Statistics & Data Science

The University of Arizona

Statistics & Data Science Graduate Interdisciplinary Program

Graduate Student Handbook

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Important Websites

- The Statistics & Data Science website contains important information about the graduate program, including academic information, news, contacts, and program events.
- GradPath information page. Students submit all forms electronically through GradPath. It is vital that students know how to access GradPath via UAccess Student.
- The Graduate College website contains information pertinent to the degree certification process
- The University's General Catalog contains a wide array of information on Academic Policies and Requirements.
- UAccess hosts employment, teaching, financial and enrollment information
- Many classes use the university online class management system, D2L D2L provides tools for course delivery, constant delivery, course management

THE UNIVERSITY OF ARIZONA®

Statistics & Data Science Graduate Interdisciplinary Program

Graduate Student Handbook

Welcome

Welcome to the Statistics & Data Science (SDS) Graduate Interdisciplinary Program (the GIDP)!

The educational goal of this Program is to produce active and creative researchers and practitioners who will develop statistical and data science techniques and practical innovations to advance research ideas across the areas of enquiry that rely on statistical and data science. Such an interdisciplinary focus requires strong analytical and computational skills, in addition to a deep knowledge of the discipline from which new research problems arise. Developing this level of expertise is a challenging goal and requires sincere dedication on the part of our students. Your level of commitment to your program will largely determine your success as a future statistician and data scientist. So, welcome, and best of luck in your graduate training!

Using this Handbook

This handbook describes the Program's current regulations and procedures as well as the various requirements that must be met for the Ph.D. and M.S. degrees, the Ph.D. Minor and the Graduate Certificate in Statistics & Data Science. Please use the links provided in this handbook to review up-to-date information on Graduate College and Statistics & Data Science (SDS) GIDP policies.

It is GIDP policy that the student holds final responsibility for being aware of and responding to all GIDP and Graduate College policies, requirements, formats, and deadlines as they pertain to progression towards and completion of their degree.

Please refer to the Graduate College website, http://grad.arizona.edu/new-and-current-students, for information on academic services, policies, and procedures.

If you have any questions about the program, please contact Brooke Valmont, Graduate Program Coordinator, at bvalmont@arizona.edu.

Program Overview

Degree Options

The Graduate Interdisciplinary Program (GIDP) in Statistics & Data Science at the University of Arizona focuses and enhances statistical data science training and research across the UA campus. It administers Doctor of Philosophy (Ph.D.) (regular track and statistical informatics track) degrees, Master of Science (M.S.) degree, Accelerated Master's degree, as well as a Graduate Certificate and a Ph.D. Minor in Statistics & Data Science.

In addition to coursework and research opportunities, Statistics & Data Science Graduate students also have access to a variety of seminars, colloquia featuring distinguished invited speakers, special lecture series, workshops, and conferences sponsored by the Statistics & Data Science GIDP.

Our Faculty

The Statistics & Data Science Program boasts a diverse and distinguished research faculty who hail from a variety of campus units, including departments in the Biosystems Engineering, Agricultural-Resource Economics, Computer Science, Public Health, School of Plant Sciences, Epidemiology & Biostatistics, Systems & Industrial Engineering, Mathematics, School of Geography & Development, Psychology, Pharmacy Practice & Science, Systems & Industrial Engineering, Economics, Molecular & Cellular Biology, Communication, Economics, Teaching/Learning and Sociocultural Studies, Medicine, Ecology & Evolutionary Biology, Tree-Ring Laboratory, Aerospace & Mechanical Engineering, School of Information, Animal & Comparative Biomedical Sciences, Government & Public Policy, School of Natural Resources & the Environment. Students can select an advisor from a list of faculty with a wide range of trans-disciplinary studies in both theoretical and applied statistics and data science. A complete list of our faculty and their research interests is available on the Faculty page of the Program website.

Program Administration

Graduate Interdisciplinary Programs

The Statistics & Data Science Program is one of 21 GIDPs at the University of Arizona. The University of Arizona's GIDPs transcend departmental boundaries by facilitating cutting edge teaching and research where traditional disciplines interface. GIDPs report directly to the Dean of the Graduate College.

The Statistics & Data Science GIDP is administered by an Executive Committee. The Executive Committee is directed by the Program Chair and includes six faculty members. The Program Coordinator facilitates the day-to-day activities of the Program.

The duties of the Chair are to:

- convene and preside at meetings of the Executive Committee to be held not less than once a semester; (once a month is standard)
- help guide the efforts of the Executive Committee in acquiring University and other external resources to support the full functioning of the GIDP and effectively manage the budget and financial resources of the Program;
- convene and preside at meetings of the larger GIDP in Statistics & Data Science at least once per year and otherwise as needed;

- prepare Promotion & Tenure and Continuing Review documentation for faculty members of the GIDP according to University policies and procedures;
- monitor and update catalogue and all GIDP curricular and promotional materials; and
- with the advice and counsel of the Executive Committee, appoint and supervise the Standing Committees of the GIDP.

The Executive Committee assists the Chair in providing general oversight and direction for the GIDP, via the following activities:

- review and admit both regular and affiliate faculty members to the program;
- provide advice and counsel to the GIDP Chair regarding appointments to GIDP committees;
- rule on any curriculum matters brought by GIDP students;
- promote interdepartmental awareness and supporting education and research related to the field of Statistics & Data Science;
- advise the Director of Graduate Interdisciplinary Programs and the Vice President for Research on issues pertinent to the GIDP and to the field of Statistics & Data Science; and
- review the Bylaws regularly to ensure that the GIDP structure remains modern, pertinent, and operable.

Four members of the Executive Committee serve as chairs for the Program's standing committees, (1) Recruitment and Admissions, (2) Curriculum, (3) Colloquia and Forums, and (4) Qualifying Examination Committee. The Program Vice Chair oversees the Annual Progress Reports and represents the program in place of the Chair as needed.

Current members of the Statistics & Data Science GIDP Executive Committee may be found on the Program Administration page of the program website.

Student Participation in Program Administration

Student Rights and Responsibilities

Students are entitled to the following rights as members of the Statistics & Data Science GIDP:

- Right to representation through a Graduate Student Representative;
- Right to appeal as outlined in Appendix 5. Student Appeals;
- Right to clear information on all degree requirements;
- Right to clear information on program progress through
    - consistent assessments;
    - meetings with faculty advisors at least once per year; and
    - timely feedback (maximum 6 week turn-around) on degree requirements.
- Right to prompt notification of changes in Program policy.

Students are responsible for

- conducting themselves professionally in all university-related activities, including all interactions with students, faculty, staff, and university visitors;
- regular participation in SDS colloquia, seminars, community meetings, professional development seminars, and other program events;
- maintaining satisfactory academic progress (Appendix 1);
- meeting the other expectations of the Graduate College and the Statistics & Data Science GIDP as outlined in this Handbook.

Responsibility for meeting Statistics & Data Science GIDP and University requirements ultimately rests with the student. Students should not expect reminders of deadlines from the program.

SDS students are also expected to abide by all relevant ethical and academic standards of the University as described in the Code of Academic Integrity and the Responsible Conduct of Research.

Student Affiliation for Publications and Presentations

The Statistics & Data Science student affiliation (for publications or presentations) is "Statistics & Data Science Interdisciplinary Program", with the address "Mathematics Building 115, 617 N. Santa Rita Ave., PO Box 210089, Tucson, AZ 85721." This is true even though your advisor (who may be a co-author on your work) may have a separate, departmental affiliation (e.g. Department of Mathematics).

Graduate Representatives

At the beginning of each academic year, the master's and doctoral students in the Statistics & Data Science Graduate Program under the direction of the current Graduate Representatives will select a representative from among their peers to serve a two-year term. The first year, the student is the Graduate Representative-Elect and assists the Graduate Representative. The Representative-Elect then becomes Representative for the term's second year.

The primary duties of the Graduate Representative are to:

- bring the concerns of the students in the Program to the attention of the Chair of the Program, and vice versa;
- help the Program management develop Program policy as needed;
- assist with the organization of the annual recruitment workshop in the Spring semester and other program activities when appropriate;
- organize at least 1 student meeting per year (2 are strongly recommended).

The student meetings, as organized by the Graduate Representative, are a system of peer-to-peer mentoring in which students at different stages of their academic careers in the Program come together to discuss questions, share experiences, and give each other advice about their academic and professional development.

SDS students are encouraged to work with the Executive Committee to improve any aspect of the Program, including examinations, application processes, course requirements and electives, and research and funding opportunities. *To ensure that messages are not lost, students should direct comments through the Graduate Representative*. If there is a conflict of interest or some other complication that prohibits this path of action, please contact the Program Coordinator.

Changes to the Program

All changes to the Statistics & Data Science policy will be promptly shared with students via the student email listserv.

The Statistics & Data Science Graduate Programs

Graduate College Requirements for Ph.D. and M.S. students

The following information applies to Doctorate, Master's, and Accelerated Master's Students. Students undertaking the Graduate Certificate or the Ph.D. Minor should refer to the appropriate sections of this handbook. Students who enter the SDS program via the Master's Degree should note that the course requirements are structured to allow students to apply most of their coursework to the SDS doctoral program. Students pursuing this option must apply for a Ph.D. and be recommended by the Recruitment and Admissions Committee.

A significant portion of the process for obtaining a graduate degree involves the proper handling of University mandated paperwork and requirements. The Program requirements and the Graduate College requirements are not necessarily one and the same. Both entities must be satisfied to obtain a graduate degree. Graduate College requirements, such as the timely submission of accurate forms and adherence to deadlines, are rigid and generally not subject to appeal. The Graduate College changes its requirements occasionally, so be advised that the requirements presented here to be used as guidelines. Therefore, if the student has any doubts or questions concerning the material in this section, the wisest course is to contact the Graduate College directly.

Please refer to the Graduate College website New and Current Students for information on academic services, policies, procedures, professional development, FAQs; and work-life resources. The Graduate College Degree Requirements and Important Degree Dates and Deadlines contains information on the requisite forms and activities that must be completed to receive your degree.

Advising/Mentoring

Prior to matriculation, students will be assigned an initial academic advisor and are expected to meet to discuss course selection. Academic advisors are members of the Statistics & Data Science GIDP faculty who will advise the student on course selection, the Annual Progress Report, and any other academic related issues, Qualifying Exam preparation and beginning research (if applicable). M.S. students completing the Qualifying Exams can keep their academic advisor throughout their program tenure. Students conducting research must choose a research (thesis or dissertation) advisor from among the Regular Faculty of the GIDP in Statistics & Data Science. Students should choose an advisor by the end of their second semester in residence for master's students and the fourth semester for doctoral students.

Students should expect to meet with their advisor regularly, and a minimum of once per semester. These meetings are to be coordinated between the advisor and the advisee. Each Spring Semester, each master's and doctoral student has a mandatory meeting with their academic advisor before completing the Annual Progress Report. (See Appendix 4.)

During the course of graduate education, students will engage with Statistics & Data Science Program faculty in several mentoring capacities – coursework, independent studies, internships, graduate committees, and advising theses and dissertations. Mentoring relationships should be entered voluntarily under the expectation that both the mentor and mentee will engage in a rich and rewarding professional development experience.

To maintain a positive and productive working relationship**, potential advisors/mentors and students are encouraged to discuss expectations prior to finalizing their roles**. Possible expectations include,

but are not limited to, turn-around time for assignments, appropriate communication protocols, and meeting frequency. Establishing these expectations early on will forestall future conflicts. To this end, the Statistics & Data Science Program stresses the importance of a mentor/mentee discussion to reach a clear understanding on the conditions of this relationship. Sometimes, a written memorandum of understanding (MOU) is used to formalize the expectations and responsibilities of both parties. Example MOUs can be found on the Statistics & Data Science webpage. Even if you do not use a written MOU, the examples will facilitate your discussion.

Annual Progress Report

All master's and doctoral students are required to complete an Annual Progress Report (See Appendix 4). This report is to be completed in collaboration with the student's advisor. The Progress Report provides the Executive Committee with valuable insight into the accomplishments and progress of each student. Students will receive a reply from the Executive Committee evaluating the accomplishments of the previous year and making recommendations for the upcoming year.

Coursework

On-Line vs In Person Courses

Students in the Statistics & Data Science Graduate program are expected to take the in-person sections of the core courses. Exceptions can be made with approval. For questions or approval of an exception, contact the Program Coordinator.

Prerequisites for Individual Courses

Students must meet all prerequisites for any elective courses they wish to undertake or must secure instructor permission prior to registering for the course. Instructor decisions are final.

Petitioning for Credit Courses

When needed to suit a particular or specialized need in an individual student's Plan of Study, a petition may be submitted to the GIDP Executive Committee for approval of a course not listed for use as an elective. Petitions may be submitted to the Program Coordinator to distribute to the Executive Committee. The student must be in good standing and be enrolled in the Statistics & Data Science GIDP. The burden of proof for including the course rests with the student, and the decision of the committee will be final. Note that introductory, elementary-methods courses that do not expand the statistical frontier are not generally approved for credit towards the graduate degrees in Statistics & Data Science.

Policy for Incompletes

Information on Incomplete Grades can be found in the University's Office of the Registrar webpages. Students are responsible for working with the course instructor to complete all necessary coursework and have the Incomplete grade changed within one year.

The Statistics & Data Science Program does not have a limit on the number of Incompletes a student may have to remain in good academic standing, but all students will be held to the standards of Satisfactory Academic Progress as outlined in Appendix 1.

Transfer Credit

Students may transfer graduate courses completed at another regionally accredited college or university (or a recognized foreign institution). Master's students may transfer up to 6 units and doctoral students may transfer up to 12 units. The University also allows some courses taken as a University of Arizona nondegree seeking student to be applied to the Plan of Study. Students are strongly urged to discuss their plans with their advisor, the Program Coordinator, and the Graduate College representative.

The student must provide a detailed syllabus for the course to be evaluated by the Chair of the Curriculum Committee. For more information, see the University's Transfer Credit webpage.

Independent Study

Students may consider STAT 599 Independent Study as a course on the Plan of Study. A maximum of 6 units from STAT 599 may be applied to the Ph.D. program of study. Master's students may have up to 3 units of STAT 599 on their Plan of Study. Upon request, the Program Coordinator will provide the student with a form to petition for this inclusion on the Plan of Study. The petition must explain how the following conditions are satisfied:

- The supervisor must be a member of the Statistic & Data Science Program Faculty.
- The proposed material does not duplicate the material in an approved course.
- The rigor and time devoted to the Independent Study must be comparable to that of existing approved courses.

The form will be submitted for review and approval by the Program Vice Chair and the Curriculum Chair. If a conflict of interest occurs (e.g., the reviewer is also the Independent Study supervisor), the Chair will appoint a member of the Executive Committee as a replacement.

Continuous Enrollment

A student admitted to a master's or doctoral program must register each fall and spring semester for a minimum of 1 graduate unit, from original matriculation until all course and thesis requirements are met. Note that students may have other obligations (graduate assistantships or visa status) that will have their own minimum graduate unit requirements.

Graduate students may apply for a Leave of Absence from a program for a semester or for the academic year using the Graduate Petition for a Leave of Absence**.** If a student fails to register and does not have a Leave of Absence on file, the student will be discontinued from their program. A new application will be necessary for the student to continue in the program. International students must check with the International Students Programs and Services before filing for a Leave of Absence.

Thesis and Dissertation Defense

Students undertaking an M.S. thesis and all doctoral students, must develop a (formal or informal) proposal of sufficient academic merit and on a topic of significant scholarly impact to satisfy their committee. Work proceeds on the research via the thesis course STAT 910 or the dissertations course STAT 920, under the direction of the candidate's advisor and using the skills and knowledge of the larger committee where appropriate. The final, completed thesis must meet all Graduate College formatting and submission requirements.

The oral defense of the thesis/dissertation will be held at the completion of STAT 910/STAT 920. The examination focuses on the thesis/dissertation itself but can include general questions relating to the

interdisciplinary study of statistics & data science contained within the scope of the thesis research. The exact time and place of this examination must be scheduled with the GIDP Program Coordinator at least seven working days before the event. The candidate must be in good academic standing in order to schedule the defense.

The student's thesis/dissertation advisor presides over the examination. The examination has two parts: 1) an initial, open public presentation during which the candidate presents the thesis/dissertation results and entertains questions. 2) subsequent closed portion in which the thesis/dissertation committee brings forward questions to the candidate. There is no minimum time limit for the Final Exit Examination, but the entire proceedings may not exceed three hours. If held, all members of the thesis committee must be present for the entire examination. In private session following the examination, the committee votes to pass or fail the candidate based on her/his performance during the oral defense.

A candidate who fails a final oral defense may, upon the recommendation of the GIDP to the Graduate College, be granted a second oral defense. This second defense must be held within 4 months of the first defense. The results of the second oral defense are considered final.

The Ph.D. in Statistics & Data Science

Students graduating with a Ph.D. in Statistics & Data Science are prepared to move onto careers in university, government, and business environments. Statistics & Data Science Ph.D. students typically complete their degree in five years, though some students take longer to complete their dissertations.

The following guidelines identify the basic structure of the Ph.D. in Statistics & Data Science at the University of Arizona. At the core of the program is a fundamental grounding in both statistical theory and methodology; however, extensive flexibility via course electives allows students to tailor their final programs of study to their own interdisciplinary interests. The student's advisor, along with the Program Chair, are available to discuss individual selection of these electives. Refer to the Doctor of Philosophy page for general Ph.D. requirements. The following policies and procedures are specific to the Statistics & Data Science GIDP and *are intended as a supplement to Graduate College policies and procedures.*

Course Requirements

The GIDP in Statistics & Data Science offers two tracks for the Ph.D. - the Regular Track and the Track in Interdisciplinary Statistical Informatics. A minimum of 71 units of coursework, with at least a 3.0 overall GPA, past the bachelor's degree is required. The requirements include Core Courses (18 units), Elective Courses, Minor Courses (at least 9 units), and Dissertation (18 units). The list of course requirements for both tracks may be found on the program website.

Professional Development Requirement

The ability to communicate effectively, both verbally and in writing and to audiences of varying levels of sophistication, is essential to a successful career in industry, research, or teaching. The professional development requirement gives students an opportunity to develop their capabilities in a variety of ways.

To complete the requirement students all students must:

- Prepare a basic web page containing information on their own research, teaching, and other professional activities and make this page available through the Program's website.
- Prepare a professional CV, one-page biosketch, or resume and submit it to the Program Coordinator for posting on the program website.

Ph.D, Students must complete one verbal and one written item from each requirement category. Note that course requirements in BIOS 688A B do not count towards the Communications Requirements. An extension beyond the coursework in BIOS 688 may count.

The entries in the table below are meant to be illustrative and do not exhaust the possibilities. Each component must be sponsored by a faculty member who will review the text or presentation and provide constructive feedback. When the sponsoring faculty member is satisfied with a student's performance on a component of the requirement, this fact should be communicated to the Program Coordinator by including the details in the Annual Progress Report.

Communication Requirements	Verbal	Written

1. Communications with General Audience	• K-12 Classroom Visit • Mentoring/Tutoring (e.g. DataFest, Think Tank) • Speak to General Audience (e.g. workshop, 3-minute thesis competition) • Internships	• Blog Post • Post a project on GitHub • Extended One Course report • Award Applications (e.g. NSF GRFP, Carter Travel Award)
2. Communications with Statistical Audience	• Professional Talk (e.g. journal seminar, colloquium, conference talk) • Poster presentation (e.g. JSM) • GIDP showcase • Job talk	• Technical report (e.g. arXiv, research paper) • Student competition paper (e.g. JSM, ENAR) • Grant proposals • Develop an R package
3. Community Activity/Service	• Meet speakers (at least twice total) • Attend a conference/workshop (at least once) • Attend SDS GIDP Colloquiums regularly • Serve as Student Representative • Organize professional events (e.g. DataFest, Institutional Advisory Board, Math Circle) • Volunteer at community events (e.g. Festival of Books) • Participate in Kaggle competition	

The Ph.D. Minor

In addition to the coursework outlined below, Ph.D. students are required to apply a minimum of 9 units to a Ph.D. minor. Minor requirements are fixed by the minor department or program; some Minor programs require upwards of 12 or even 15 units for completion. (A Ph.D. Minor in Statistics & Data Science cannot be counted towards a Ph.D. in Statistics & Data Science.) The selection of the Ph.D. Minor field is to be made by the student in consultation with her/his advisor and the Program Chair. The Minor should reflect the student's trans-disciplinary interests, and wherever possible should be coordinated with the student's additional SDS electives. A non-exhaustive list of potential Ph.D. Minors is provided on the dedicated Program Webpage. **The Ph.D. minor must be completed in advance of the Comprehensive Exam**.

Dissertation Credits

Per Graduate College requirements, a minimum of 18 units in the Ph.D. program of study must include dissertation credits. These are used to undertake dissertation research. **Registration for any units of STAT 920 is restricted to students who have assembled an active, complete Ph.D. Comprehensive Examination Committee** (see below).

The Path to Your Ph.D.

You will submit the necessary forms for your degree using GradPath. New users should begin with the "FAQ for Students" found on that website.

The Graduate College Degree Requirements webpage contains information on the requisite forms and activities that must be completed to receive your Ph.D. Refer to the relevant webpages for the Graduate College's Ph.D. Requirements and Important Degree Dates and Deadlines. The information below is specific to the Statistics & Data Science GIDP and *is intended as a supplement to Graduate College policies and procedures.*

Ph.D. Timetable

Below is a typical timetable for a SDS Ph.D. student to make satisfactory progress and finish the Ph.D. in 5 years.

Year 1	Complete core courses: STAT 564, STAT 566, STAT 571A, 571B Prepare for Qualifying Exam and take exam at the end of first year.
Year 2	Submit *Plan of Study* in GradPath by end of fourth semester Investigate research opportunities in one or more areas Pass Qualifying Exam by the end of the second year. Choose an advisor from Statistics & Data Science faculty by end of the fourth semester
Year 3-4	Form Comprehensive Exam Committee Plan for Comprehensive Exam Submit Comprehensive Exam Committee Appointment Form in GradPath Submit Announcement of Doctoral Comprehensive Examination in GradPath
Year 5	Submit Doctoral Dissertation Committee Appointment Form in GradPath Submit Announcement of Final Defense Defend your thesis, earn your doctorate!

The Doctoral Plan of Study (DPOS)

The Doctoral Plan of Study represents a tailored guideline for the courses that will satisfy the student's Ph.D. degree requirements; it may be amended if circumstances require it. The DPOS must be formulated by the end of the student's fourth semester in residence in the SDS GIDP. To facilitate this, the student must choose an *advisor* from among the Regular faculty of the GIDP in Statistics & Data Science. After consultation with the chosen advisor and the GIDP Chair, the student determines an anticipated list of courses to be taken toward the Ph.D. degree and submits these on the DPOS on GradPath. The DPOS *must* be on file before the student can sit for the Ph.D. Oral Comprehensive Examination (See below.)

Components on the DPOS will include:

- 32 units of core Ph.D. courses

- a minimum of 12 + 9 = 21 units of additional electives and Ph.D. minor coursework that comprise the student's own interdisciplinary specialization.
- 18 required units of STAT 920, Dissertation

The Ph.D. Minor must be officially recognized and correctly listed on the DPOS form. No more than half of the total units listed on the DPOS (including transfer units) can be in courses graded with an S or P grade.

The Qualifying Examination

To proceed towards Ph.D. candidacy in the GIDP, a student must pass a written Ph.D. Qualifying Examination by the beginning of her/his fifth semester of study. More information on the exam format, registration, and study materials is available in Appendix 2.

Note that a Qualifying Examination result of M.S. Pass on a first attempt indicates that the student has made good progress but also identifies areas of weakness that must be resolved to pursue more advanced studies. Although students are often initially disappointed at not having achieved a Ph.D. pass on their first attempt, they should recognize that an M.S. Pass demonstrates development in their studies. In most cases, students who retake the exam receive a Ph.D. pass after the benefit of further study and to go on to produce excellent dissertations.

The Ph.D. Comprehensive Examination

Before advancing to Ph.D. candidacy, a student must pass the Ph.D. Comprehensive Examination in both the major area of Statistics & Data Science and the chosen minor. This examination is intended to test the student's comprehensive knowledge of Statistics & Data Science and of the minor field of study, both in breadth across the general field of Statistics & Data Science and in depth within the area of interdisciplinary specialization. The Comprehensive Examination, consisting of separate written and oral components, is considered a single examination.

A student must pass the written portion of the exam before sitting for the oral portion. The written portion is determined and graded by a Comprehensive Examination Committee, which by Graduate College regulations must consist of a minimum of four members. It is expected, but not required, that the examining committee will overlap with the student's graduate dissertation committee (See below,), to foster continuity in the student's research program.

The Comprehensive Examination Committee bears the responsibility for setting the written portion of the qualifying exam. The format and the timing for the exam is flexible and left to the discretion of this Committee with the goal of structuring the exam in the best interests of advancing the preparation of the candidate. The typical format for the written portion of the examination is a series of technical and conceptual activities put forth by the Committee concerning the student's expected dissertation research. A variety of formats are acceptable and not limited to the following suggestions:

- A series of written questions prepared by the Committee under a specified schedule.
- A review paper based on a specific set of background documents set by the Committee and related to the candidate's research topic.
- A literature review of the dissertation topic with an analysis of the shortcomings of previous research as they apply to the candidate's research topic.
- A dissertation proposal with preliminary analysis.

The written portion of the exam will be graded by the Examination Committee, and results transmitted to the student within 14 calendar days of receipt of the student's submission. A student who fails her/his written portion may sit for a second attempt; an entirely new exam may be constructed and graded by the Committee. This second sitting must be scheduled within 90 days of the original sitting. Failure on a second written portion will lead to a student's dismissal from the Program.

Upon successful completion of the written portion of the Comprehensive Examination, a student must sit for the oral portion of the exam. The oral portion is again conducted by the student's Examination Committee and must occur no earlier than 1 calendar week and no later than 4 months after successful completion of the written portion. **The oral examination is open only to the members of the Committee.**

After the student has completed their Comprehensive Examination Committee Appointment form on GradPath, they will gain access to the Announcement of Doctoral Comprehensive Examination form. Students will use this form to set the date of the oral portion of their Comprehensive Exam. After the Announcement form has been approved, the Results of the Comprehensive Examination form is automatically created in GradPath. The Chair of the student's Examination Committee (the dissertation advisor) will have access to the Results form, letting them submit the student's results to the Graduate College electronically. **Students must be careful to fill out the requisite forms on GradPath** (i.e., Comprehensive Examination Committee Appointment, Announcement of Doctoral Comprehensive Examination).

The faculty committee conducting the oral portion of the examination has both the opportunity and obligation to require the student to exhibit knowledge of

- the specific questions/material posed during the written portion,
- general comprehension of the minor field(s) of study as it pertains to the student's research interests, and
- sufficient depth of understanding in the area(s) of the student's statistical and data science specialization.

Discussion of proposed dissertation research may be included. The examining committee must attest that the student has demonstrated the professional level of knowledge necessary to successfully undertake a Ph.D.-level career in interdisciplinary Statistics & Data Science.

The written and oral portions of the comprehensive examination must be completed no later than 90 days before the Final Oral Defense Examination. (See below.)

Advancement to Candidacy, the Dissertation Committee, the Ph.D. Dissertation, and the Final Oral Defense

Information on these steps can be found on the Graduate College's Doctor of Philosophy website.

All students are required to maintain continuous enrollment during their time as a Candidate. International students in their final year of study can remain in good standing by registering for a single unit of STAT 920 Dissertation. In this circumstance, the candidate must keep in mind the 18-unit requirement for dissertation credit.

The Statistics & Data Science program requires that three the Dissertation Committee members be members of the Statistics & Data Science GIDP. The student may choose to have one committee

member from the student's minor field of study. It is encouraged, but not required, that the dissertation committee include as many members as possible from the candidate's Comprehensive Examination Committee, to foster continuity in the student's research.

For the dissertation, candidates must develop a (formal or informal) research proposal of sufficient academic merit and on a topic of sufficient scholarly impact to satisfy their committee. Work proceeds on the research via the dissertation course STAT 920, under the direction of the candidate's advisor and using the skills and knowledge of the larger committee where appropriate. Students can expect feedback on dissertation drafts within six weeks of submission.

The final completed dissertation must represent an original, substantive advance in the theory, methodology, and/or practice of statistics & data science, with a focus on the candidate's interdisciplinary interests. The results of the dissertation are expected to become the body of one or more published research articles in high-quality, peer-reviewed statistics and data science or subject-matter journals.

The M.S. in Statistics & Data Science

SDS Students that have completed their Master of Science in Statistics & Data Science have moved on to careers in a wide variety of fields. M.S. students typically complete their degree in two years, though some students, especially part-time students, may take longer.

The following guidelines identify the basic structure of the M.S. in Statistics & Data Science at the University of Arizona. At the core of the program is a fundamental grounding in both statistical theory and methodology; however, flexibility via course electives allows students to tailor their final programs of study to their own interests. The student's advisor, along with the Program Chair, are available to discuss individual selection of these electives. Refer to the Graduate College's Master's Degrees webpage for general M.S. requirements. The following policies and procedures are specific to the Statistics & Data Science GIDP and *are intended as a supplement to Graduate College policies and procedures.*

Course Requirements

The GIDP in Statistics & Data Science offers both a Master's Degree and an Accelerated Master's Degree. For the Master's Degree, a minimum of 30 units of coursework past the Bachelor's Degree with at least a 3.0 GPA is required. The Accelerated Master's Degree Program (AMP) offers exceptional undergraduate students the opportunity to earn both a bachelor's degree and master's degree in as few as 5 years. For AMP students, some of the coursework taken during the final year of undergraduate education will apply to the Master's Degree.

AMP and M.S. students have the same degree requirements. The degree has 6 Core Courses (18 units) and both a thesis and a non-thesis option. Students who choose the thesis option will complete 3 elective courses plus at least 3 units of STAT 910, Thesis. Students choosing the non-thesis option must complete 4 elective courses plus receive an M.S. or Ph.D. pass on the Qualifying Exam. (See Appendix 2.) The list of course requirements may be found on the program website.

Professional Development Requirement

The ability to communicate effectively, both verbally and in writing and to audiences of varying levels of sophistication, is essential to a successful career in industry, research, or teaching. The professional development requirement gives students an opportunity to develop their capabilities in a variety of ways.

To complete the requirement students all students must:

- Prepare a basic web page containing information on their own research, teaching, and other professional activities and make this page available through the Program's website.
- Prepare a professional CV, one-page biosketch, or resume and submit it to the Program Coordinator for posting on the program website.

Master's Students must complete one verbal and one written item for requirement number 1, and one from requirement number 2. Note that course requirements in BIOS 688A B do not count towards the Communications Requirements. An extension beyond the coursework in BIOS 688 may count.

The entries in the table below are meant to be illustrative and do not exhaust the possibilities. Each component must be sponsored by a faculty member who will review the text or presentation and provide constructive feedback. When the sponsoring faculty member is satisfied with a student's performance on a component of the requirement, this fact should be communicated to the graduate office by including the details in the Annual Progress Report.

Communication Requirements	Verbal	Written
1. Communications with General or Statistical Audience	• K-12 Classroom Visit • Mentoring/Tutoring (e.g. DataFest, Think Tank) • Speak to General Audience (e.g. workshop, 3-minute thesis competition) • Internships • Professional Talk (e.g. journal seminar, colloquium, conference talk or job talk) • Master's Thesis	• Blog Post • Post a project on GitHub • Extended One Course report • Technical report (e.g. arXiv, research paper) • develop an R package • Master's Thesis
Professional Requirements		
2. Community Activity/Service	• Meet speakers (at least once) • Attend SDS Colloquiums regularly • Attend a conference/workshop (at least once) • Organize professional events (e.g. DataFest, Industrial Advisory Board, Math Circle) • Professional service ○ e.g. consulting (STAT688 does not count), volunteer data scientist (e.g. DataKind), Kaggle participant	

The Path to Your M.S.

You will submit the necessary forms for your degree using GradPath. New users should begin with the "FAQ for Students" found on that website.The Graduate College Degree Requirements webpage contains information on the requisite forms and activities that must be completed to receive your M.S. Refer to the relevant webpages for the Graduate College's M.S. Requirements and Important Degree Dates and Deadlines.The information below is specific to the Statistics & Data Science GIDP and *is intended as a supplement to Graduate College policies and procedures.*

M.S. Timetable

More information on the requirements outlined in this table is available below. Below is a typical timetable for full-time M.S. students:

Year 1	Complete 4 core courses: STAT 564, STAT 566, STAT 571A, 571B, Submit *Plan of Study* in GradPath by beginning of the second semester. **For the thesis option** Choose an advisor from Statistics & Data Science faculty by beginning of second semester **For the non-thesis option** Prepare for the Qualifying Exam
Year 2	Complete remaining core courses. STAT 574M and BIOS 688A&B, elective courses, and the Professional Development Requirement **For the thesis option** Form thesis committee, submit *Committee Appointment* form on GradPath Present and defend your thesis, earn your M.S.! **For non-thesis option** Submit *Committee Appointment* form on GradPath, choose "No Committee" option Pass Qualifying Exam, earn your M.S.!

The Master's Plan of Study (MPOS)

The Master's Plan of Study represents a tailored guideline for the courses that will satisfy the student's degree requirements; it may be amended if circumstances require. The MPOS must be formulated and submitted by the beginning of the student's second semester in residence in the GIDP. To facilitate this, after consultation with the student's advisor and the GIDP Chair, the student determines an anticipated list of courses to be taken toward the M.S. degree and submits these on the MPOS on GradPath.

Components on the MPOS will include the 18 units of core M.S. courses, the minimum 9 units of additional electives that comprise the student's own interdisciplinary specialization, and the 3 thesis units of STAT 910. If the student elects to apply advanced statistical coursework and a M.S. pass on the Qualifying Exam in lieu of the M.S. Thesis, then these (minimum) 3 units should be listed instead of STAT 910 on the MPOS. No more than half of the total units listed on the MPOS (including transfer units) can be in courses graded with an S or P grade rather than a regular letter grade. This includes the 3 units of thesis research via STAT 910 which, if so elected, should appear on the MPOS.

Components on the MPOS will include:

- 18 units of core M.S courses
- 12 units of additional electives
    - For nonthesis students, this is 9 units of electives plus 3 units of an advanced course
    - For thesis students, this is 9 units of electives plus 3 thesis units

The Graduate Certificate in Statistics & Data Science

The following guidelines identify the basic structure of the Graduate Certificate in Statistics & Data Science. Students may design or select courses pertinent to their own research or professional interests from a list of advanced, statistically rigorous courses taken from across the campus. Depending on the student's selection of Elective Courses, expertise may be gained in statistical and data science practice, theory, and/or applications in a specialized area such as bioinformatics, econometrics, environmetrics, and psychometrics.

Online Options

The Statistics & Data Science GIDP offers a Graduate-level Certificate for both on-campus and off-campus (online) students.

Coursework

A minimum of 12 units of coursework is required for the certificate. The courses must include STAT/MATH 566 as the (only) required course, and at least three more from the complete list of courses on the program website. To complete the minor, students must receive an A or B in STAT 566 and have a 3.0 GPA for the entire minor coursework. Note that students who do not receive an A or B in 566 may satisfy the minor requirement by passing the theory portion of the Qualifying Exam at the M.S. or Ph.D. level. (See Appendix 2.)

The Ph.D. Minor in Statistics & Data Science

The following guidelines identify the basic structure of the Ph.D. Minor in Statistics & Data Science Students may design or select courses pertinent to their own research or professional interests from a list of advanced, statistically rigorous courses taken from across the campus. Depending on the student's selection of Elective Courses, expertise may be gained in statistical practice, theory, and applications in a specialized area such as bioinformatics, econometrics, environmetrics, and psychometrics.

Candidates seeking a Statistics & Data Science doctoral minor must have one member of the SDS Program on the Comprehensive Examination Committee. This Exam should take place no earlier than the semester that the Candidate completes the Minor coursework. Under exceptional circumstances, candidates may petition the Executive Committee for earlier scheduling of the Comprehensive Exam. The decision will be based in part on consultation with the Candidate's minor representative.

The student's minor advisor should be consulted to plan the selection of Elective Courses. *It is GIDP policy that the student holds final responsibility for being aware of and responding to all GIDP and Graduate College policies, requirements, formats, and deadlines as they pertain to progression towards and completion of her/his graduate degree*.

Coursework

A minimum of 12 units of coursework is required for the Ph.D. Minor. The courses must include STAT/MATH 566 as the (only) required course, and at least three more from the complete list of courses on the program website. Students must receive an A or B in STAT 566 and have a 3.0 GPA for the minor coursework. Note that students who do not receive an A or B in 566 may satisfy the minor requirement by passing the theory portion of the Qualifying Exam at the M.S. or Ph.D. level. (See Appendix 2.) *Where needed to suit a particular or specialized need, a petition may be made to the SDS Executive Committee through the SDS Chair for approval of a course not listed on the website for use as an Elective Course.* The decision of the committee will be final.

Prerequisite Courses

Prerequisite courses necessary to undertake one chosen for the Minor are the student's responsibility and may only count towards the Minor if they are listed as a Core Course or as Elective Courses. Students may, however, consult each individual course instructor to determine if special permission can be secured to register for a course when a prerequisite course requirement has not been met. Decisions of the course instructors are considered final.

Transfer of Credit

No transfer of credit from outside of the University is allowed; however, coursework taken previously at another institution may be used to satisfy prerequisites for any of the courses in the Ph.D. Minor, at the discretion of the course instructor or offering department.

Financial Support Options

Eligibility

Many graduate students in the Program receive financial assistance in the form of Fellowships, Teaching Assistantships, and/or Research Assistantships. Students should recognize that financial support from the GIDP is a privilege and is not guaranteed. In order to receive financial aid, the SDS Program requires that each student must maintain a cumulative GPA of 3.0 or higher while enrolled in the Statistics graduate program. *Different sources of funding have different enrollment requirements*, so students should pay close attention to hiring and award documents.

All M.S. and Ph.D. students are encouraged to seek out funding from a variety of sources; the Graduate College has online resources which can facilitate this effort. Students are also strongly encouraged to apply for Research Assistantship support through faculty and fellowship awards from local and national agencies. The Executive Committee works diligently to expand the sources of funding for SDS students.

Note: Graduate Certificate students are not eligible for financial assistance, unless concurrently enrolled in a separate M.S. or Ph.D. program at the University of Arizona.

Financial Support for International Applicants/International Students

Additional requirements for financial aid eligibility apply to international applicants. The Graduate Center offer guidance on funding for international students.

Fellowships

University Fellowships, which are highly competitive, are available mainly to first year students. These fellowships carry no explicit teaching or research obligations. All support is contingent upon meeting Graduate College requirements, which include maintaining at least a 3.0 grade point average.

Students can obtain external fellowships of various kinds from funding agencies such as the National Science Foundation (NSF) and other Federal Departments. and Agencies, and private foundations. Information can be found on the Office of Fellowships page. These fellowships are prestigious, financially advantageous, and can reduce time to graduation. Students are strongly encouraged to apply for these awards.

Graduate Assistantships (GAs)

SDS graduate students who receive any form of a graduate assistantship, either a TA or RA, become a student employee of the University and must sign a Graduate Notice of Appointment (NOA). A copy of the NOA is provided to the student to sign, and it should be read carefully. Please be aware of all appointment processes and responsibilities. For more information, the Graduate College has extensive documentation in the GA Manual .

The University has a clear Graduate Assistant and Associate Workload Policy. All GAs are limited to working **no more than 26.4 hours per week if domestic and 20 hours per week if international** total compensation while classes are in session (.66 FTE or .50 FTE). In addition, the University requires that the time and workload of students engaged in Graduate Assistant positions be carefully planned, monitored and limited. The Workload Policy describes both the rights and responsibilities of a GA.

International Students should pay particular attention to their own workplace requirements and maintaining of status on the Workload Policy page and the International Student Services page.

Mamy Statistics & Data Science Program's GAs are based in the Mathematics Department. For information on the Mathematics Department's compensation policies, contact the Mathematics Business Office or consult with the SDS Program Coordinator.

Graduate Assistantships based in other departments will be compensated based on their funding policies. The Statistics & Data Science Program will endeavor to provide, if necessary, additional support to bring the students up to parity with the stipends in the Mathematics Department.

Teaching Assistantships (TAs)

Teaching Assistantships carry teaching assignments in various departments and programs across the campus.

In addition to the key points established by the Graduate College above, the GIDP in Statistics & Data Science has an additional set of guidelines which must be followed by students on Teaching Assistantships. These are:

- Students working as Teaching Assistants are classified by the University as exempt student employees; therefore, there is no provision for sick or medical leave time. If a TA becomes ill and cannot teach or meet her/his class responsibilities, s/he must inform the course supervisor and the TA coordinator *immediately*, and s/he must make the necessary arrangements for coverage of the class/responsibilities. In the extreme circumstance of being incapacitated to the extent that a TA cannot teach for an indefinite or extended period, the University will require the student to resign from the Teaching Assistantship.
- There is *no* vacation time for Teaching Assistants. Time off during the semester is only allowed for the most exceptional family situations (e.g. death, serious illness) or to participate in essential religious or cultural obligations and must be kept to the minimum number of days possible. Obviously, the TA must inform the course supervisor and the TA coordinator if such a situation arises.
- TAs will *not* be paid for time taken off during the semester and for payroll purposes must report any time away to their supervisor and to the business office of the sponsoring department or program.
- *In the extreme circumstance of your being incapacitated to the extent that you cannot teach for an indefinite or extended period of time, the University will require you to resign from your teaching position.*

GIDP students may need clarification about their status when they are Teaching Assistants in another University department or program. The GIDP notes that students view the teaching and services they provide as a "contract" between the student and the department or program. (A similar sort of arrangement often occurs with employees of consulting companies in the commercial sector). For those holding a TA contract with another University department or program, you must follow their (and the University's) rules and procedures regarding your teaching performance. We call, however, for GIDP students to always conduct themselves as citizens of, and ambassadors for, the GIDP in Statistics & Data Science, since they are governed by all the GIDP's academic policies and requirements, irrespective of the source of their financial support.

Research Assistantships (RAs)

Research assistantships typically are funded through grants and contracts to faculty members and generally require research related to the supporting grant or contract. Faculty in the Program receive such support from numerous Federal agencies, including the National Science Foundation (NSF), the National Institutes of Health (NIH), the Environmental Protection Agency (EPA), the Department of Agriculture (USDA), Department of Energy (DOE), Defense Advanced Research Projects Agency (DARPA) as well as private foundations and companies.

Individual faculty or campus training programs administering the research position(s) may have specific requirements that students must meet to be eligible for funding. *The nature of financial support for graduate students can vary year to year.* Continuation of research support is always at the discretion of the Principal Investigator of the grant, regardless of the number of years of prior funding.

Professional Conduct

The guidelines reviewed above all center on how a GIDP student should conduct herself or himself, i.e., one's *professional conduct*. Professional conduct not only involves a commitment to follow the letter of a GA contract but also implies that proper respect be given to the spirit behind these requirements. The award of a GA is a privilege, not a right. Irresponsible actions exhibited while serving the GIDP and the University not only damage the student's own reputation (who will want to hire you as GA in the future if you are known to disrespect rules?) but ultimately damages the reputation of the GIDP. **Failure to exhibit professional conduct can result in the termination of program funding.** GA positions are exciting opportunities for graduate students to develop professional and communication skills that will carry through the rest of their careers.

Appendices

Appendix 1. Satisfactory Academic Progress

Satisfactory Academic Progress is based on a combination of maintaining a 3.0 GPA in program courses, timely completion of steps to degree as outlined in this handbook, and performance against the Expected Student Learning Outcomes described in Appendix 6 and the Annual Progress Report. The Graduate College maintains a website on Satisfactory Academic Promise.

Annual Progress Report

Annual progress reports are required from all current students. Progress reports are generally due after the end of the Spring Semester. Students will receive a notification during the Spring semester on the deadline for progress reports. The Program Vice Chair reviews the reports. Each student and their advisor receive a letter with a summary of the Vice Chair's thoughts and concerns. Copies of all reports will be placed in the students' files.

In those cases where the student's progress is insufficient, the Vice Chair will recommend a meeting of the student and advisor with the Program Chair.

The format for annual progress reports is available in Appendix 4.

Failure to Achieve Satisfactory Progress

When a student fails to meet program guidelines for satisfactory progress, the student will receive written notification with a clear statement of what the student must do and a date by which such actions must be completed. The Graduate College will receive a copy of letters of unsatisfactory progress.

Students will be given an opportunity to appeal to the Program Chair the actions and/or deadlines required to prevent program termination. Students who fail to remediate by the deadlines specified may be dismissed from the program.

In any case, should a student feel that there is a conflict of interest that may interfere with the objective review of their appeal, this issue should be raised with either the Program Chair or the Program Coordinator.

Appendix 2. Qualifying Examination

All Ph.D. and non-thesis M.S. students are expected to attempt the Qualifying Exam at the end of their first year of study. The exam is set by the Examinations Committee. This committee generally consists of the Committee chair and instructors from the relevant courses. The exam is administered in two parts over two consecutive days. The first part, the Theory Exam, centers on the material from STAT 564-566/MATH 564-566, and the second part, the Methodology Exam, centers on the material from STAT 571A- 571B/MATH 571A-571B. Note, however, that concepts from all four course areas may be addressed freely in either or both parts of any examination, at the discretion of the Examination Committee. Students have 4 hours each day to complete the exam.

Information on exam registration will be distributed by the Program Coordinator. Students may petition with the Disability Resource Center for accommodation (e.g. additional time) as needed.

Even though a student may choose to take a single part of the Qualifying Exam, we advise the student to plan to complete the Qualifying Exam in a timely manner. In particular, the Qualifying Examination must be passed by a Ph.D. candidate by his/her fifth semester of study in order to proceed towards candidacy. The Program Chair can make exceptions in special cases.

There are three possible results to each part of the exam:

- **Ph.D. Pass:** A student who achieves this result on both parts of the exam may consider taking further coursework towards candidacy in the Program.
- **M.S. Pass:** A student who wishes to complete the M.S. degree may use this result or the Ph.D. pass to stand for a pass of the Qualifying Exam.
- **Fail:** A student who receives this score must retake this part of the exam.

A Ph.D. pass on both parts of the exam is necessary for a doctoral student to have passed the Qualifying Examination. An M.S. pass on both parts of the exam is necessary for a master's student to have to have passed the Qualifying Examination. A student may have up to **two attempts** for each part of the Qualifying Examination. Failure of either part on the second attempt prevents the student from continuing in their respective graduate program. However, master's students after one failure may choose to shift to the thesis option.

Entering doctoral students who can document prior coursework with appropriate academic level and selection of course topics may attempt either part of the Qualifying Examination upon entrance into the program. In these instances, this attempt at the Exam **does not count** against the two allowed attempts described above. For such students, a Ph.D. pass on either part of will exempt the students from taking the associated courses from the University of Arizona. However, the student must still satisfy all other Course and Professional Development Requirements as described in this handbook.

Student appeals of the Qualifying Exam results are given in Appendix 5.

Appendix 3. Potential Ph.D. Minors

Statistics and Data Science touch on nearly every research endeavor. The selection of the Ph.D. Minor field is to be made by the student in consultation with her/his advisor and the Program Chair. The Minor should reflect the student's trans-disciplinary interests, and wherever possible should be coordinated with the student's additional Statistics & Data Science electives.

The Common Doctoral Minors span the University's Colleges. **This list is *not* considered exhaustive**, and students should study the Graduate College Catalog for other possible Minor areas that can meet their individual interdisciplinary interests.

Appendix 4. Progress Report Format

The annual student progress report is to be completed using an online Progress Report Form. Students will need to schedule a meeting with their advisor. The report collects the following information.

1. Your Name
2. Your Program
3. Who is your major advisor (the initial advisor for M.S. & beginning Ph.D. students, or thesis advisor for advanced Ph.D. students)
4. Date of Annual Progress Report meeting with your advisor (for this form)
5. Semester you entered the program
6. When you expect to complete your degree
7. How were you funded this past year (e.g. TA, RA, Self-funded, NA)
8. Name the members of your graduate committee (Thesis, Comprehensive or Final Oral, if you have one)
9. Last date your committee met (if applicable)
10. Describe your progress to date on your professional development requirements
11. How many colloquia did you attend this past year, and who were the speakers?
12. Summarize your major academic milestones and achievements to date (e.g. qualifying exams and results, comprehensive exams, publications, presentations, posters, internships). Provide dates and locations if applicable.
13. Short summary of the thesis/dissertation research project (even if preliminary). Please write this for educated non-specialists (i.e. not just for your advisor). Tip: please write to a non-specialist audience and do it succinctly. We would like anyone who reads your progress report to get a sense of your research progress.
14. Goals of the past calendar year (from last year's report), and a discussion of how those goals were met, or not met, and if the latter, why not. If you are a first-year student, or have not submitted one of these before, you may have to think back on what your goals were, exactly.
15. Goals for the next twelve months. These should be two to five concrete statements and should include research objectives as well as other aspects of progress in your program. (e.g. Finish coursework requirements, form a committee and have a committee meeting, or submit draft of thesis/dissertation to committee). Try to make them realistic, because these goals will be measured against your progress at the end of next year.
16. Upload a current 2-page CV that should include contact information, education, experience (academic work/research/teaching), awards and honors, service/activities, presentations, and publications. You can use any format you prefer. However, please highlight the activities of the past year. Tip: Brag about yourself!
17. Please describe any challenges or concerns during your study this past year. Please provide any suggestions for the program (e.g. new courses, mentoring)

Appendix 5. Student Appeals

All students of the Statistics & Data Science GIDP have the right to appeal decisions which impact their academic standing. The grade appeal website is https://registrar.arizona.edu/records-enrollment/petitions-appeals/grade-appeal.

Graduation Requirements

Appeals for changes in the graduation requirements can be made to the Program Chair and will be considered at the next Executive Committee meeting.

Course Grades

University policy for grade appeals can be found under Grade Appeal in the Office of the Registrar.

Qualifying Examination Results

Step 1: Within two weeks of receiving the Qualifying Exam results, the student shall carefully formulate an appeal in writing (including contested questions) and submit it to the Chair of the Examinations Committee with a copy to the Program Chair.

Step 2: Within two weeks from the date of receipt of the student's written statement, the Chair of the Examinations Committee shall respond to the student in writing. The Chair of the Examinations Committee should explain the grading procedures, how the grade was determined, and other issues raised in the student's statement.

Step 3: If the Chair of the Examinations Committee is not available or does not resolve the matter within the two-week period, the student shall, within one week thereafter, readdress and submit the written appeal to the Program Chair.

Step 4: The Program Chair has two weeks to consider the student's written statement, the Chair of the Examinations Committee's written statement, and confer with each. The Program Chair shall inform the Chair of the Examinations Committee and the student in writing of his/her recommendation. The Chair of the Examinations Committee makes a final decision and notifies the Program Chair and the student in writing of this decision.

Step 5: If the Program Chair does not act on or resolve this matter to the student's satisfaction within a two-week period, the student shall, within one week thereafter, readdress and submit the written appeal to the dean of the Graduate College.

Appendix 6. Statistics & Data Science Graduate Program Assessment

SDS Program assessment is based on the five learning outcomes (L01 to L05)

LO1 Theory of Probability and Statistics Understanding
Students demonstrate an understanding of fundamental theories and key concepts of probability and statistics and can communicate that understanding through well-constructed theoretical arguments.

Direct Measure - Theory portion of the qualifying exam based on the content in STAT 564 and STAT 566.

LO2 Practice of Statistical Methodologies and Data Science Tools
Students can use statistical methodologies and machine learning tools, including experimental design and data analysis methods such as regression, to extract insights from real-world data and interpret the results.

Direct Measure - Methodology portion of the qualifying exam based on the content in STAT 571A and STAT 571B.

LO3 Computation Proficiency and Collaboration
Students master cutting edge statistical computing tools and software packages to analyze big and complex data sets.

Direct Measure - Course project assessment for MATH 574M, STAT 675 and BIOS 688B

LO4 Research Students develop creative and innovative research ideas and approaches that can further the body of statistical knowledge and contribute to significant advances in the intended field of application.

Direct Measure: Comprehensive Exam, Ph.D. Dissertation, M.S. Thesis

LO5 Communication and Professional Development Students can clearly communicate statistical ideas and results, both written and oral, and adapt the presentation to be suitable for the intended audience.

Measure: Student activities on the Communications and Professional Development requirement

Direct Measure: Course project assessment for MATH 574M, STAT 675 and STAT 688B

Indirect measures on learning outcomes are obtained through the Annual Progress Report or the exit interview.

The Annual Progress Report is based on a structured conversation between the students and their advisors on milestones over the past year and goals for the upcoming year. Out of this conversation will be the student's perceptions, opinions, and attitudes of their own progress in the context of the goals of the Program.