

SAINT PETER'S COLLEGE

DEPARTMENT OF MATHEMATICS

GUIDELINES FOR MATHEMATICS MAJORS

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The following pages describe the core curriculum and required mathematics courses in the mathematics major, and several programs available within the mathematics major. The mathematics major is available only in the Day Session.

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1. BEGINNING THE MATHEMATICS MAJOR

Entering students who intend a mathematics major should follow the schedule of courses listed on page 5 for the Freshman year of the mathematics major. They should identify themselves to the instructor in their calculus course (Ma 143-144), who can then keep them informed of the special lectures and programs available during the year, as well as of other information important to mathematics majors.

Entering students who are considering mathematics as one of several possible majors should include the special requirements of the mathematics major (Ma143-144 and Cs 180) in their Freshman program. These courses fulfill some requirement of every major in the College, and so are not "wasted", should the student later decide against majoring in mathematics.

Students transferring into Saint Peter's College with credits, particularly mathematics credits, from another institution, and intending to major in mathematics, should consult with an advisor in the Mathematics Department as early as possible, preferably before their first registration. Only in this way can students' past academic records be matched with the Department's requirements.

Except in extraordinary cases, the pre-registration period for Sophomore year, which is during the spring term of Freshman year, is the last opportunity to transfer into a mathematics major without delaying the date of graduation by at least one term. In counseling potential mathematics majors, the Department emphasizes most strongly the sequential nature of its courses. The mathematics program for Sophomore, Junior, and Senior years cannot easily be compressed into two years. Very few of the Junior and Senior year mathematics courses can be taken before Multivariable Calculus (Ma 273-274) has been completed.

The first-year calculus courses other than Ma 143-144 are not adequate preparation for the study of Ma 273, Multivariable Calculus. Each year in the Intersession the Mathematics Department offers a two-credit course, Ma 125 Intermediate Calculus; this course is intended for students who have completed the six credit calculus sequence Ma 123-124 and who now wish to take Ma 273.

Mathematics majors who are considering Student Teaching or Junior Year Abroad should discuss this possibility with their department advisor during the first term of Sophomore year, at the latest.

The courses in the mathematics major presume three years of academic high school mathematics, including trigonometry. While specific items of content (for example, trigonometry) may be supplied in the college courses which use them, a reasonable fluency with basic algebraic techniques cannot be supplied in a short time period, although review and refresher help is available. Entering students who are concerned about the adequacy of their high school preparation should consult with a member of the mathematics faculty after taking the

algebra placement test which is part of pre-Freshman counseling. Such advice and assistance is regularly available during the summer preceding Freshman year.

No courses suitable to the mathematics major are available in the Evening Session or in the Summer Session.

Entering students who have had a strong calculus course in high school can be counseled individually by a member of the mathematics faculty during the summer preceding Freshman year. On the basis of this interview, such students may be placed directly into Multivariable Calculus, waiving the first-year requirements. This opportunity is available whether credit for the first year is granted or not, and whether or not the Advanced Placement test has been taken.

2. THE CORE CURRICULUM

Mathematics majors must take Ma 143-144, Differential and Integral Calculus (8 credits); these courses also fulfill the core curriculum requirement in mathematics. The remaining core curriculum requirements are:

Philosophy	6 credits
Theology	6 credits
English	6 credits
History	6 credits
Modern Language	6 credits
Social Sciences	6 credits
Fine Arts	3 credits
Natural Sciences	9 credits
Communications	3 credits
Values course	3 credits

Refer to the *Undergraduate Bulletin* for specific courses.

Mathematics majors ordinarily fulfill 6 credits of the Natural Science requirement by taking Pc 185-186, General Physics I and II. Laboratory Physics is not required. The remaining 3 credits may be fulfilled by taking Cs 180, Fundamentals of Computer Programming.

The Social Science requirement is fulfilled by taking one course in each of two departments selected from: Economics, Political Science, Sociology, and Urban Studies. The

Mathematics Department recommends that its majors select Ec 101 as one of these two courses.

The Values requirement is fulfilled by taking one course (3 credits) in Ethics or in Moral Values. *Appropriate courses are indicated each term in the Schedule of Courses.*

3. THE MATHEMATICS MAJOR FRESHMAN AND SOPHOMORE YEARS

The usual distribution of courses in the first two years is:

Freshman	Ma143-144	Differential and Integral Calculus	(8)
	Cs180	Fundamentals of Computer Programming	(3)
		Core courses	(21)
Sophomore	Ma246	Discrete Mathematics	(3)
	Ma247	Linear Algebra	(3)
	Ma248	Mathematics Technology Laboratory	(1)
	Ma273-274	Multivariable Calculus	(8)
	Pc185-186	General Physics	(6)
		Core courses	(9)

A student must have achieved an average of 2.0 or better in the mathematics courses listed above in order to continue as a mathematics major.

4. THE MATHEMATICS MAJOR JUNIOR AND SENIOR YEARS

In addition to the successful completion of the Freshman and Sophomore year program as described, with an average of at least 2.0 in mathematics courses, the mathematics major is required to complete eight courses from the upper division courses in the department. The selection must include:

	Ma335	Probability Theory
and	Ma441	Modern Algebra
and		
	either Ma382	Mathematical Modeling
	or Ma385	Topics in Applied Mathematics
and		
	either Ma375	Advanced Calculus
	or Ma377	Ordinary Differential Equations

The Chair of the Mathematics Department may reduce the remaining number of required courses from four to two if the student has, in consultation with the Department advisor, combined a mathematics major with a specified program of courses in a related field. Such programs include, but are not limited to, major or minor programs in another department and the certification program in secondary education.

After the completion of the Freshman and Sophomore year program as described, the following core curriculum requirements remain to be completed in Junior and Senior years:

Core Courses (15)

The remaining 19 credits are unrestricted either by the core curriculum or by the major program.

A student must have an average of 2.0 or better in all mathematics courses counted toward the major in order to graduate as a mathematics major.

As is College policy in any major, at least half the courses counted toward the major must be taken at Saint Peter's College (that is, not transfer credits, either before enrolling at Saint Peter's College or after).

5. UPPER DIVISION MATHEMATICS COURSES

Upper division courses are offered only in alternate years. Regularly four or five courses are offered each year. The pattern of alternation is as follows:

2008-2009 and alternate years:

Ma 335	Probability Theory
Ma 336	Mathematical Statistics
Ma 377	Ordinary Differential Equations
Ma 385	Topics in Applied Mathematics

2009-2010 and alternate years

Ma 350	College Geometry
Ma 375	Advanced Calculus
Ma 382	Mathematical Modeling
Ma 387	Topics in Mathematics
Ma 441	Modern Algebra

Recently the Department has also been offering each year Ma495, Undergraduate Research, for those students who are interested in doing some mathematical research under faculty supervision.

6. HONORS PROGRAM

In the Honors Program, students take a number of special courses in place of certain core requirements. Participation is by invitation, and students who accept the invitation to enter the Honors Program should work both with the Director of the Honors Program and with the Chair of the Mathematics Department to be sure that all their major requirements are properly scheduled. Generally, mathematics majors in the Honors Program take the standard sequence of mathematics and related courses in Freshman and Sophomore years.

The final Honors Program research thesis, paper, or project, prepared by the student and mentored by a faculty member of the Mathematics Department, ordinarily carries Honors Program credit rather than mathematics credits. In those cases where the project merits mathematics credit, this credit does not automatically substitute for any of the 18 required upper division mathematics credits.

Occasionally, upper-division mathematic courses may be "double-listed" in the Honors Program. Such courses may be counted toward the mathematics major, whether taken under an Ma or an Hp designation. Additional content requirements may be presumed under the Hp designation.

7. SECONDARY EDUCATION PROGRAM

Regulations on certification in secondary education are set by the state Department of Education. There is a list of required courses in Education available from the Education Department. Students should consult with an advisor in the Department of Education for the details of the state requirements.

The state requirements for certification in mathematics include a subject-matter undergraduate major, and at least 30 credits in mathematics. Students who are not mathematics majors should include 18 credits representing a standard mathematics minor program addressed elsewhere in this booklet.

Students pursuing the minor program in secondary education should be advised that its requirements, which address state certification requirements, along with the core curriculum requirements and the requirements of the mathematics major allow for few, if any, free elective credits within the minimum degree requirements of 120 credits.

8. CAREERS FOR MATHEMATICS MAJORS

Mathematics derives its great importance from the fact that its concepts and techniques are essential ingredients in a wide variety of theoretical and practical disciplines. Not merely the computational solution of problems but the thought processes which are developed by the analysis of problems in mathematics courses carry over into countless other fields of human endeavor. Thus the mathematics major program provides valuable career preparation even for the careers where there seems to be little or no obvious "use" for mathematics.

Too often students think that the only thing you can do with mathematics is teach it to someone else. It is true that graduates of the Mathematics Department at Saint Peter's College have taught at over thirty colleges and universities, from Yale University to the University of California, and in secondary schools in over one hundred communities. In addition, our graduates also have taught in instructional programs at, for example, IBM Corporation, Macy's Department Stores, The Port Authority of New York and New Jersey, and Aberdeen Proving Grounds.

But a wide variety of other careers are possible. Among graduates of the Department of Mathematics have been patent attorneys and trial attorneys, medical doctors and meteorologists, investment counselors and pension managers; there has been an economist for the State Office of the Public Advocate, a bio-statistician for the National Institute for Occupational Safety and Health, a Fellow of the American Society of Actuaries, a mathematician for the Air Force Weapons Laboratory, a manager of Operations Research for United States Steel Corporation, a counselor for the Social Security Administration, a systems analyst for a hospital, and a special

agent for the Federal Bureau of Investigation. Mathematics graduates of Saint Peter's College hold advanced degrees in such diverse fields as philosophy, theology, economics, library science, engineering, operations research, computer science, business management, urban planning, and environmental studies, as well as law, medicine, and, of course, mathematics.

What ties all these fields together? Surely not the content of their subject matters. But in each field the professional must analyze a problem and formulate a process for solving that problem and others like it. This is the training that, in the long run, is at the heart of college-level mathematics. Mathematics is not a narrow preparation for a single occupation. By its very abstraction, it is not tied to particular uses, but provides a broad and liberating preparation which conscientious graduates can then apply in a wide variety of careers, many of which might not yet exist at the time they take their undergraduate courses.

9. PI MU EPSILON

Since 1968, Saint Peter's College has had a chapter of the national honorary mathematics society, Pi Mu Epsilon. This national honor society was founded in 1914 to promote scholarly activity and interest in mathematics.

Minimum criteria for eligibility for membership are an interest in mathematics and: for Sophomore mathematics majors, an average of 3.8 in mathematics courses and ranking in the upper quarter of the class; for Junior mathematics majors, a 3.2 average in mathematics courses and ranking in the upper third of the class; for Seniors mathematics majors, a 3.0 average in mathematics courses and ranking in the upper third of the class. Invitation to membership is by vote of the current student membership, ordinarily during the spring term. Juniors and Seniors in other majors who take a significant number of courses appropriate to the mathematics major and who meet these same grade standards may also be invited to join. Invitations to membership may also be extended to persons other than students who have achieved distinction in mathematical sciences.

During the year, the society sponsors a series of lectures on topics of interest to undergraduate mathematics majors, as well as several informal seminars and social activities. These lectures and activities are open to all interested students. Saint Peter's College students have presented short report papers at the national meeting of Pi Mu Epsilon and also at the annual New Jersey Section meeting of The Mathematical Association of America.

10. FACULTY OF THE DEPARTMENT OF MATHEMATICS

George P. Evanovich (1987) EdD, Temple University	Associate Professor Emeritus	Education
John E. Hammett III (1999) EdD, Rutgers University	Associate Professor	Education
Brian P. Hopkins (2001) PhD, University of Washington	Assistant Professor	Algebra Combinatorics
B. Melvin Kiernan (1959) PhD, New York University	Professor Emeritus	Algebra Business Applications
Michele Picarelli (2001) PhD, NJ Institute of Technology	Assistant Professor	Applied Mathematics
Eileen L. Poiani (1967) PhD, Rutgers University	Professor VP for Student Affairs	Real Analysis
Gerard P. Protomastro (1976) PhD, Clemson University	Professor	Real Analysis
Francis T. Rush (1964) PhD, University of Notre Dame	Professor Emeritus	Algebra
Katherine Safford (1996) EdD, Rutgers University	Associate Professor	Education
Michael B. Sheehy (1989) PhD, Kansas State University	Associate Professor	Algebra Statistics
Karen F. Smith (1992) PhD, University of Iowa	Assistant Professor	Algebra Knot Theory
Larry E. Thomas (1970) PhD, Rensselaer Polytechnic Institute	Professor	Applications Computer Science