

# Undergraduate Handbook\*

Department of Mathematics and Statistics  
Mississippi State University

2005-2006

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\*This handbook is for general information only and is not intended to replace the official statements included in the *Bulletin of Mississippi State University*.

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# 1 Introduction

Thank you for your interest in the undergraduate programs in the Department of Mathematics and Statistics at Mississippi State University. The department offers several degree programs.

1. The Bachelor of Arts (B.A.) in Mathematics;
2. The Bachelor of Science (B.S.) in Mathematics;
3. The B.S. in Mathematics with teaching certification;
4. The Master of Science (M.S.) in Mathematics;
5. The M.S. in Statistics;
6. The Doctorate of Philosophy (Ph.D.) in Mathematical Sciences.

The department also offers a minor in mathematics and a minor in statistics at both the undergraduate and graduate levels. The department currently has 32 faculty members, including 24 graduate faculty, approximately 60 undergraduate majors, and about 25 full-time graduate students.

While our faculty are very active in research, undergraduate education is of paramount importance to the faculty. Almost every class at the level of Calculus I and above is taught by a full-time faculty member. Thus, our students are taught by energetic, internationally recognized faculty who are indeed interested in teaching at the undergraduate level.

When you enter the mathematics degree program the departmental Undergraduate Coordinator will initially advise you. However, within a short period of time, you will be assigned to one of our regular advisors. It is your advisor's job to help you plan your program throughout your career at Mississippi State University. Your advisor can also assist you with your plans after graduation. If you wish to change advisors at any time in your career, you merely need to notify the Undergraduate Coordinator.

## 2 Degree Requirements and Sample Programs

The Department of Mathematics and Statistics offers two undergraduate degrees and a significant number of possible double majors with other departments. The requirement for each of our two-degree programs are listed in Tables 3 and 1. Sample programs are in Tables 4 and 2. Degree check sheets are found in Appendices A through E.

### 2.1 The Bachelor of Arts

The candidate for a Bachelor of Arts degree must complete at least 124 hours with an overall "C" average as outlined in Table 3. At least 32 of the total number of credit hours applied toward the degree must be upper division Arts and Sciences hours. The outline in Table 4 is

provided as an example of how these requirements can be satisfied. Please note that this is only one possible program. You are not required to follow this suggested program of study. There is sufficient flexibility in the degree program to tailor it to your personal career goals. Indeed, a very ambitious student may complete one or more of the core courses of our Master of Science degree program during their senior year. Your advisor will assist you in planning your individual course of study.

Table 1: Requirements for a B.A. in Mathematics

English Composition	EN 1103 and EN 1113
Foreign Language	3 semesters of foreign language
Communication	CO 1003 or CO 1093
Natural Sciences	One sequence of CH 1213-CH 1233 or PH 2213-PH 2223 and one Biological Science. One Physical Science and one Life Science lab.
	lab and one Life Science lab.
Humanities (English, History, Philosophy, and Religion)	18 hours of humanities; 3 hours of literature, 3 hours of history, 3 hours of philosophy, and 9 more in any of the four disciplines.
Social Sciences (Anthopology, Communications, Economics, Geography, Political Science, Psychology, and Sociology)	18 hours of social science. Courses must spread out over at least 4 disciplines; a maximum of 1 in ecomonics and a maximum of 2 in each remaining discipline.
Computer Science	One of CS 1213, CS 1233, or DC 1253.
Mathematics: These courses must be completed with at least a "C" average.	MA 1713, MA 1723, MA 2733, MA 2743, MA 3113, MA 3253, MA 3163, MA 3213, MA 4633, MA 4643, and 6 additional semester credit hours of upper division Mathematics. While not required, MA 3053 is recommended prior to taking MA 3163 and MA 4633.

## 2.2 The Bachelor of Science

The candidate for a Bachelor of Science degree must complete at least 124 hours with an overall "C" average as outlined in Table 1. At least 32 of the total number of credit hours applied toward the degree must be upper division Arts and Sciences hours. The outline in Table 2 is provided as an example of how these requirements can be satisfied. Please note that this is only one possible program. You are not required to follow this suggested program of study. There is sufficient flexibility in the degree program to tailor it to your personal career goals. Indeed, a very ambitious student may complete one or more of the core courses

Table 2: Sample Program for B.S. in Mathematics

Freshman Year		Sophomore Year	
First Semester	Second Semester	First Semester	Second Semester
MA 1713	MA 1723	MA 2733	MA 2743
CH 1213	CH 1223	MA 3113	MA 3253
FL 1114	FL 1124	FL 2133	FL 2143
EN 1103	EN 1113	Biology	CS 1253
History	Literature	C0 1003	Philosophy
		Social science	Social science
Junior Year		Senior Year	
First Semester	Second Semester	First Semester	Second Semester
MA 3053	MA 3163	MA 4633	MA 4643
Math elective	Math elective	Math elective	MA 3213
Fine arts	Social science	Humanities	Social science
Social science	Humanities	Social science	3000+ arts and
Humanities	3000+ arts and	3000+ arts and	science course
	science course	science course	Any course

of our Master of Science degree program during their senior year. Your advisor will assist you in planning your individual course of study.

## 2.3 Mathematics and Statistics Course Descriptions

The course offerings and descriptions for the Department of Mathematics and Statistics are numerous and may be found in the *Bulletin of Mississippi State University*. Copies of the *Bulletin* may be found on-line or may be requested from the Office of the Registrar, P.O. Box 5268, Mississippi State, Mississippi 39762. The Registrar Office phone number is 662-325-2022.

## 2.4 Tracks within Mathematics, Minors, and Double Majors

There are a variety of ways to tailor your degree program to your personal career goal. For instance, if you wish to build a program in mathematical and applied statistics, you could complete the Bachelor of Science program with a minor in statistics. The minor in statistics consists of ST 3123, ST 4213, one of ST 4523 or ST 4543, ST 4111, ST 8114 and ST 8214 or ST 8253.

Many students complete double majors. It is possible for a student to double major in Mathematics and any other discipline, but the student needs to be aware that a double major in Mathematics and a discipline that is not in the College of Arts and Sciences can be difficult because of the different core requirements in the different colleges. There is a special

Table 3: Requirements for a B.S. in Mathematics

English Composition	EN 1103 and EN 1113
Foreign Language	3 semesters of foreign language
Communication	CO 1003 or CO 1093
Natural Sciences	You must take one of the three groups: I. CH 1213-CH 1223 and PH 2213-PH 2233 II. CH 1213-CH 1223 and 9 hours of Biology III. PH 2213-PH 2233, 6 hours of Biology and 2 labs
Humanities (English, History, Philosophy, and Religion)	One history, one literature
Social Sciences (Anthropology, Communications, Economics, Geography, Political Science, Psychology, and Sociology)	6 hours of social science in two different disciplines.
Computer Science	One of CS 1213, CS 1233, or DC 1253.
Mathematics: These courses must be completed with at least a "C" average.	MA 1713, MA 1723, MA 2733, MA 2743, MA 3113, MA 3253, MA 3163, MA 3213, MA 4633, MA 4643, MA 4313, three semester credit of hours of mathematics at the 3000 level or above, plus six additional semester credit hours of mathematics at the 4000 level of above. While not required MA 3053 is recommended prior to taking MA 3163 and MA 4633.

program for double majors in Mathematics and Computer Sciences that reduces some of the requirements. A check sheet for this double major is in Appendix D.

A student in a field other than mathematics may minor in mathematics. The minor in mathematics consists of MA 1712, MA 1723, MA 2733, MA 2743, MA 3113, MA 3253, and six more MA hours numbered 3000 or above.

## 3 Activities and Benefits

### 3.1 Student Organizations

Kappa Mu Epsilon is the mathematics honor society at Mississippi State University. Any student with at least sophomore standing is eligible to join. This organization sponsors one or more parties or picnics, as well as several colloquia during the year. There is also a student chapter of the Mathematical Association of America, which is open to all students. The two organizations often hold joint functions.

Table 4: Sample Program for B.S. in Mathematics

Freshman Year		Sophomore Year	
First Semester	Second Semester	First Semester	Second Semester
MA 1713	MA 1723	MA 2733	MA 2743
CH 1213	CH 1221	MA 3113	MA 3253
FL 1114	CH 1223	FL 2133	PH 2223
EN 1103	EN 1113	Fine arts	FL 2143
History	FL 1124	PH 2213	CO 1003
	Literature	CS 1213	Social science
Junior Year		Senior Year	
First Semester	Second Semester	First Semester	Second Semester
MA 3053	MA 3213	MA 4633	MA 4643
MA 4313	MA 3163	4000+ math	5 other courses
PH 2233	4000+ math	elective	
CO 1003	elective	3 other courses	
Social science	3 other courses		
3000+ arts and science course			

### 3.2 Student Computing Facilities

All mathematics majors are eligible for a computer account on the University server. This gives the student access to e-mail and the internet. Furthermore, the department maintains a computer lab and a computer classroom; each with 25 to 35 networked Pentium-class PC's. The lab can also be used as a fully functional electronic classroom.

### 3.3 Student Competitions

There are two major competitions in which our students participate. The first is the annual William Lowell Putnam Competition. This is open to any student without a college degree. A student may only take the Putnam exam four times. Students should alert the Undergraduate Coordinator no later than October 1 if they are interested in taking the Putnam examination.

The second competition is the Louisiana-Mississippi Section of the Mathematical Association of America's (MAA) undergraduate competition. This typically involves a road trip to the MAA regional conference in the Spring. Mississippi State has won this competition six times since 1990. Membership on the team is by invitation only.

### 3.4 Undergraduate Research Opportunities

Several departmental faculty members are available to serve as faculty mentors for undergraduate students who have an interest in mathematical research. The research projects are selected based upon the student's area of interest and the level of mathematical maturity of the student. Those students who complete a noteworthy research project are often provided both the opportunity and the necessary financial support to present their results at the MAA regional conference and publish their results in the conference proceedings.

### 3.5 Cooperative Education Opportunities

Many of our students take advantage of the Cooperative Education Program at Mississippi State. This involves taking alternate semesters off and working for a private company or government organization. Recently students have "co-oped" with such companies as the various baby Bells, power companies, IBM, and even the National Security Agency. Please contact the Director of Cooperative Education for more detailed information concerning the Cooperative Education or Program, see <http://www.coop.msstate.edu>.

## 4 Financial Assistance

### 4.1 Working for the Department of Mathematics and Statistics

If you qualify, you may apply for a work study position with either the Department of Mathematics and Statistics or another department. Even if you do not qualify for work-study, the Department of Mathematics and Statistics maintains a tutoring lab on the second floor of Allen hall. Students who have done well in their basic classes have an opportunity to apply for work as tutors in the lab.

## 5 Scholarships

There are several major departmental scholarships for mathematics majors. Inquires should be directed to the department head, Dr. Michael Neumann ([neumann@math.msstate.edu](mailto:neumann@math.msstate.edu) or 662-325-3414).

1. **Frank L. Culley Memorial Scholarship.** (Credit for tuition and fees, awarded alternately by the Department of Mathematics and Statistics and Physics and Astronomy). Frank L. Culley, class of 1928, left a bequest of approximately \$50,000 worth of stock to establish the Frank L. Culley Memorial Scholarship fund at MSU. He died at the age of 90 in 1994. While at MSU, Mr. Culley participated in Army ROTC and served during W.W. II as a Captain and Lt. Colonel. Later, he was promoted to full Colonel. After he retired from military service, he earned the position of Secretary/Treasurer of the International Union of Geodesy and Geophysics. Among his distinctions is achieving the rank of Chief of Geodesy Army Corps of Engineers



and breaking the radio code between Moscow and Sputnik in the first travel expedition. Predominately, he was responsible for implementing the use of computers into the U.S. Space Program. This scholarship is available to a full time junior or senior student majoring in math or physics. They must have demonstrated high academic achievement, a minimum 3.0 GPA, leadership ability, and professional development. Preference given to an unmarried parent or female.

2. **Alton C. Grimes Endowed Scholarship.** (\$300-\$500 per semester). Professor Alton C. Grimes established an endowed scholarship intended to support deserving students majoring in mathematics or an area that would include at least 18 credit hours of mathematics, beginning with first year calculus. Grimes was a longtime professor of math at MSU who wished to encourage students to seek mathematical professions. The scholarship is available to students completing their sophomore year and with an overall GPA of 2.5. The student needs to be a Mississippi resident and exhibit strong leadership qualities.
3. **Christopher Randolph Stark Memorial Scholarship.** (\$500-\$800 per semester). The children of the late Christopher Randolph Stark made a gift to the university in honor of their father. The purpose of this scholarship is to attract superior students to MSU and assist them with their education in mathematics. The scholarship is available to a full time junior or senior mathematics major who has a minimum 3.5 GPA and has demonstrated leadership and character. The student must be a Mississippi resident or the child of an MSU alumnus who was a resident of Mississippi.
4. **Dolores M. and John L. Tilley Endowed Scholarship.** (\$200-\$250 per semester). In December of 1999, Dolores and John Tilley established this scholarship. John Tilley was a long time professor of mathematics at MSU who also served as the department head. This scholarship is awarded on an annual basis to two mathematics majors, one junior and one senior, on the basis of academic achievement. The junior needs to have finished all the freshman and sophomore mathematics courses and have a minimum GPA of 3.2 in those courses. The senior needs to have finished all the freshman, sophomore and junior level math courses and have a minimum GPA of 3.2 in those courses. Both recipients need an overall academic achievement of 3.0 GPA.
5. **Quay Webb Camp Scholarship.** (\$500 per semester). In August of 1991, Dr. Bonnie W. Camp established this scholarship in memory of her mother, Mrs. Quay Webb Camp. Mrs. Quay Webb Camp received her master's degree from MSU at the age of 52. This scholarship will be awarded to a full-time mathematics, statistics, or biometrics major. The student must be an African-American U.S. citizen or a financially needy student with a talent in mathematics. Also required are good moral character, demonstrated leadership, and a minimum GPA of 2.5. This scholarship will expire soon.
6. **Dr. Donald R. Hunt Endowed Scholarship.** (\$200-\$300 per semester). In November of 2000, friends and former students of Dr. Hunt established the Dr. Donald R. Hunt

Endowed Scholarship at MSU. Dr. Hunt received a master's degree in Mathematics from MSU in 1967 and was the head track coach at MSU for several years. This scholarship will be awarded to a full time student majoring in mathematics having demonstrated high academic achievement and a minimum 3.0 GPA.

7. **Henry Family Scholarship in Arts and Sciences.** (\$2,500 per year). This freshman scholarship is for residents of Mississippi majoring in chemistry, mathematics, or physics, with a minimum composite ACT score of 26 and demonstrated academic achievement and financial need. The scholarship is awarded on a four-year basis. However, to continue the award, the recipient must maintain a 3.0 GPA.

Mathematics majors are also eligible for a wide variety of other scholarships such as the Anderson Consulting Scholarship, the ACT Scholarship, The William Winter Teacher Scholarship, and other Scholarships that are administered through the Department of Student Financial Aid and Scholarships. See <http://www.sfa.msstate.edu>.

## 6 Post Graduate Opportunities

### 6.1 Business, Industry, and Government

The opportunities for mathematics majors in business, industry, and government are excellent. In a number of instances, employers, having found mathematics majors generally bright and flexible, have hired them for positions which may involve considerable training on the job, but not much formal or direct use of their mathematical knowledge. These jobs often make use of the incisive reasoning abilities and broad problem-solving skills that are developed through effective mathematical training, as well as the strong communication skills required by the mathematics major. In other positions, mathematics majors may make considerable use of their backgrounds in mathematics, computer science, statistics, and science. The possibilities range from positions in management to jobs as programmers, actuaries, or mathematics and computing specialists. To make your college experience most valuable, you should schedule courses in areas where mathematics is applied, such as economics, sociology, psychology, general business, computer science, statistics, engineering, and the physical and biological sciences.

### 6.2 Actuarial Science

Students with an interest in statistics should strongly consider actuarial science. Preparation for this career can be done by receiving a mathematics major with a statistics minor. More information about actuarial science can be found at <http://beanactuary.org/>. The Career Services Center can assist you with your search for employment. The Department of Mathematics and Statistics is also developing a file of companies that have expressed interest in hiring our majors.

## 6.3 Teaching

There is a critical shortage of qualified high school mathematics teachers throughout the country. The shortage is most acute in rural areas in the South, especially in Mississippi.

There is also financial support for students planning on entering the teaching profession. One such source is the William Winter Teacher Scholarship. For more information concerning this scholarship, write to The Board of Trustees of State Institutions of Higher Learning, Student Financial Aid Office, 3825 Ridgewood Road, Jackson, MS 39211-6543.

There are currently three avenues by which a student may be certified to teach mathematics in grades 7-12. These avenues are as follows.

1. The student receives a degree in Math Education within the College of Education. This degree involves 36 hours of math and 36 hours of education including 12 hours of student teaching.
2. The student receives a B.S. in mathematics within the College of Arts and Sciences and also takes 36 hours of education, which includes 12 hours of student teaching.
3. Another method for receiving certification for teaching is the alternate route to certification.

A student may receive a non-education degree (preferably in mathematics, but it could also be in a math-related discipline) and then take 2 Praxis exams and a two or three week teaching training workshop. Information may be found at or writing Post Office Box 771 or 359 North West Street, Jackson, MS 39205, or e-mailing [cchester@mde.k12.ms.us](mailto:cchester@mde.k12.ms.us), or phoning 601-359-3483. The Mississippi Corps has a program for certifying qualified mathematics majors. For information contact: Phone 1-800-884-7606 or 662-915-5224 Fax (662) 915-7249, Mississippi Teacher Corps Room 161 C, School of Education, P.O. Box 1848, University, MS 38677-1848.

There is also certifying available through the Mississippi University for Women. Contact Suzanne Bean or call 662-241-7760.

## 6.4 Peace Corps and the Military

The Peace corps is almost always in need of mathematics majors. Likewise, the various branches of the armed forces actively seek out mathematics majors.

## 6.5 Graduate or Professional School

Our undergraduate degree program is an excellent preparation for a wide variety of graduate and professional school options. These include business, medicine and law, as well as programs in computer science, meteorology, economics, engineering, and other fields. Of course, our majors are also very well prepared to enter graduate study in either mathematics or statistics.

In particular, students interested in a medical career are urged to speak with the pre-medicine advisor. Elective hours and required science hours may be used to take the courses expected at entry into medical school. A complete list of the recommended courses for the University of Mississippi School of Medicine which are not included in your mathematics' degree requirements are: principles of zoology, plant biology, two semesters of chemistry with lab, organic chemistry with lab, and three semesters of physics. Note that the physics and chemistry together fulfill the science requirement for the B.S. The additional hours of organic chemistry and two semesters of biology remain. The premedical student will also find cell biology, comparative anatomy, and physiology useful. It is easy to see that a B.S. program in mathematics with biology minor would be an excellent preparation for medical school. Again, we emphasize the need to speak with a premedical advisor.

Those students interested in pursuing a career in the law are urged to speak with a pre-law advisor as soon as possible. Some appropriate classes to help prepare for entry into law school are: logic (PHI 1113), speed reading (LSK 2013), the legal environment of business (BL 2413), and constitutional powers (PS 3063). Again, a list of suggested courses is no substitute for an early visit with a prelaw advisor.

## 6.6 Career Center Services

The Career Center provides currently enrolled students the following services:

- Major exploration and career planning assistance
  - Job search assistance
  - Resume critiques
  - Videotaped mock interviews
  - Experiential learning opportunities, including Cooperative Education
- On-line registration with the Career Center provides the following:
  - Resume available for review by potential employers
  - Participation in on-campus interviews
  - Access to jobs posted to the Career Center Web site

For additional information visit <http://www.careercenter.msstate.edu>.

For more information about undergraduate programs in the Department of Mathematics and Statistics at Mississippi State University, contact

Undergraduate Coordinator  
Department of Mathematics and Statistics  
P.O. Drawer MA  
Mississippi State, Mississippi 39762-9715  
Phone: (662) 325-3414  
FAX: (662) 325-0005  
e-mail: office@math.msstate.edu

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# A B.A. in Mathematics Check Sheet

## B B.S. in Mathematics Check Sheet

**C B.S. in Mathematics with Secondary Teaching Certification Check Sheet**



# D B.S. in Mathematics and Computer Science Check Sheet

# E B.S. in Mathematics and Physics Check Sheet