webpage) and complete sections I and II. Once your Committee Chair is satisfied with your prospectus, have them sign section I. Then bring your "Prospectus Defense Checklist and Scheduling" Form to the Graduate Secretary. Also, give the Graduate Secretary a copy of your corrected prospectus to make copies for your other committee members and the Graduate Coordinator.

At this time, the Graduate Coordinator will assign other committee members if

you do not yet have a full committee. Once you have three committee members, discuss possible times to defend your prospectus with the Graduate Secretary—be aware of your committee members' schedules, which should be posted outside their office doors. The Graduate Secretary will schedule your defense and circulate copies of your prospectus to your committee and the Graduate Coordinator to read before your defense.

The prospectus must be scheduled no later than one week in advance of the actual presentation. In some cases, your committee will need two weeks' notice. Your First-Year Committee Chair will supervise the oral presentation and must approve the proposed project or thesis. After all the required signatures are obtained, a copy of your prospectus and the signed approval form will be placed in your student file.

The defense will most likely be held in 301 TMCB. There is tech equipment available in the room, but you will need to provide your own laptop. Visitors are welcome to come and listen. The defense usually takes between one and two hours, allowing time for presentation, questions, and evaluation. It is customary, but not required, for defending students to provide refreshments for their committee. Please remember that there will likely be no more than six people at the defense, and you should not spend a lot of money.

# Project or Thesis

The project or thesis is the culminating step of your course of study in the Department of Statistics. It is a carefully written, polished report of a well-designed and well-executed research project.

## Purposes

The project or thesis component of a graduate education has several purposes, including

- To have an academic experience that continues until an acceptable intellectual and written product is produced (as opposed to ending with an exam and a grade when time has expired)
- To synthesize the knowledge, skills and techniques obtained during your statistical education
- To develop and demonstrate detailed understanding of a specific statistical methodology or topic
- To develop and demonstrate the ability to search the statistics literature and to understand, assimilate, and summarize current and past literature on a specific statistical topic
- To develop and demonstrate competence in technical writing in English
- To gain experience with the peer review process in which your work is reviewed and constructively criticized by others
- To gain experience in collaborative work guided by graduate mentoring

## Components

The project or thesis document should include

- A clear delineation of the problem,
- A thorough discussion of the related statistical literature, and a description of how your work fits in with that literature. It is essential that this discussion be original—not plagiarism of the words of others,
- A detailed explanation of precisely what you did, sufficiently detailed so that another interested statistician could duplicate your work,
- A discussion of the implications of the research—how it can be used and extended, new research questions that arise as a result of the research.

## Format

The project or thesis document must reflect well on the student, the department, and the university. The university and the Department of Statistics require that the document conform to certain standards of format and style. An example can be found online at the Graduate Studies website. For further reference, the ASA style guide can be found at <http://pubs.amstat.org/page/styleguide>. Please make sure that your project or thesis conforms to the indicated standards. The department maintains a LaTeX template that you are encouraged to use. If you have any questions, please consult with the Graduate Coordinator before you make extensive use of a potentially unacceptable format.

## Project or Thesis Defense

The project or thesis defense is a formal oral presentation describing the project or thesis research. This presentation will allow the examining committee to determine if you satisfactorily completed your project or thesis and satisfied the university Final Oral Examination requirement.

### Scheduling

After you receive approval from your Thesis Committee Chair, circulate your document to your committee. To schedule your Project or Thesis Defense, complete a “Department Scheduling of Final Oral Examination” (Form ADV 8c) in its entirety. It is your responsibility to obtain the necessary signatures. As you obtain the signatures, ask your committee members of possible times they could participate in your defense. When the form is complete, take it to the Graduate Secretary for scheduling of your defense. *Your project or thesis defense must be scheduled in the university’s online system by the Graduate Secretary at least two weeks before the date you desire to defend.* It is imperative that the Graduate Coordinator and the Graduate Secretary are informed of your intent to defend your thesis so that the necessary paperwork and scheduling can be completed in time to meet this deadline. In order to schedule the defense you must

1. Apply for graduation
2. Submit a complete copy of your thesis to the graduate secretary to place in the Department Library (Room 223F TMCB)
3. Provide a complete copy of your thesis to the Graduate Coordinator to be reviewed for correct format and given to the department representative
4. Be enrolled for at least 2.0 credit hours of Stat 698R or Stat 699R the semester you defend

It is advisable to complete these requirements a month before you intend to defend. Please pay attention to University deadlines for scheduling your defense, having the final oral examinations, and other important deadlines that you need be aware of. The last day to have a final oral examination is usually 1–2 months before the actual graduation ceremonies. See the graduation section for specific deadlines.

## Defense

Your entire committee must be in attendance for your Project or Thesis Defense. The Graduate Coordinator, Department Chair, and any other member of the BYU Graduate Faculty may also be in attendance. Other interested persons may attend the presentation, including any guests you may wish to invite. Only your committee will be involved in the evaluation process.

You will prepare a 25-minute presentation focusing on the primary project or thesis result. Your defense will most likely be held in 301 TMCB. There is tech equipment there that should be suitable to your needs for your presentation; however, you must supply your own laptop. Following your presentation you should expect questions from the audience and the Graduate Committee. The evaluation will occur after you've been excused from the defense, and the Graduate Committee will judge your performance as pass, pass with qualifications, or fail. If the decision is "pass," no further work on the content of the project or thesis is required. If the decision is "pass with qualifications," the committee may require minor revisions of the project or thesis, or may request that you strengthen your preparation in subject matter areas. Your committee will give you a time limit for minor corrections to the project or thesis that will require Committee Chair approval. When the document is changed to meet the committee demands and the Committee Chair's approval is granted, the clearance is recorded in AIM and the student is judged to have passed the examination. If two or more examiners vote to fail, the examination is failed and the graduate degree program of the student is terminated. To avoid possible failure, please make sure that you are fully prepared and that your committee finds your work to be adequate before scheduling the defense.

As with the prospectus defense, the presentation will most likely be held in 301 TMCB. There is tech equipment available in the room, but you will need to provide your own laptop. Visitors are welcome to come and listen. The presentation usually takes between one and two hours, allowing time for presentation, questions, and evaluation. It is customary, but not required, for defending students to provide refreshments for their committee. There will likely be no more than six people at the defense, and you should not spend a lot of money.

## Editing

When you have passed your defense and your project or thesis is complete, the Graduate Secretary will do a final edit of your document. Depending on the time of year you defend, yours could be at the end of a long list of editing projects, so be patient—your document will likely be returned within one week.

## Project or Thesis Submission

### Signatures

Before submitting your ETD, it is necessary to obtain all of the necessary signatures in the preliminary pages, *except* the dean's signature. After the ETD is submitted, you will need to get the dean's signature.

When submitting your ETD, do not include the signatures that were previously obtained for the preliminary pages. These signatures are only to be used for the hard copies of your thesis or selected project. Please do not include the signatures in the ETD document, due to privacy issues.

Please be sure to submit your project or thesis electronically and to the library by the deadline. Your final project or thesis must be submitted about one month before your actual graduation date.

### ETD Submission

An ETD (Electronic Thesis or Dissertation) is an electronic version of your final project or thesis. When submitted, the document will receive final approval from the Graduate Coordinator and the College Dean, and will then be put on the internet for scholarly viewing. ETD submission is required by the Department. For information on how to submit your document electronically, go to <http://etd.byu.edu/>.

When preparing your ETD for submission, it is necessary to pay close attention to the guidelines outlined on the ETD website. Please go to <http://etd.byu.edu/start/prepare.html> and carefully view these guidelines before submitting your ETD. These submission guidelines are very specific, and if not fulfilled, the ETD will not be approved.

The PDF document to be submitted as an ETD must contain bookmarks. These bookmarks are to mark all chapters, sections, subsections, preliminary pages, appendices, and the bibliography. If you do not insert bookmarks into your ETD, it will be denied. The bookmarks should mirror your Table of Contents; that is, the bookmark directing to chapter 1 should read "1. Introduction," and so on. The bookmarks must also be hierarchical—subsections must be nested under their section, and sections must be nested under their chapter.

To create a bookmark, convert the document to a PDF. Then, go through the PDF and find the pages where a new chapter, section, subsection, appendix, or bibliography begins. Right click on each of these pages. Choose "add bookmark." Type the title of the bookmark. Do this in all necessary places in the PDF document. Remember to indent the bookmarks of sections and subsections.

## Library Submission

When your final document is ready for submission and all of the signatures have been acquired, you will need to submit it to the library for binding by the appropriate deadline. (See page 43 for deadlines.) The Library does not permit you to submit your document to them until you have submitted it as an ETD and it has been approved by the Graduate Coordinator and the College. For detailed instructions on submitting your document to the library, go to <http://www.byu.edu/gradstudies/forms/forms.php> and select ADV Form 11.

You will need at least two copies (one for the department and one for your Thesis Committee Chair). Make the necessary number of copies of your document on white 24-pound bond paper. Each copy of the document should be lightly labeled in pencil on the title page with “DC” for the Department copy, “CC” for the Chair copy, and “P1, P2, etc.” for each personal copy. The documents must be placed in separate manila envelopes and held together with a large rubber band, with Form 8d on top. The packet can then be delivered to the **Library Administration Office (2060 HBLL)**. The appropriate total binding fee must be submitted to the library at this time. If you have questions for the Library Administration Office, you can contact them at 422–2905.

Library submission is the last graduation requirement. If you have applied for graduation but did not make the deadlines for the semester in which you applied, in order to avoid paying tuition for the coming semester, you must complete and submit your thesis as an ETD and to the Library for binding by the last day of the semester in which you applied (or the semester before you will officially graduate). For April and August graduation, the day of Convocation is considered the last day of the semester. For December graduation, the last day of classes is considered the official last day. Be aware, however, that some university services are not available on the day of Convocation, so you are better off completing the submission of your document a couple of days in advance of the deadline.

# BS/MS Statistics Program



## **BS/MS Statistics Students**

The Department of Statistics has a five-year integrated program. An integrated Masters student is one who chooses a course of study that will enable them to get their Bachelor's and Master's degrees at the same time, usually in five years. If you fall into this category, please pay attention to the following details. For the first four years, you will be considered an undergraduate. Your senior year, you may begin to take Master's-level classes that will apply to your MS degree.

The fifth year, you must apply to the Master's program by February 1st, and you will then obtain graduate status. Having obtained graduate status, you will need to pay graduate tuition. As a BS/MS student, you will be required to pay for two semesters of graduate tuition. If you receive an undergraduate university scholarship, your entry into the graduate program cancels that scholarship.

When it comes time to graduate and receive your Bachelor's and Master's degrees, you will need to fill out an undergraduate application for graduation and a graduate application for graduation separately. Filling out one application for graduation will not apply you for graduation for both degrees. If you apply for graduation and fail to meet the necessary requirements by the established deadlines it will be your responsibility to withdraw or defer your BS application for graduation. If you apply for and receive your Bachelor's Degree before fulfilling the requirements for the Master's Degree, many of the courses on your study list will no longer be counted for graduate credit.

Please be aware that you are responsible for ensuring that you complete all necessary coursework for your undergraduate degree. It will be up to you to seek advisement for your GE and other undergraduate requirements; the Statistics Department will primarily be concerned with your graduate coursework.



# Graduate Students Outside Statistics



## Graduate Statistics Minor

As a graduate student, you have the opportunity to obtain a graduate-level minor as well as a major, if you so desire.

The Department of Statistics offers both a PhD and MS Statistics Minor. In order to declare a Statistics Minor, permission from the Chair of the Department of Statistics must be obtained. You must also get approval from your Major Department. After obtaining permission and approval, you will need to fill out a Program of Study change form for your Major Department. It is necessary to include one Statistics Graduate faculty member as a member of your Major Committee.

The PhD Statistics Minor and the MS Statistics Minor contain similar, but distinct requirements. Students who wish to work for a graduate-level minor in statistics must fill out a Stat Minor Declaration form, available on the Statistics website.

### Master's Level Requirements

- 9 credit hours of coursework selected from Stat 535, 536, 624, 641, and 642
- Written comprehensive examination

### PhD Level Requirements

- Stat 535, 536, 624, 641, 642 (15 total credit hours)
- Written comprehensive examination

In accordance with University policy, both Master's and PhD Level minor students must also

- Obtain the approval of the department chair/graduate coordinator of the major department and the Statistics Department
- Select a graduate faculty member from the Statistics Department (approved by the department chair of the Statistics Department) to serve as a committee member

University Policy regarding Grade Point Average (GPA) Requirements also apply to minor courses.

- Graduate students whose graduate (program of study) GPA falls below 3.0 (prerequisite and skill courses are exempt) will not be allowed to graduate and may be dismissed from their graduate programs.
- Students whose grades frequently fall in the C range or below should consult with their committees about the advisability of continuing graduate study.
- No D credit may apply toward a graduate degree.

## **Statistics Graduate Committee Member**

If, as a non-statistics graduate student, you would like to include a member of the Statistics Graduate Faculty on your Project or Thesis Committee, you must fill out a Committee Member Request Form, available on the Statistics website. This form does not need to be completed by students getting a graduate-level minor in Statistics.

# Rules of Conduct



# Brigham Young University Honor Code

Brigham Young University exists to provide an education in an atmosphere consistent with the ideals and principles of The Church of Jesus Christ of Latter-day Saints. That atmosphere is created and preserved through commitment to conduct that reflects those ideals and principles. Members of the faculty, administration, staff, and student body at BYU are selected and retained from among individuals who voluntarily live the principles of the gospel of Jesus Christ. Observance of such is a specific condition of employment and admission. Those individuals who are not members of The Church of Jesus Christ of Latter-day Saints are also expected to maintain the same standards of conduct, except church attendance. All who represent BYU are to maintain the highest standards of honor, integrity, morality, and consideration of others in personal behavior. By accepting appointment on the faculty, continuing in employment, or continuing class enrollment, individuals evidence their commitment to observe the Honor Code standards approved by the Board of Trustees “at all times and . . . in all places.” (Mosiah 18:9)

We believe in being honest, true, chaste, benevolent, virtuous, and in doing good to all men. . . . If there is anything virtuous, lovely, or of good report or praiseworthy, we seek after these things. (Thirteenth Article of Faith)

As a matter of personal commitment, students, faculty, and staff of Brigham Young University, Brigham Young University-Hawaii, Brigham Young University-Idaho, and LDS Business College seek to demonstrate in daily living on and off campus those moral virtues encompassed in the gospel of Jesus Christ, and will

- Be honest

- Observe Dress and Grooming Standards

- Obey the law and all campus policies

- Participate regularly in church services

- Live a chaste and virtuous life

- Use clean language

- Respect others

- Abstain from alcoholic beverages, tobacco, tea, coffee, and substance abuse

- Encourage others in their commitment to comply with the Honor Code

## Specific Policies Embodied in the Honor Code

Specific policies embodied in the Honor Code include (1) the Academic Honesty Policy, (2) the Dress and Grooming Standards, (3) the Residential Living Standards, and (4) the Continuing Student Ecclesiastical Endorsement Requirement.

### (1) Academic Honesty Policy

BYU students should seek to be totally honest in their dealings with others. They should complete their own work and be evaluated based upon that work. They should

avoid academic dishonesty and misconduct in all its forms, including plagiarism, fabrication or falsification, cheating, and other academic misconduct. Students are responsible not only to adhere to the Honor Code requirement to be honest but also to assist other students in fulfilling their commitment to be honest. (Complete version of the Academic Honesty Policy available at [www.byu.edu/honorcode](http://www.byu.edu/honorcode)).

### **Applicable Actions for the University**

The university may elect to place an affected student on probation or to suspend or dismiss the student and to place a temporary or permanent notation on the student's permanent academic transcript that he or she was suspended or dismissed due to academic misconduct. The university may report an incident of academic misconduct to appropriate law enforcement officials and may prosecute an affected student if the act in question involves the commission of a crime (e.g., breaking into an office or building, stealing an examination, etc.).

### **Honor Code Office Involvement**

The Honor Code Office will maintain a record of all violations of the Academic Honesty Policy reported to it by the faculty. If the occurrence is sufficiently egregious or if a pattern of dishonesty or misconduct is discovered, the Honor Code Office may take additional action on behalf of the university based upon the nature of the infraction(s). The Honor Code Office, in consultation with the involved academic personnel, including the Associate Academic Vice President-Undergraduate Studies, may determine to place a student on probation or to recommend suspension or dismissal from the university for academic dishonesty and other forms of academic misconduct.

## **Dress and Grooming Standards**

The dress and grooming of both men and women should always be modest, neat and clean, consistent with the dignity adherent to representing The Church of Jesus Christ of Latter-day Saints and any of its institutions of higher learning. Modesty and cleanliness are important values that reflect personal dignity and integrity, through which students, staff, and faculty represent the principles and standards of the Church. Members of the BYU community commit themselves to observe these standards which reflect the direction given by the Board of Trustees and the Church publication, *For the Strength of Youth*. The Dress and Grooming Standards are as follows:

Men – A clean and well-cared-for appearance should be maintained. Clothing is inappropriate when it is sleeveless, revealing, or form fitting. Shorts must be knee length or longer. Hairstyles should be clean and neat, avoiding extreme styles or colors, and trimmed above the collar leaving the ear uncovered. Sideburns should not extend below the earlobe or on to the cheek. If worn, moustaches should be neatly trimmed and may not extend beyond or below the corners of the mouth. Men are expected to be clean shaven; beards are not acceptable. Earrings and other body piercing are not acceptable. Shoes should be worn in all public campus areas.

Women – A clean and well-cared-for appearance should be maintained. Clothing is inappropriate when it is sleeveless, strapless, backless, or revealing; has slits above

the knee; or is form fitting. Dresses, skirts, and shorts must be knee length or longer. Hairstyles should be clean and neat, avoiding extremes in styles and colors. Excessive ear piercing (more than one per ear) and all other body piercing are not acceptable. Shoes should be worn in all public campus areas.

## Residential Living Standards

As stated in its Code of Honor, Brigham Young University is committed to providing a learning atmosphere consistent with the principles of the Church. The university is likewise committed to creating such an atmosphere for students residing on and off campus. To achieve this, BYU has established living standards to help students learn some of the high ideals and principles of behavior expected at Brigham Young University. The university requires all students to adhere to the following applicable standards.

### **Off-Campus, Wyview Park, Foreign Language Student Residence**

Visitors of the opposite sex are permitted in living rooms and kitchens but not in bedrooms in off-campus living units. The use of the bathroom area by members of the opposite sex is not appropriate unless emergency or civility dictate otherwise; and then only if the safety, privacy and sensitivity of other residents are not jeopardized. Visiting hours may begin at 9 a.m. and extend until midnight. Friday night visiting hours may extend until 1:30 a.m. Landlords may establish a shorter visiting period if proper notice is given to residents. This policy applies to all housing units occupied by single students.

## Conduct

All students shall be required to conduct themselves in a manner consistent with the principles of The Church of Jesus Christ of Latter-day Saints and the BYU Honor Code. Furthermore, all students are required to abstain from possessing, serving, or consuming alcoholic beverages, tobacco, tea, coffee, or harmful drugs. Involvement with gambling; pornographic, erotic, or indecent material; disorderly, obscene, or indecent conduct or expressions; or with other offensive materials, expressions, or conduct or disruption of the peace that, in the sole discretion and judgment of the university, is inconsistent with the principles of the Church and the BYU Honor Code is not permitted in student housing. All guests of students must comply with the Residential Living Standards while on the premises of university-approved housing. All students are required to know the Dress and Grooming Standards and abide by them. (The standards expressed above apply to students at all times whether on or off campus.)

## Plagiarism

Intentional plagiarism is a form of intellectual theft that violates widely recognized principles of academic integrity as well as the Honor Code. Such plagiarism may subject the student to disciplinary action administered through the university Honor Code Office, in addition to academic sanctions that may be applied by an instructor. While inadvertent plagiarism is not a violation of the Honor Code, it is a form of intellectual carelessness that is unacceptable in the academic community. Plagiarism of any kind is completely contrary to the established practices of higher education, where all members of the university are expected to acknowledge the original intellectual work of others that is included in one's own work. In some cases, plagiarism may also involve violations of copyright law.

Intentional plagiarism is the deliberate act of representing the words, ideas, or data of another as one's own without providing proper attribution to the author through quotation, reference, or footnote.

Inadvertent plagiarism involves the inappropriate, but nondeliberate, use of another's words, ideas, or data without proper attribution. Inadvertent plagiarism usually results from an ignorant failure to follow established rules for documenting sources or from simply being insufficiently careful in research and writing. Although not a violation of the Honor Code, inadvertent plagiarism is a form of academic misconduct for which an instructor can impose appropriate academic sanctions. Students who are in doubt as to whether they are providing proper attribution have the responsibility to consult with their instructor and obtain guidance.

Examples of plagiarism include:

- **Direct Plagiarism:** The verbatim copying of an original source without acknowledging the source.
- **Paraphrased Plagiarism:** The paraphrasing, without acknowledgment, of ideas from another that the reader might mistake for your own.
- **Plagiarism Mosaic:** The borrowing of words, ideas, or data from an original source and blending this original material with one's own without acknowledging the source.
- **Insufficient Acknowledgment:** The partial or incomplete attribution of words, ideas, or data from an original source.

Plagiarism may occur with respect to unpublished as well as published material. Acts of copying another student's work and submitting it as one's own individual work without proper attribution is a serious form of plagiarism.

## EEO Statement on discrimination and harassment

Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education and pertains to admissions, academic and athletic programs, and university-sponsored activities. Title IX also prohibits sexual harassment of students by university employees, other students, and visitors to campus. If you encounter sexual harassment or gender-based discrimination, please talk to your professor or the Graduate Coordinator; contact the Equal Employment Office at 801-422-5895 or 1-888-238-1062 (24-hours) or <http://www.ethicspoint.com>; or contact the Honor Code Office at 801-422-2847.

## Ownership of Research

Brigham Young University strives to maintain an environment of open inquiry for the pursuit of truth. In connection with your graduate studies and Brigham Young University, you will be given various assignments and opportunities to engage in scholarly work. Both the research for your project or thesis and any consulting you might do through the Center for Statistical Consultation and Collaborative Research are examples of this type of scholarly work. You may or may not receive direct financial assistance (research assistantships, scholarships, tuition waivers, etc.) in connection with this work. However, you do receive indirect support for your education; the university and its sponsor, The Church of Jesus Christ of Latter-day Saints, provide approximately two-thirds of the cost of your education. Therefore, Brigham Young University retains all rights (including rights to income from sales or licensing), ownership, and title to any scholarly work you perform in connection with your education here. This includes, but is not limited to, data, formulae, computer programs, projects, reports, research papers, copyrights, process patents and other technical information developed by you to satisfy course requirements or department assignments.

This retention of ownership allows the university to carry out its academic mission, fulfill external obligations, and ensure access to scholarship in the future. You have the right to copyright your project or thesis if you desire.

## Confidentiality of Research

As a graduate student, in order to work for the Department of Statistics you must sign a Nondisclosure Agreement indicating your willingness to respect the confidentiality of certain research or other work you might perform for the department. This agreement is necessary to participate in research or consulting activities at Brigham Young University. You should sign this agreement during the first week of your initial semester or term as a graduate student and turn it in to the Graduate Secretary. A copy of this form can be found at <http://techtransfer.byu.edu/forms/employeestudentassign.pdf>.



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