Program Description

The joint bachelor’s and master’s degree program is designed to provide our selected highest quality students with the opportunity to link advanced undergraduate coursework with graduate coursework and degree completion. It shall allow accelerated students to obtain a Bachelor’s and Master’s degree within five years. This shall cut the time to complete the M.A degree by at least one year. In addition, this provides a great incentive to our own best students to stay on to pursue their Ph.D degrees at ASU and allow our best undergraduate students and first year graduate students more chances to aggressively compete for NSF fellowships and other national scholarships. Until a couple of years ago, all our best undergraduate students left ASU to pursue graduate degrees elsewhere. Traditionally, our graduate students, most come from other state universities or small liberal arts colleges, are less competitive than our own best undergraduate students. In the last four years, our undergraduate majors more than doubled from about 200 to 418 strong. The quality of these undergraduate students is also greatly improved.

Background and Rationale

Our department is home to more than 418 undergraduate students and near 180 graduate students. ASU is home to 173 national merit scholars (in this regard, ASU is ranked third among public colleges and universities). This joint degree will seamlessly link our fast growing undergraduate and graduate programs and serve the needs of the increasingly numerous talented students. It provides an excellent mechanism to serve and retain our best undergraduate students. Specifically, it will dramatically enhance our graduates’ competitiveness in graduate school and job application competitions, cut their time to degrees at all levels, and enable long lasting and productive student-faculty relationships.

Presently, the credit hour requirements are 128 for the B.S. and 30 for the M.A. 12 of the 30 credit hours for MA can be senior level mathematical courses. Many of our top undergraduate students enter ASU with some university credits and often take many more senior-level mathematical courses than required and a few graduate level mathematics courses. The integrated program allows such excessive senior level courses and graduate level courses be counted toward to the M.A. degree. The program is also suited for students with strong academic backgrounds who are interested in pursuing in-depth research.
Admission Standards

Undergraduate students admitted to the B.S. in the Department of Mathematics and Statistics, who have at least 4 semesters of full-time enrollment, completed 60 credit hours of course work applicable to the B.S. degree with a GPA of at least 3.25 for all courses and a GPA of at least 3.25 for mathematical courses, have obtained at least B in MAT 342 (or 343) and MAT 371 are eligible for the program.

Applications are normally submitted with three semesters remaining in the B.S. program of study. Students must submit an Application Form for the Integrated B.S/ M.A. program in the Department of Mathematics and Statistics. Interactive form will be posted online in the department’s undergraduate program homepage and will be prominently linked from the department website as well as from the graduate program homepage.

Applications must be accompanied by an official transcript and three letters of recommendation. At least two letters of recommendation are from departmental faculty members. These two letters shall attest to the applicant’s readiness and probable success in completing the graduate program. Applications are reviewed and processed by the Graduate director of the department.

Application and admission deadlines. Applications are reviewed twice each year and are due by September 15 in the fall and by February 15 in the spring. Acceptance notices are sent by November 15 and April 15 in the semester of application.

Specific Degree Requirements for Each Degree

The credit hour requirements are 128 for the B.S. and 30 for the M.A. In general, students must satisfy all existing requirements for B.S. and M.A.

The M.A. student who does not write a thesis takes 30 hours of graduate course work, at least 18 hours at the 500 level. The M.A. student who writes a thesis takes 24 hours of graduate course work, at least 12 hours at the 500 level. In addition, six hours of thesis (599), or three hours of thesis and three hours of research (592) are taken. A final oral examination (which serves as the culminating experience) in defense of the thesis is required.

A Master's degree student who writes a thesis is required to take only one written qualifying examination. An M.A. student who does not write a thesis takes a second exam (which serves as the culminating experience) which is either a qualifying exam, a comprehensive exam or a special master's exam.

Standards and Procedures for Monitoring Student Progress

Students admitted to the program are assigned a faculty advisor and supervisory committee to develop an integrated program of study leading to the dual degrees. Self and advisor evaluation will be conducted and filled each semester. Progress toward the undergraduate degree is the
primary focus of the program and such evaluations. The student must maintain a minimum GPA of 3.0 in mathematical courses and a minimum GPA of 3.0 in cumulative courses every semester to remain in the program. Students fail to satisfy these GPA requirements will return to the B.S. program if they have not completed the B.S. requirements. Students who completed the B.S. requirements but failed to meet these GPA requirements must leave the B.S./M.A. program. All courses must be taken at ASU Tempe Campus.

The student together with the faculty advisor, selects 12 or more credit hours of 400- and 500-level courses to be taken prior to the B.S. graduation. Up to 12 credit hours of course work may be credited toward the Master’s degree requirements. The Graduate Catalog and the department graduate program homepage list the advanced 400-level courses allowable for graduate credit. There is a maximum of 12 credit hours at the 400 level allowable for graduate programs.

The student is still considered an undergraduate for tuition purposes until the Bachelor’s degree is conferred and the student is admitted as a regular Master’s student. Upon receipt of the B.S., the student must change their status from the Dual B.S./M.A. Degree to regular M.A. status to avoid registration and funding difficulties. Also, a graduate Program of Study must be on file in order to register as a Master’s student. Students on the M.A. track will be eligible for financial support in the form of a department assistantship after the B.S. is conferred.

Standards and Procedures for Monitoring the Program’s Quality

The Department of Mathematics and Statistics is committed to establish and maintain excellence in all its programs. To this end, records will be well kept and an extensive database containing demographic data, course work information, grades and contact information will be created. Annual program participant evaluation will be conducted. Every two years, the department officials will jointly evaluate the program in order to identify ways to better serve the students in the future. At the end of three years, the department will submit a report to the Division of Graduate Studies detailing the progress and effectiveness of the joint program (e.g., student academic progress, completion rates).

Samples of Program of Study (B.S./M.A. without thesis)

The B.S. degree in mathematics requires a minimum of 120 semester hours. Included in this total are 42 semester hours of course work in mathematics and statistics, and an additional 13 semester hours of course work in related fields. The M.A. degree requires 30 semester hours of graduate course work.

The B.S. degree in computational mathematical sciences requires a minimum of 32 semester hours of course work in mathematics and statistics, a minimum of 12-14 semester hours in science, 9 hours in computer science and a 3 hour advanced science course or internship/research credit for a minimum of 56-58 semester hours of advanced course work related to the major.

In the sample programs below, we list only courses that are required specifically by the B.S and M.A programs in the Department of Mathematics and Statistics. All 200 and 300 level courses are credited toward the B.S. degree. All 500 level courses are credit toward M.A. degree. 400 level courses credited toward M.A. are marked by (ge).
A Generic Sample Program of Study (B.S./M.A. without thesis)

The normal course load for an undergraduate is 15 hours per semester and for a graduate student is 9 hours per semester. However four of the courses required for the M.A. are only at the 4xx level. So in order to complete the required 150 semester hours for a B.S. and M.A. in mathematics in five years, a student should gain 12 hours of additional undergraduate credit during the first four years. This will typically be accomplished by some combination of university credits earned in high school, summer school classes and an additional class in some semesters. For example a typical student might enter the university with six credits in each of mathematics, science and history.

In the following sample program we assume that the student has received college credit for MAT 270, 271 Calculus with Analytic Geometry I ,II (8 hr.) (core courses) before entering ASU. We list only courses that are required specifically by the B.S and M.A programs in the Department of Mathematics and Statistics.

Fall, year 1 (18, including credits from MAT 270, 271)
MAT 272 Calculus with Analytic Geometry III (4 hr.) (core course)
CSE 200 Concepts of Computer Science (3 hr.)
MAT 274 Elementary Differential Equations (3 hr.)

Spring, year 1 (24)
MAT 342 (or MAT 343) Linear Algebra (3 hr.) (core course)
MAT 300 Mathematical Structures (3 hr.) (core course)

Fall, year 2 (33)
MAT 371 Advanced Calculus I (3 hr.) (core course)
A course work in related fields (3 hr.)
A 300 level mathematics or statistics course (3 hr.)

Spring, year 2 (42)
A course work in related fields (3 hr.)
A course work in related fields (3 hr.)
A 400 level mathematics or statistics course (3 hr.)

Fall, year 3 (51)
An allowable 400 level mathematics or statistics course (3 hr.)
Another allowable 400 level mathematics or statistics course (3 hr.)
The third allowable 400 level mathematics or statistics course (3 hr.)

Spring, year 3 (57)
An allowable 400 level mathematics or statistics course (3 hr.)
Another allowable 400 level mathematics or statistics course (3 hr.)

Fall, year 4
First course of qualifying sequence I (3 hr.) (gc)
First course of qualifying sequence II (3 hr.)(gc)

Spring, year 4
Second course of qualifying sequence I (3 hr.)(gc)
Second course of qualifying sequence II (3 hr.)(gc)

Fall, year 5
Three 500 level mathematics or statistics courses (9 hr.)

Spring, year 5
Three 500 level mathematics or statistics courses (9 hr.)

_A Sample Program of Study With General Emphasis_ (B.S./M.A. without thesis)

Fall, year 1 (7)
MAT 270 Calculus with Analytic Geometry I (4 hr.) (core course)
CSE 200 Concepts of Computer Science (3 hr.)

Spring, year 1 (17)
MAT 271 Calculus with Analytic Geometry II (4 hr.) (core course)
MAT 342 Linear Algebra (3 hr.) (core course)
MAT 300 Mathematical Structures (3 hr.) (core course)

Fall, year 2 (24)
MAT 272 Calculus with Analytic Geometry III (4 hr.) (core course)
MAT 274 Elementary Differential Equations (3 hr.)

Spring, year 2 (30)
MAT 371 Advanced Calculus I (3 hr.) (core course)
MAT 410 Introduction to General Topology (3 hr.)

Fall, year 3 (39)
MAT 372 Advanced Calculus II (3 hr.)
MAT 461 Applied Complex Analysis (3 hr.)
MAT 443 Introduction to Abstract Algebra (3 hr.)

Spring, year 3 (48)
MAT 472 Intermediate Real Analysis I (3 hr.)
STP 420 Introductory Applied Statistics (3 hr.)
MAT 442 Advanced Linear Algebra (3 hr.)

Fall, year 4 (54)
MAT 415 Introduction to Combinatorics (3 hr.) (gc)
MAT 462 Applied Differential Equations (3 hr.)
MAT 444 Intermediate Algebra (3 hr.) (gc)
MAT 445 Theory of Numbers (3 hr.)
A Sample Program of Study Emphasis in Statistics (B.S./M.A. without thesis)

Fall, year 1 (7)
MAT 270 Calculus with Analytic Geometry I (4 hr.) (core course)
CSE 200 Concepts of Computer Science (3 hr.)

Spring, year 1 (17)
MAT 271 Calculus with Analytic Geometry II (4 hr.) (core course)
MAT 342 Linear Algebra (3 hr.) (core course)
MAT 300 Mathematical Structures (3 hr.) (core course)

Fall, year 2 (24)
MAT 272 Calculus with Analytic Geometry III (4 hr.) (core course)
MAT 274 Elementary Differential Equations (3 hr.)

Spring, year 2 (30)
MAT 371 Advanced Calculus I (3 hr.) (core course)
STP 420 Introductory Applied Statistics (3 hr.)

Fall, year 3 (39)
MAT 372 Advanced Calculus II (3 hr.)
STP 421 Probability (3 hr.)
MAT 423 Numerical Analysis I (3 hr.)

Spring, year 3 (48)
STP 427 Mathematical Statistics (3 hr.)
STP 429 Experimental Statistics
MAT 442 Advanced Linear Algebra (3 hr.)

Fall, year 4 (54)
STP 530 Applied Regression Analysis (3 hr.)
STP 532 Applied Nonparametric Statistics (3 hr.)
MAT 420 Scientific Computing (3 hr.)
MAT 451 Mathematical Modeling (3 hr.)

Spring, year 4 (57)
STP 425 Stochastic Processes (3 hr.)
STP 531 Applied Analysis of Variance (3 hr.)
STP 533 Applied Multivariate Analysis (3 hr.)

Fall, year 5
STP 526 Theory of Linear Models (3 hr.)
STP 535 Sampling Methods (3 hr.)
QBA 527 Categorical Data Analysis (3 hr.)

Spring, year 5
STP 598 Smoothing Methods in Statistics (3 hr.)
HSM 572 Advanced Biostatistics (3 hr.)
IEE 598 Data Mining (3 hr.)

A Sample Program of Study for BS in general math with MA in mathematical biology

Fall, year 1(10)
MAT 270 Calculus with Analytic Geometry I (4 hr.) (core course)
MAT 243 Discrete Mathematical Structures (3 hr.)
CSE 200 Concepts of Computer Science (3 hr.)

Spring, year 1(20)
MAT 271 Calculus with Analytic Geometry II (4 hr.) (core course)
MAT 342 or MAT 343 Linear Algebra (3 hr.) (core course)
MAT 300 Mathematical Structures (3 hr.) (core course)

Fall, year 2(30)
MAT 272 Calculus with Analytic Geometry III (4 hr.) (core course)
MAT 274 or MAT 275 Elementary Differential Equations (3 hr.)
MAT 351 Mathematical Methods for Genetic Analysis (3 hr.)

Spring, year 2(39)
MAT 371 Advanced Calculus I (3 hr.) (core course)
MAT 462 Applied Partial Differential Equations (3 hr.)
STP 420 Introductory Applied Statistics (3 hr.)

Fall, year 3(48)
MAT 372 Advanced Calculus II (3 hr.)
STP 421 Probability (3 hr.)
MAT 472 Intermediate Real Analysis I (3 hr.)

Spring, year 3(54)
STP 427 Mathematical Statistics (3 hr.)
MAT 473 Intermediate Real Analysis II (3 hr.)

Fall, year 4(57)
MAT 475 Differential Equations (3 hr.) (gc)
MAT 461 Applied Complex Analysis (3 hr.)
MAT 420 Scientific computing (3 hr.) (gc)

Spring, year 4
MAT 476 Partial Differential Equations (3 hr.) (gc)
MAT 570 Real Analysis I (3 hr.)

Fall, year 5
MAT 571 Real Analysis II (3 hr.)
MAT 598 Mathematical Biology I. (3 hr.)
MAT 574 Advance ODEs. (3 hr.)

Spring, year 5
MAT 598 Mathematical Biology II. (3 hr.)
MAT 598 Applied Delay Differential Equations. (3 hr.)
MAT 575 Advance PDEs. (3 hr.)

A Sample Program of Study for BS in CMS with MA in Mathematics

Fall year (11)
MAT 271 Calculus with Analytic Geometry II (4 hr.) (core)
MAT 300 Mathematical Structures (3 hr.) (core)
Science I (4 hr.) (BIO187 General Biology I (SG)) (core)

Spring year 1(22)
MAT 272 Calculus with Analytic Geometry III (4 hr.) (core)
CSE 200 Concepts of Computer Science (3 hr.) (core)
Science I I (4 hr.) (BIO 188 General Biology II (SQ)) (core)

Fall year 2(32)
MAT 275 Modern Differential Equations (3 hr.) (core)
CSE 210 Object Oriented Design and Data Structures (3 hr.) (core)
Science III (4 hr.) (CHM 117 General Chemistry for Majors I (SQ)) (core)

Spring year 2(42)
MAT 343 Applied Linear Algebra (3 hr.) (core)
CSE240 Intro to Progr. Languages (3 hr.) / CSE310 Data Structure and Algor. (3 hr.) (core)
Science IV (4 hr.) (CHM 118 General Chemistry for Majors II (SQ)) (core)

Fall year 3(48)
MAT 371 Advanced Calculus I (3 hr.) (core)
MAT 420 Scientific Computing (4 hr.) (core)
Spring year 3 (57)
MAT 421 Applied Computational Methods (3 hr) (core)
STP 420 Introductory Applied Statistics (3 hr) (elec. II)
MAT 351 Mathematical Methods for Genetic Analysis (3 hr) (elec. I)

Fall year 4
MAT 423 Numerical Analysis I (3 hr) (gc)
MAT 494 Mathematical Biology I (3 hr) (gc)

Spring year 4
MAT 425 Numerical Analysis II (3 hr) (gc)
MAT 494 Mathematical Biology II (3 hr) (gc)

Fall year 5
MAT 520 Numerical Linear Algebra (3 hr)
MAT 533 Computational Elliptic and Parabolic PDEs (3 hr)
MAT 574 Ordinary Differential Equations (3 hr) / Thesis (3 hr)

Spring year 5
MAT 523 Numerical Optimization (3 hr)
MAT 535 Spectral Methods for Partial Differential Equations (3 hr)
MAT 534 Computational Hyperbolic Partial Differential Equations (3 hr) / Thesis (3 hr)