

Statistics BS / Statistics MS Five Year Combined-Degree Program

February 2020

Proposed by the Faculty of
the Statistics Department
College of Natural and Agricultural Sciences
University of California, Riverside
Riverside, CA 92521

1 Introduction

The Department of Statistics proposes a new degree program allowing students to obtain a joint BS/MS through an integrated 5-year plan of study. The proposed program is within the framework established by the UCR Committee on Educational Policy and the UCR Graduate Council in 2007. The program prepares students for careers that require specialized knowledge of statistics, and also for pursuing subsequent doctoral degrees. The Joint BS/MS program is open to UCR undergraduates only.

Participation in the joint degree program is initiated through an application for admission prior the student's senior year. The Graduate Division nor the Statistics Department provide financial support for students enrolled in the program.

Motivation: As noted in the document, "Establishment of Combined Programs at UCR"¹ "Combined programs can better attract top high school graduates, transfer students, and returning students, especially those interested in advanced degrees. Thus, UCR departments can expect a higher proportion of good undergraduates. Combined program students will be more inclined to stay at UCR for their Masters studies instead of applying to other institutions. Thus, UCR departments can better retain these students." UC has placed an increased emphasis on attracting transfer students from community colleges and the joint BS+MS program provides a unique opportunity for these students.

In sum, the program should attract top students into both the BS and MS programs.

¹ https://senate.ucr.edu/about/policies/establishment_of_combined_programs_at_ucr.html

Method: To make it possible to complete both degrees in five years, the combined program allows double-counting of up to twelve credits of coursework (used for both the BS and MS degrees). The justification is that many UCR MS programs require up to 12 units of preparatory coursework that may be necessary from other institutions but may be redundant for undergraduates coming from an appropriate UCR program. In the case of Statistics, all graduate students are required to take a twelve- unit graduate core in lieu of preparatory undergraduate courses. Students in the combined program will receive the requisite background in their undergraduate curriculum.

Relation to existing programs. The program consists of the same course requirements as the already-existing Statistics MS Plan II-examination. The students will take the STAT 201ABC series (twelve units total) in their senior year as part of the electives for the BS degree. As the primary motivation for the program is to attract and attain top students, the program involves no new courses or requirements.

Contributions to diversity. Since the new program will allow well prepared students to obtain a master degree within one year after they obtain a B.S. degree, it can greatly reduce their financial burden and therefore attract more underrepresented students who are usually from low-income family. We plan to make more recruitment effort in California, such as in California state university and local community colleges and encourage underrepresented students to apply our BS+1 program. In addition, our department will provide necessary resources and help, such as funding for conference travels, fellowships awards, frequent Q&A sessions, to increase retention of underrepresented minority students. The department will also broaden the diversity of faculty by cultivating a diverse pipeline and ensuring that faculty thrive for retention and improved climate, and campus policies and departmental incentives are aligned to make aggressive progress on hiring goals. Our department student clubs such as Statistics GSA and Mu Sigma Rho will also help us recruit and retain the underrepresented students by investing in each student's success, sense of belonging, and cultural competency. The above diversity goals for students can be measured by the broader demographics of eligibility pools, applicants, and enrollments, improved graduation rates and time to graduation for disadvantaged groups, and 2nd-year retention rates. The diversity goals for faculty can be measured by broader demographics of availability pools, hiring pools, and new hires, improved retention and turnover rates, improved rates of performance measurement and advancement for underrepresented and disadvantaged groups, and equity in salary and other resources.

Interrelation with other UC institutions. The proposed program would be unique among statistics programs nationally. Consequently, beyond making the respective BS and MS programs more attractive, the program does not directly compete or inter-relate with other UCR or UC programs or institutions. It may indirectly recruit top students into the UCR (or other UC) statistics PhD programs via the MS program.

Department that will administer the program. The BS and MS portions will be administered by the Statistics Department in the College of Natural and Agricultural Sciences.

Timetable for development. Based on current levels of participation in the Statistics BS program over the 2014-2019 period, we expect from 4-8 students to participate at the MS level per year.

Historical development of the field. There is a consistent strong demand for individuals with BS and MS degrees in Statistics in private industry, government and institutional service, and in research. Many of these positions do not require the extensive training provided by the Ph.D. Students with BS and MS in Statistics would be excellent candidates to fill these positions. For example, our undergraduate majors have grown from 15 students in 2008 to 131 in 2017, which is almost a tenfold increase. Based on Fortune 500, there will be 18.2% projected job growth by 2022 for M.S. graduates in statistics and the national median salary for M.S. graduates is as high as \$109,700.

Plan for evaluation of the program. The effectiveness of the program will be evaluated by monitoring the extent to which it increases the quality of students in the BS and MS programs. The metrics of evaluation will include GPA, graduation rates, job placement, and acceptance to advanced degree programs.

2. Program

Admission Criteria. The proposed 5-year joint BS/MS program in Statistics will have two timeframes for admission, one of which is for conditional admission: 1) preliminary conditional admission as an incoming lower division student, and 2) admission as a senior meeting admission criteria. The Statistics Department proposes to offer outstanding freshman the opportunity to apply for preliminary (conditional) admission into the joint BS/MS program in Statistics based on their undergraduate admission qualifications. This can serve as a recruiting tool as well as increase participation in the program. Official admittance would still require meeting the course and GPA criteria and satisfactory progress in the undergraduate major.

Preliminary Conditional Admission Criteria

- High School GPA >3.6
- SAT 1 combined score > 1250
- Satisfy Entry-Level Writing requirement prior to matriculation
- Have sufficient math preparation to enroll in calculus upon arrival

Official Admission Criteria

- Enrolled in the UCR Statistics Program
- Overall GPA 3.0 or higher
- Statistics major GPA 3.3 or higher
- Completion of STAT 160ABC sequence or equivalent

Joint BS/MS Degree Requirements. The BS program course requirements remain as currently outlined in the general catalog.

The MS requires a total of 41 units, and the course and examination requirements are the same as currently outlined in the general catalog for the regular MS program. More specifically, to earn the MS degree, students are required to complete a minimum of 41 units that must include STAT 201A, 201B, 201C, STAT 202A, 202B, 202C, STAT 206, STAT 208, STAT 288, and two quarters of STAT 293. No more than 12 units earned prior to matriculation to graduate status can be applied towards the MS degree requirements. Students receive credit toward the 41 units by completing STAT 201ABC as an undergraduate senior.

During the MS portion of the program, students must maintain a GPA (both overall and in the major) of at least 3.0 for all coursework. If the GPA falls below 3.0, they may be dropped from the program.

Additional requirements are successfully passing a written comprehensive examination.

Sample BS/MS Degree Program. The following table outlines a sample program for a student in the proposed joint BS+MS program in Statistics. Graduate courses STAT 201ABC taken prior to matriculation to graduate status will double count towards the BS and the MS degree requirements.

Sample Joint BS/MS Course Plan

	FALL	WINTER	SPRING
1ST YEAR	ENGL 1A, MATH 9A (4) CS 010 (4) H/SS Breadth (4) 16 UNITS	ENGL 1B (4) MATH 9B (4) STAT 100A (5) Biological Science w/lab (4) 17 UNITS	MATH 9C (4) MATH 010A (4) STAT 100B (5) ENGL001C (4) 17 UNITS
2ND YEAR	MATH 31 (4) Physical Science Breadth (4) STAT 147 (4) H/SS Breadth (4) 16 UNITS	STAT 157 (4) H/SS Breadth (4) Upper division STAT (4) Elective (4) 16 UNITS	Upper division STAT (4) H/SS Breadth (4) H/SS Breadth (4) Elective (4) 16 UNITS
3RD YEAR	STAT 160A (4) Upper division STAT (4) H/SS Breadth (4) Elective (4) 16 UNITS	STAT 160B (4) Upper division STAT (4) H/SS Breadth (4) Elective (4) 16 UNITS	STAT 160C (4) H/SS Breadth (4) Elective (4) 12 UNITS
4TH YEAR	H/SS Breadth (4) STAT 170A (4) Elective (4) STAT 201A (4) 16 UNITS	STAT 170B (4) Elective (4) STAT 201B (4) 12 UNITS	STAT 171 (4) STAT 183 (4) STAT 201C (4) 12 UNITS
5TH YEAR (MS)	STAT 202A (4) STAT 206 (4) STAT 293A (4) 12 UNITS	STAT 202B (4) STAT 293B (4) STAT 200 Elective (4) STAT 288 (1) 13 UNITS	STAT 202C (4) STAT 208 (4) STAT 291 (4) 12 UNITS

Normative time from matriculation to degree. Five years.

Catalog entry

Joint B.S.+1 Statistics M.S. Program

The College of Natural and Agricultural Science offers a combined B.S.+1 Statistics M.S. program, designed to allow successful B.S. graduates who have taken some graduate level statistics courses in their senior standing year in UCR to complete the Master of Science degree in Statistics in one year, by allowing up to 12 units of coursework taken in UCR as an undergraduate to be counted towards the MS degree requirements.

A student should apply for the B.S.+1 Statistics M.S. program (including transfer students) before the start of their senior standing year. To apply, the student must have a cumulative GPA at least 3.0 overall, 3.3 GPA in the statistics major, and has completed STAT 160ABC or equivalent. These are minimum requirements and do not guarantee the admission. The application to the B.S.+1 M.S. program must include a transcript, and at least two recommendation letters. Submission of GRE scores with the application is recommended but not required. Matriculation into the graduate portion of the B.S.+1 M.S. program occurs in the Fall term following their final year, provided: (a) the M.S. application is accepted, (b) throughout the final undergraduate year at UCR the student has a cumulative GPA 3.0 or higher, (c) by the end of senior standing year, the student completes the B.S. degree requirements.

Incoming freshman students who apply to the Statistics B.S. program may simultaneously apply for preliminary conditional admission into the B.S.+1 Statistics M.S. program provided their high-school GPA is at least 3.6, their SAT-I combined score is at least 1250, they satisfy the Entry-Level Writing requirement prior to matriculation, and they have sufficient math preparation to enroll in calculus upon arrival. Preliminary conditional admission status is maintained as long as the student is a Statistics B.S. student in good standing with a cumulative GPA of at least 3.0. Conditionally admitted students still need to apply for full admission by the start of their senior standing year as described above. Continuing undergraduate students who meet the above criteria may apply to the program by submitting a petition and should confer with their staff advisor for details.

To earn the MS degree, students are required to complete a minimum of 41 units that must include STAT 201A, 201B, 201C, STAT 202A, 202B, 202C, STAT 206, STAT 208, STAT 288, and two quarters of STAT 293. No more than 12 units earned prior to matriculation to graduate status can be applied towards the MS degree requirements. (The courses that can be double counted are those that are eligible to be counted as electives in the B.S. requirements.)

Comprehensive Examination

All M.S. students are required to take a written comprehensive examination and pass at the M.S. level, with no more than two attempts allowed to pass. A program proposal is not required.

Advancement to Candidacy

Advancing to candidacy takes place when students complete all the course requirements and pass the written exam.

Professional Development

Students in the Statistics B.S.+1 M.S. Program must register two quarters of STAT 293, which give students training in (a) the ability to use fundamental statistical techniques to formulate problem and solution in diverse real-world application; (b) the ability to use at least one statistical software package to conduct statistical data analysis; (c) the ability to communicate with researchers in statistical community and other disciplines by using graphical methods to display and interpret information.

3. Projected Need, resource requirements, student support

This combined program is primarily a recruitment tool, intended to leverage the increasing interest in graduate education to attract top freshmen into the BS program, and to attract top UC Riverside BS students into the MS program.

In the BS program, the prospect of entering the program at year three and completing both the BS and MS in a total of five years should attract students that are highly motivated and more likely than average to make it through the program. The combined BS/MS program will increase the visibility of the STAT undergraduate major to entering students. We expect that the opportunity of earning a joint BS/MS in three years will be highly attractive to community college transfer students as well. Enrollment of community college students has recently become an urgent priority for the University of California. Combined with ongoing increases in admissions standards, this should increase both retention and the overall quality of the students.

In the MS program, we anticipate growth in combined-program enrollment initially of only a few students per year. There would be no expectation of support for the participants in the combined BS/MS program. In addition, if at some point in the future, funding opportunities emerge from campus, college, department, or Graduate Division sources for MS students, then fifth-year BS/MS students would be eligible. Each student accepted into the combined program is likely to be near the top of the applicant pool. If a student decides to continue on for a Ph.D., then full support packages would be provided.

In short, the main effect of the program should be to increase the quality and diversity of students in the BS and MS programs, and achieve a modest increase in enrollment levels. Similarly, it should increase the employability of students produced by the BS and MS programs, and help meet the increasing demand for Statistics students with graduate degrees.

Resources. Note that each student in the combined program is essentially just a regular student (in the BS program, or, in fifth year, in the MS program), and requires the same resources as a regular student at the same level. Also, because of the highly selective nature of the admissions requirements, BS and MS enrollments will be modestly affected, at least initially. Therefore, the program requires no change in faculty, courses, or resources such as library, computing, equipment, space, etc. Likewise, the program requires no change in levels or mechanisms for student funding.

The program does require minor administrative support. During the BS portion of this program, students will be advised by the CNAS Undergraduate Academic Advising Center as normal for pursuance of a BS in Statistics. The administration of the program at the undergraduate level requires processing applications for preliminary acceptance, tracking preliminarily enrolled students, and identifying and informing students who will be eligible to apply at the end of their junior year. The administrative functions for admission to the Statistics Graduate program are already performed by the department Graduate Admission Committee; this committee will also be responsible for administering the BS/MS program with continued support from the CNAS Graduate Student Affairs Center, which will have to track which MS students are in the combined program and account for the double-counting allowance.

Finally, only to the extent that existing resources allow, BS students with "preliminary conditional admission" status will be given additional advising appropriate for MS-bound students.

4. Changes in Senate Regulations

No changes in Senate regulations are required.