

# MATHEMATICS (B.S.)

The courses offered by the Department of Mathematics serve several purposes; they supply the mathematical preparation necessary for students specializing in the physical, life or social sciences, in business administration, in engineering, and in education; they provide a route by which students may achieve a level of competence to do research in any of several special mathematical areas; they allow students to prepare themselves for work as mathematicians and statisticians in industry and government; and they give an opportunity to all inquisitive students to learn something about modern mathematical ideas.

## Admission Requirements

Admission requirements for this program are satisfied by the general requirements for undergraduate admission (<http://bulletins.wayne.edu/undergraduate/general-information/admission/>) to the University. Undergraduates declaring a mathematics major are strongly encouraged to meet with a departmental advisor before doing so. After a student's acceptance as a major, a student should consult a Departmental advisor at least once a semester to verify progress.

## Program Requirements

Students must complete 120 credits in coursework including satisfaction of the University General Education Requirements (<http://bulletins.wayne.edu/undergraduate/general-information/general-education/>) and the College of Liberal Arts and Sciences Group Requirements (<http://bulletins.wayne.edu/undergraduate/college-liberal-arts-sciences/bachelors-degree-requirements/>), as well as the departmental major requirements cited below. All coursework must be completed in accordance with the regulations of the University (<http://bulletins.wayne.edu/undergraduate/general-information/academic-regulations/>) and the College (<http://bulletins.wayne.edu/undergraduate/college-liberal-arts-sciences/academic-regulations/>) governing undergraduate scholarship and degrees.

It is each student's responsibility to learn the requirements, policies, and procedures governing the program the student is following and to act accordingly. Students should consult the Department of Mathematics' undergraduate academic advisor on a regular basis. Although the advisor will provide assistance, the responsibility for fulfilling degree requirements remains with the student.

## Major Requirements

**Residency:** A minimum of 15 credits of major requirements at or above MAT or STA 5030 must be taken at Wayne State University. This includes courses that are considered equivalent to the Mathematics Department's MAT or STA courses and that are approved by the Mathematics Department to meet a major requirement.

**Minimum Grade Requirements:** The following grade requirements must be satisfied in the major.

- C- or better in all required coursework.
- C or better average for all coursework.

### Notes:

1. STA courses previously designated by MAT (for example STA 2210 was previously labelled MAT 2210) are the same courses and meet the same requirements.
2. Although this policy is found in the College of Liberal Arts and Sciences (CLAS) requirements, it is worth noting that if a student is majoring in a CLAS major, they must obtain at least one minor that has 3 unique courses from the major. This means that at least

3 courses used to complete requirements in the minor must not be used to complete requirements in the major.

3. The required courses listed are the minimum that students should complete. Students are encouraged to take more courses in order to strengthen their background and enhance their prospects for employment and/or graduate school.

## Course Requirements and Concentrations

The candidate must complete the following courses in addition to choosing one of the concentrations as described below.

### B. S. Additional Requirements

Code	Title	Credits
MAT 5600	Introduction to Analysis I	4
Select one of the following two options:		5
PHY 2170 & PHY 2171	University Physics I for Scientists and Engineers and University Physics I Experimental Laboratory	
PHY 2175 & PHY 2171	University Physics for Engineers I and University Physics I Experimental Laboratory	
Select one of the following two options:		5
PHY 2180 & PHY 2181	University Physics II for Scientists and Engineers and University Physics II Experimental Laboratory	
PHY 2185 & PHY 2181	University Physics for Engineers II and University Physics II Experimental Laboratory	
Select one of the following two options:		3
BE 1600	Introduction to Programming and Computation: Python	
CSC 2000	Introduction to C++ Programming Language	
Select one of the following six options:		4-5
BIO 1510	Basic Life Mechanisms	
CHM 1100 & CHM 1130	General Chemistry I and General Chemistry I Laboratory	
NFS 2030 & NFS 2220	Nutrition and Health and Nutrition Laboratory	
ESG 1010 & ESG 1011	Geology: The Science of the Earth and Geology: The Science of the Earth Laboratory	
PSY 1010	Introductory Psychology	
OR		
PSY 1020 & PSY 1030	Elements of Psychology and Introductory Psychology Laboratory	

### Prospective Graduate Study Concentration

This concentration is for students interested in advanced mathematics, including those who intend to pursue graduate study in mathematics or statistics and those who want to be exceptionally well qualified for high-level employment in government or industry.

Code	Title	Credits
MAT 2010	Calculus I	4
MAT 2020	Calculus II	4
MAT 2030	Calculus III	4
Select one of the following two options (MAT 2350 is preferred if available, and it is 3 credits rather than 4):		3-4
MAT 2350	Elementary Differential Equations	
MAT 2150	Differential Equations and Matrix Algebra	
MAT 2250	Elementary Linear Algebra	3
MAT 5070	Elementary Analysis	4
MAT 5420 & MAT 5993	Algebra I and Writing Intensive Course in Mathematics	4

MAT 5600	Introduction to Analysis I	4
MAT 5700	Introduction to Probability Theory	4
Select one of the following two options:		3-4
MAT 5430	Algebra II	
MAT 5610	Introduction to Analysis II	
Select one of the following six options:		3-4
MAT 5230	Complex Variables and Applications	
MAT 5430	Algebra II	
MAT 5520	Introduction to Topology	
MAT 5530	Elementary Differential Geometry and its Applications	
MAT 5610	Introduction to Analysis II	
STA 5800	Introduction to Mathematical Statistics	
Select one of the following four options:		3-4
An MAT or STA course numbered 5030 or above, OR one of the courses below. <sup>1</sup>		
CSC 6500	Theory of Languages and Automata	
CSC 6620	Matrix Computation I	
CSC 6991	Topics in Computer Science (The topic must be approved by the Mathematics Department Undergraduate Committee.)	
ECO 5270	Games of Strategy	
<b>Total Credits</b>		<b>43-47</b>

<sup>1</sup> Excluding MAT 5120, MAT 5180, MAT 5190, MAT 5992, MAT 6130, MAT 6150, and MAT 6210. Only one (at most) of the courses may be selected from MAT 5890 or MAT 5990. These electives are subject to advisor approval on the Student's Plan of Work.

## General Topics Concentration

This concentration is for students interested in a broad range of topics.

Code	Title	Credits
MAT 2010	Calculus I	4
MAT 2020	Calculus II	4
MAT 2030	Calculus III	4
Select one of the following two options (MAT 2350 is preferred if available, and it is 3 credits rather than 4):		3-4
MAT 2350	Elementary Differential Equations	
MAT 2150	Differential Equations and Matrix Algebra	
MAT 2250	Elementary Linear Algebra	3
MAT 5070	Elementary Analysis	4
MAT 5700	Introduction to Probability Theory	4
MAT 5420 & MAT 5993	Algebra I and Writing Intensive Course in Mathematics	4
Two MAT or STA courses numbered 5030 or above. <sup>1</sup>		6-8
And select one of the following five options: <sup>1</sup>		3-4
An MAT or STA course numbered 5030 or above, OR one of the following courses		
CSC 6500	Theory of Languages and Automata	
CSC 6580	Design and Analysis of Algorithms	
CSC 6620	Matrix Computation I	
CSC 6991	Topics in Computer Science (The topic must be approved by the Mathematics Department Undergraduate Committee.)	
ECO 5270	Games of Strategy	
<b>Total Credits</b>		<b>39-43</b>

<sup>1</sup> Excluding MAT 5120, MAT 5180, MAT 5190, MAT 5992, MAT 6130, MAT 6150, MAT 6150, and MAT 6210. Only one (at most) of the courses may be selected from MAT 5890 or MAT 5990. These electives are subject to advisor approval on the Student's Plan of Work.

## Computer Science Concentration

Mathematics and computer science are so closely related that a great many students who major in mathematics pursue careers or graduate study in computer science. A mathematics degree, being more than just welcome in the field, is highly regarded. For students who would like to complete a double degree in mathematics and computer science or a major in mathematics with a minor in computer science, the Department offers a specially designed program. Under this concentration, students can take certain courses that satisfy both mathematics and computer science requirements simultaneously. Students must discuss the details of this with their Mathematics and Computer Science advisors.

*This concentration is available only to students who complete a second degree or a minor in computer science prior to graduation.* Students should consult the Computer Science Department concerning the requirements for the second degree or minor.

Code	Title	Credits
MAT 2010	Calculus I	4
MAT 2020	Calculus II	4
MAT 2030	Calculus III	4
MAT 2250	Elementary Linear Algebra	3
Select one of the following (If pursuing a second degree in Computer Science, choose only from MAT 5700 or BE 2100):		3-4
MAT 5700	Introduction to Probability Theory	
STA 2210	Probability and Statistics	
BE 2100	Basic Engineering III: Probability and Statistics in Engineering	
ECO 5100	Introductory Statistics and Econometrics	
PH 3200	Introduction to Biostatistics	
TIS 3400	Quantitative Methods II: Statistical Methods	
MAT 2860	Discrete Mathematics	3
MAT 5070	Elementary Analysis	4
MAT 5100	Numerical Methods I <sup>2</sup>	3
MAT 5420 & MAT 5993	Algebra I and Writing Intensive Course in Mathematics	4
One MAT or STA course numbered 5030 or above. <sup>1</sup>		3-4
Select one of the following five options: <sup>1</sup>		3-4
An MAT or STA course numbered 5030 or above		
CSC 5870	Computer Graphics I	
CSC 6500	Theory of Languages and Automata	
CSC 6620	Matrix Computation I	
CSC 6991	Topics in Computer Science (The topic must be approved by the Mathematics Department Undergraduate Committee.)	
ECO 5270	Games of Strategy	
<b>Total Credits</b>		<b>38-41</b>

<sup>1</sup> Excluding MAT 5120, MAT 5180, MAT 5190, MAT 5992, MAT 6130, MAT 6150, MAT 6150, and MAT 6210. Only one (at most) of the courses may be selected from MAT 5890 or MAT 5990. These electives are subject to advisor approval on the Student's Plan of Work.

<sup>2</sup> This course can also count as an elective for the minor or major in computer science.

## Mathematics Departmental Honors Program

In order to graduate with honors in mathematics, students must satisfy the following criteria:

1. Completion of the requirements for a Bachelor of Science degree in Mathematics.
2. Have an overall grade point average of 3.3 or above at graduation.
3. At least 12 Mathematics honors credits at the level of MAT 2020 or above, including at least 4 credits of an approved 5000 level course. See the undergraduate mathematics advisor for approved courses. MAT 4990 is not included in these 12 credits (see below). The student must complete the course with at least a B and the honors option work with at least a B in order to obtain honors credit.
4. Completion of an HON 42XX - Honors College Seminar. See the Honors College website for information.
5. Satisfactory completion of MAT 4990 - Directed Study: Honors Program (3-6 credits). MAT 4990 involves the completion of an honors thesis in mathematics. The thesis must extend, supplement or compliment the 5000 level coursework the student has taken. It must be written under the guidance of a full-time faculty member.
6. Obtain a 3.3 average for all Mathematics classes upon completion.