



U N I V E R S I T Y O F
SOUTH CAROLINA
Department of Statistics

***GRADUATE STUDENT
HANDBOOK***

Academic Year 2009-10

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1. INTRODUCTION

This Graduate Handbook is designed to acquaint each Statistics graduate student with procedures of the Department of Statistics, details of the degree programs and those aspects of the Graduate School and the University which influence graduate student life. In particular, the procedures and regulations for obtaining degrees as specified herein apply to all students entering the program in the year shown on the title page (despite any changes that may occur in later years). Note that the Graduate School has its own set of degree requirements which must also be satisfied; in most respects the Department's requirements match, or are more stringent than, those of the Graduate School.

The University publishes several supporting documents which are available at no charge. Reference will be made to these throughout the handbook, but all relevant information in these publications is not completely duplicated below. Each graduate student should familiarize themselves with the following:

1. The University of South Carolina Graduate Bulletin (course descriptions and general degree information). This is available online at the website:

<http://bulletin.sc.edu/>

2. The Carolina Community (published annually with general information about student life, student organizations, and extra curricular activities).

<http://www.sa.sc.edu/carolinacommunity/>

The information contained in this Handbook is complemented by the information on the Department's homepage:

<http://www.stat.sc.edu/>

Also of interest is the Graduate School's homepage:

<http://www.gradschool.sc.edu/>

2. THE DEPARTMENT

The seeds of the Department of Statistics were planted in 1971 when two young statisticians, W.J. Padgett and R.L. Taylor, were hired by the Department of Mathematics at USC. Under their leadership the size of the statistics faculty grew and a wide variety of courses are now offered. While there have been numerous important formative events over the years, probably the most significant have been:

1977	Formation of Statistical Laboratory
1981	Approval of MS and PhD in Statistics Degree Programs
1982	Approval of BS in Statistics Degree Program
1985	Formation of the Department of Statistics
1990	Formation of Center for Reliability and Quality Sciences
1992	Approval of the MIS in Statistics degree program
1999	Approval of the CAS program

The current administrative officers of the Department are:

Don Edwards	Chair
Georgie Baker	Graduate Coordinator, Assistant to the Chair
Edsel Pena	Director of Graduate Studies
Brian Habing	Director of Undergraduate Studies
John Grego	Director of the Statistical Laboratory
Ian Dryden	Computer Committee Chair

Various aspects of the Departmental functions are supervised by faculty committees. The committee of most interest to graduate students is the Graduate Advisory Committee, which recommends policy for the Department's graduate programs, reviews student academic progress, approves all curriculum developments and revisions at the graduate level, and serves as an appeal body for grievances. The committee also reviews all admissions and awards of financial aid. Current members of the Graduate Advisory Committee are Edsel Pena (chair), Don Edwards, Ou Zhao and Georgie Baker.

The Department houses the Statistical Laboratory which offers statistical consulting services to clients from throughout the University, government, and industry.

FACILITIES

The following facilities may be of interest to graduate students:

1. *The Thomas Cooper Library:*

The Cooper Library is the central library facility on campus. Statistics publications for the Cooper Library are ordered by the Department's library representative, based on recommendations of faculty and graduate students. Cooper Library houses research carrels which are available to graduate students doing research. The library conducts tours each semester to familiarize students with its holdings and facilities. Several mathematics and statistics journals are now electronically accessible from your office computers through the databases such as JSTOR and MathSciNet. To access electronically, go to the website

<http://www.sc.edu/library/er/>

2. *The Mathematics Library:*

The Mathematics Library is located at the south end of the third floor of the Statistics Department's home building, LeConte College. It holds the University's collection of mathematics publications and is a good quiet place to study between classes. There are few Statistics texts or journal holdings, however.

3. *Computer Facilities:*

The Department currently has a variety of Unix Machines and PCs, including a PC for each graduate student in their offices. PCs are also available in LC 124 and LC 303A during the day. For those needing to run simulations on PCs, the computers in LC 200A and LC 205 are available by permission when the STAT 201 labs are not in session. The main UNIX file server (fhat.stat.sc.edu) should not be used for running simulations, but there are four computer clusters available through your advisor. Please note that departmental printers should only be used for academic work, and your computer privileges may be revoked for misuse.

Students should read BOTH their departmental and university email accounts regularly (daily, at least) as announcements will often be sent via email with no paper copies provided. Both of these accounts can be set to forward to another account you have, and the university account has a web-interface.

4. *The Department Lounge*

This is a common room for use by faculty and students of the Statistics Department located in LeConte 213. Students, together with the faculty and the staff, have a responsibility to keep this lounge clean.

COLLOQUIA AND SEMINARS

Colloquium talks are given most Thursdays during major semesters by visiting scientists, local faculty, and graduate students. Colloquia provide a valuable addition to classroom learning and are an integral part of graduate study, and also provide graduate students an opportunity to meet researchers and faculty from other institutions, to hear and learn about current and new research areas and exploratory talks, and exposure on how to present research as well as non-research talks. As such, all graduate students are very strongly encouraged to attend and participate actively in these colloquia.

Weekly research seminars (information organized around specific topics of interest) may also be conducted by various research subgroups in the Department during the year. Graduate students are welcome to participate with faculty in the study of recent research, which may be relevant to their theses or dissertations.

3. DEGREE PROGRAMS AND ACADEMIC REGULATIONS

The Department offers programs leading to the Certificate of Graduate Study in Applied Statistics (CAS), the Master of Industrial Statistics (MIS) degree, the Master of Science (MS) in Statistics degree, and the Doctor of Philosophy in Statistics (PhD) degree.

Requirements for these programs may be found under the program links on the Graduate Page of the Department Website and in the Graduate Bulletin.

A. PhD Examinations and Dissertation

Students pursuing the Ph.D. in statistics are required to pass three examinations. The first, the Admission to Candidacy Examination, taken after one year of study, is designed to measure potential for advanced study in statistics at the doctoral level. The second, the Comprehensive Exam, is a defense of the dissertation proposal and is taken after most of the course work is completed. The third and final, the Dissertation Examination, is a defense of the dissertation results.

Admission to Candidacy Examination

The Admission to Candidacy Examination, or Qualifier, consists of two three-hour written sections given during the same week. The intent of this examination is to measure potential for advanced study at the doctoral level in statistics rather than to measure knowledge of content of any particular courses. The best preparation for these examinations is to master the topics in the courses STAT 704, 705, 712, and 713. Copies of previous examinations, with solution sketches, can be found on the Graduate Page of the Department Website. It is *highly* recommended that the candidate study these previous exams carefully as part of his/her preparation, and simulate the test experience itself.

A student may receive a grade of Pass, Masters Pass or Fail. Pass qualifies a student to continue in the PhD Program. Masters Pass may be substituted for a Pass on the MS Comprehensive Exam. The Admission to Candidacy Exam may be attempted twice.

The Admission to Candidacy Examination is prepared (with input from the Faculty) and graded by an examination committee consisting of five members of the Graduate Faculty appointed by the Graduate Director in consultation with the Chairman. The examination will be given in May and (if necessary) January of each year. The Admission to Candidacy Examination should be attempted as early as possible and by Graduate School rule must be completed at least one full academic year prior to the date at which the PhD degree is to be granted. Normally the exam is taken after the first year of graduate study. PhD Students who decline to take the Qualifier after their first year of study may be considered to no longer be "in good standing" for purposes of assistantship support. Two attempts of the Admission to Candidacy Examination are allowed; failure to take the second attempt at the next offering after the first attempt may result in no longer being considered to be "in good standing" for purposes of assistantship support.

Comprehensive Examination

Upon successfully passing the Doctoral Qualifying examination, if they have not already done so, the student PhD candidate should begin the process of finding a research advisor and begin researching topics suitable for a doctoral dissertation. This research will often begin through either STAT 798 (Independent Study), STAT 898 (Directed Readings and Research), or as a supported research assistant. This should be occurring while most (if not all) of the remaining course requirements are being satisfied.

Once the background reading has progressed to a stage where a dissertation area has begun to be narrowed in on and can be effectively approached, the student should enroll in STAT 890 (Doctoral Seminar) and begin writing the Dissertation Proposal. At this time the student should also select the remaining members of their Comprehensive Examination committee. This committee's four members (including the advisor, and at least one from another department) will also typically be the Dissertation Defense committee.

The Comprehensive Examination is typically taken between the end of the third and end of the fourth year of graduate study (for those who have entered the program without a masters degree) after completing the 3 hours of STAT 890. The examination consists of orally presenting and defending the written Dissertation Proposal.

The Dissertation Proposal will typically contain an overview of the problem the dissertation will address, a thorough review of the literature in the area, and a detailed plan of the remaining research to be carried out. It is common for the literature review section to be essentially the same as will appear in the finished dissertation. The write-up of the research plan will also often contain some preliminary results.

The Dissertation Proposal should be delivered to the committee at least two weeks in advance of the defense, and the individual members may provide comments to the student in advance of the defense. The proposal is then presented to the committee (with outside observers at the student's and advisor's choice) usually for 30 to 45 minutes. The committee will then orally question the student to assess whether the research topic and plan presented is at the level of a PhD dissertation in statistics or probability, and to judge whether the student is capable of completing the proposed research work.

No more than two opportunities to pass this Comprehensive Examination are allowed.

Dissertation and its Oral Presentation

To complete the program, the student, under the guidance of the Graduate Advisor, must complete the research plan contained in his/her dissertation proposal and will then write the dissertation. Upon completion of the dissertation, the student will defend its contents in a final oral Dissertation Examination before his/her doctoral committee. It is expected that the content of the dissertation will be a significant contribution to the

statistics or probability literature and that at least one paper will be submitted for publication in a reputable journal in the field before the dissertation defense.

B. MS Examination and Thesis Presentation

MS Comprehensive Examination

The MS Comprehensive Examination is given each May and (if necessary) January. It is taken by those students who choose the non-thesis MS option. It is meant to test the mastery of topics covered in the courses STAT 704, 705, 712, and 713. A student may take the Admission to Candidacy Exam (Qualifier) instead. A pass or master pass on the Admission to Candidacy Exam can be substituted for a pass on the MS Comprehensive Exam. Two attempts of the MS Comprehensive and/or Admission to Candidacy Exam is allowed.

Thesis Presentation

For those students choosing the MS thesis option, the writing and presentation of a thesis is required. After consultation with faculty members, the student chooses an advisor, usually during the third semester. Presentation of the thesis, with the agreement of the advisor, is given during the fourth semester to the advisor and two readers. There may also be others present at the discretion of the student and his/her advisor.

C. SELECTED ACADEMIC REGULATIONS OF THE GRADUATE SCHOOL

1. Graduate courses may be passed for credit with a grade as low as C, but a degree-seeking student's cumulative grade point average must be at least B (3.00 on a 4.00 scale). Graduate degree-seeking students whose cumulative grade point average drops below 3.00 (**B**) will be placed on academic probation and allowed one calendar year in which to raise the grade point average to at least 3.00. Students who do not reach a cumulative 3.00 grade point average during the probationary period will not be permitted to enroll for further graduate course work as a degree or nondegree student.
2. Courses designated as Thesis Research, Thesis Preparation, Dissertation Research, or Dissertation Preparation will be graded as satisfactory (T) or incomplete (I). Credit hours with a satisfactory grade may be counted toward total credit hours earned, but these courses will not be considered in determining the student's average grade.
3. Every degree candidate must file a formal Program of Study in the Graduate Office and do so at the earliest convenient date. A formal Program of Study is an agreement signed by the student and his/her advisor, the Director of Graduate Studies, and the Dean of the Graduate School. This agreement protects the student in the event of unexpected curricular or faculty changes. Although a formal Program of Study is binding, they can be modified or replaced by new programs when necessary.

4. No more than 6 credits of course work taken in a non-degree status can apply to a degree program of study.
5. As a general rule, not more than 6 hours of independent study may be used on a master's program of study, and not more than 9 hours on a doctoral program of study, unless justified by the department and approved by the dean of The Graduate School.
6. At the conclusion of the program, the candidate must have at least a B average on all courses attempted for graduate credit, at least a B average on all courses numbered 700 and above, and at least a B average on all courses included on the program of study.

D. ACADEMIC REGULATIONS OF THE DEPARTMENT

1. Graduate assistants enrolled in the Master of Science degree program are expected to complete all degree requirements in a period of two academic years. The PhD program normally will require five years unless a Master's Degree has been previously obtained. Graduate assistants are expected to be enrolled for at least nine semester hours in each of the fall and spring semesters. Attendance in the summer is optional.
2. The level of the courses taken should be consistent with the stated degree program, as should the course content. Courses taken must be approved by the Graduate Director.
3. Six hours of coursework with grades of C+ or below may place a student on academic probation. Students on academic probation may be required to reduce a graduate assistantship to 1/4 time. A student will remain in probationary status until achieving an overall "B" average.
4. Students with grades of C+ or below in nine hours of course work taken for graduate credit may be dismissed from the degree program in the absence of extenuating circumstances, and may be ineligible for further Department financial aid.
5. Credit for courses taken elsewhere must be approved by the Graduate School under recommendation of the Graduate Director, based upon sufficient evidence that credit is merited. It is expected that written documentation verifying the course and grade, textbook and syllabus, and instructor qualifications will be provided. As a rule, the Department allows a maximum of six semester hours of transfer credit for the MS degree.
6. A candidate may apply for waiver of a Departmental requirement if there are justified extenuating circumstances. No waiver can be granted which violates the basic Graduate School definition of the degree. Waiver of any requirement will be determined by the Graduate Advisory Committee. Waiver of Graduate School rules can also be requested.

7. Revalidation of courses: courses taken at USC become invalid after a period of six years. Revalidation is based on re-examination over the course content and payment of a fee per credit hour. To be eligible for revalidation, the course content must be of current value and consistent with the scope and level of the current curriculum.

E. GRIEVANCES AND APPEALS

The first level of appeal of any regulation is the Graduate Advisory Committee of the Department, through the Director of Graduate Studies. The second level of appeal is the Graduate Council of the University, through the office of the Dean of the Graduate School. Decisions of the Graduate Council are final, subject to approval of the Graduate Faculty of the University.

4. ACADEMIC ADVISEMENT

A. ADVISEMENT PROCEDURE

Graduate students will be initially advised as to course of study by the Graduate Coordinator. When thesis / project research has been initiated, the thesis advisor shares responsibility for advisement and determination of the student's progress toward his/her desired degree.

For all Masters Degree Students: By the end of the student's second regular semester in attendance (completion of 18 hours) the student and advisor submit a Program of Study to the Graduate Director for approval; this must then be approved by the Dean of the Graduate School.

For PhD Students: The student's preliminary Program of Study sheet should be submitted to the Graduate Director and Graduate Dean no later than one major semester following the student's successful completion of the Admission to Candidacy Examination. This Program of Study can be amended later if course offerings change.

B. GENERAL TIMETABLE FOR MS AND PhD DEGREE PROGRAMS

It is your responsibility to check the graduate school web-site at the beginning of the semester you wish to graduate in to verify the dates for various requirements (e.g. application for graduation, defense dates, format check dates, final copy dates, etc...). These days are generally as indicated in the table below.

In the table below, the letter "G" indicates the date of expected graduation. Hence "G-60 days" means "60 days before the date of graduation.

Master's Degree Program

Program of Study Form filed (before end of third semester)
Thirty hours of approved courses completed

First draft of thesis to Committee (G-65 days)
 Application for graduation filed (G-65 days)
 Final version of thesis to Committee (G-45 days)
 Comprehensive Examination completed (defense of thesis) (G-30 days)
 Thesis delivered to Graduate School (G-15 days)

PhD Degree Program

Admission to Candidacy Examination completed (end of first year)
 Comprehensive Examination completed (one-two years after Qualifier)
 Application for graduation filed (G-65 days)
 Final version of Dissertation to Committee (G-45 days)
 Dissertation Defense completed (G-30 days)
 Dissertation delivered to Graduate School (G-15 days)

5. THESIS AND DISSERTATION PREPARATION

A. SELECTION OF THESIS TOPIC AND ADVISOR

Writing a thesis / dissertation is a major project. It is important that you select a problem of interest to you and an advisor with whom you are comfortable. It is recommended that you have preliminary discussions with several faculty members before you make your decision; try to include discussions with faculty members whom you have not had as instructors. For the MS thesis, these discussions usually occur late in the second semester of study; for PhD candidates, soon after passing the Admission to Candidacy exam.

To interview a potential advisor, the student approaches a faculty member under whose guidance he/she may wish to write. Usually the faculty member will propose potential topic(s), though if the student has a topic in mind he/she is encouraged to propose it. If this faculty member agrees to direct the paper, the name of the advisor, student, and the general topic of the paper are submitted to the Graduate Director for approval.

In the event that a student wishes to change advisors or a second reader, etc. during the development of the student's paper, the Graduate Director should be notified by the advisor involved so that the necessary alterations can be implemented.

B. THESIS DIRECTION AND DEFENSE

MS Once the student has begun work on the subject of his paper, the advisor notifies the Graduate Director of the student's name and proposed topic. Under the thesis advisor's recommendation, the Graduate Director assigns a three-member committee (with the advisor as chairman) to read the thesis and to hear its defense. The defense begins with a presentation of the research (usually about 40 minutes in length) to the Department's faculty and students. The general audience is then excused for the MS examination, to be conducted privately by the three member thesis committee. The committee asks questions about the thesis, and also any aspects of the student's coursework which the examining committee deems appropriate. The decision of the three-member committee is submitted in writing.

PhD The pattern is similar to the above, but the dissertation usually takes about twice as long to complete, the presentation is usually about an hour in length, and the questioning (by a four-member examining committee) more rigorous and lengthy.

C. TECHNICAL DETAILS

Thesis and Dissertations are to be submitted electronically following the regulations outlined by the Graduate School at <http://www.gradschool.sc.edu/thesisdissertation/>.

6. FINANCIAL AID

A. TYPES OF SUPPORT

The principal source of financial assistance for graduate students in the Department is the Graduate Assistantship. The purpose of a graduate assistantship is threefold. It provides a stipend for the assistant, service to the Department and the University, and practical experience for the assistant in work related to the degree which he or she is seeking. It is within this context that the Department has established a variety of different assignments for graduate assistants.

Teaching Assistant (TA): The teaching assistant has full responsibility for an undergraduate course at the elementary level. Faculty supervision and support mechanisms are provided, e.g. weekly meetings of instructors and peer evaluations.

Instructional Assistant (IA): The instructional assistant has responsibility for conducting several labs or recitation sessions per week in support of an undergraduate course at the elementary level. Grading and/or computer laboratory supervision duties may also be assigned to complete the student's responsibilities to approximately 20 hours per week. Faculty supervision and support mechanisms are provided, e.g. weekly meetings of instructors and peer evaluations.

Research Assistant (RA): The research assistant serves as an assistant to a faculty member on a research project or to the staff of the Statistical Laboratory. Research assistants may be required to work several days beyond the end of exams, or before the start of classes, at the discretion of their work supervisors. They may also work in other Departments throughout the University.

Staff Assistant (SA): A staff assistant is assigned to supervise public-use computing facilities or other non-instructional and non-research capacities.

Some fellowships from the Department, the College, and the Graduate School, as well as from external sources, are available for meritorious applicants.

B. TAXES AND WITHHOLDING

Each assistant should complete a form W-4, available in the Statistics Department business office. If no W-4 is submitted to payroll, the default is to "0" exemptions, resulting in a substantial amount of withholding. A method of determining the number of exemptions to claim and a form for calculating such exemptions is available from the local office of the IRS. Income from Graduate Assistantships is normally considered taxable by the IRS.

7. PROFESSIONAL AND SOCIAL LIFE

A. STUDENT ORGANIZATIONS

The Department has two organizations for graduate students: (1) the Stat Club, open to all who have interest in the field of Statistics, and (2) Mu Sigma Rho, a chapter of the national honorary society for statistics. Most graduate students will be eligible to join Mu Sigma Rho after completion of at least 18 semester hours of graduate work with at least a 3.5 GPA. These organizations sponsor a wide variety of activities, including: field trips to national and regional professional meetings, visits by practicing statisticians (often USC alumni) to discuss career paths in statistics, Science Fair judging, University Showcase days, and social events such as picnics, parties, hikes, etc.

B. PROFESSIONAL SOCIETIES

Through their annual and regional meetings and their publications these societies provide statisticians with a means of making their research public as well as enabling them to keep abreast of new results. The societies perform valuable services in a variety of areas as diverse as curriculum improvement, surveys of salary and job opportunities and leadership in indexing projects as well as acting as spokesmen for the statistical community. A graduate student is studying to become a professional, and should join one or more of the major professional societies. The choice of societies depends upon personal interests.

The **American Statistical Association (ASA)**, founded in 1839, is one of the oldest professional organizations in the United States. Sections are organized within the Association on the basis of subject matter interest to further development of statistics in specialized fields. A student membership in the ASA is available; application forms are available at <http://www.amstat.org>. Membership includes a subscription to the newsletter *The AMSTAT News* and (upon election) one or more journals, e.g. *Journal of the American Statistical Association*. *The AMSTAT News* is the news periodical of the Association and includes articles on current events affecting statisticians, discussions of professional problems, job listings, and information concerning members and Association activities. In *JASA* selected papers on theoretical and applied aspects of statistics as well as comprehensive reviews of books bearing on the field of statistics are published.

The **Institute of Mathematical Statistics (IMS)** is an international organization founded in 1935 to further research, teaching and development of applications in the field of mathematical statistics. The IMS publishes the *Bulletin* of the IMS, *The Annals of Probability* and *The Annals of Statistics*. The *Bulletin* is the news periodical of the IMS. The other two journals contain research papers. Student membership in the IMS includes a subscription to the *Bulletin* and (upon election) either one of the Annals or both Annals. The IMS website is at <http://www.imstat.org/>

The **International Biometric Society (IBS)** was organized in 1947 for the advancement of biological science through the development and dissemination of effective mathematical and statistical techniques. The Biometric Society is an international society. Persons living in the United States belong either to the Eastern or Western North American Regions (ENAR or WNAR). The official journal of the

Biometric Society is *Biometrics*, and comes with membership in the society. Student memberships (in ENAR) are available. The ENAR website is www.enar.org, while the IBS website is www.tibs.org/biometric.html.

The three organizations mentioned above, ASA, IMS and the Biometric society publish a membership list approximately every three years. This book contains additional information on the societies including their constitutions, fellows, and officers. These societies hold joint meetings every August.

C. SEEKING EMPLOYMENT

Part of your advisor's job is to offer advice on seeking employment - use him/her in that capacity. Advertisements for positions appear in the AMSTAT News, Institute of Mathematical Statistics Bulletin, and major newspapers. The University Career Center also is notified of some positions. Specialized employment services (placement services) exist for statisticians and do not charge the job candidate. Most of these advertise in the AMSTAT News. Job announcements received by the Department faculty and staff are distributed by e-mail to all graduate students.

Once you have made contact with a potential employer, you may be invited for an interview visit. Get help from your advisor and/or any trusted faculty member in preparing for your job interview. You may be asked to give a seminar talk. If so, be sure to give a talk at one of the departmental colloquia first, if at all possible. You will gain valuable experience in presenting your material and in fielding questions from the audience. Be prepared to discuss your current and proposed future work with others. By the same token, you should be evaluating your interviewers and the institution or firm you are visiting. Will there be people with whom you can discuss problems professionally? Are library facilities adequate? Does the group you are interviewing with appear to be a stimulating group with whom to work? Will they respect you and support your development?