

# B.S. IN MATHEMATICS - APPLIED AND COMPUTATIONAL MATHEMATICS CONCENTRATION

College of the Sciences and Mathematics

## Curriculum

Code	Title	Credits
<b>GENERAL EDUCATION REQUIREMENTS</b> ( <a href="http://catalog.wcupa.edu/undergraduate/general-education-requirements/">http://catalog.wcupa.edu/undergraduate/general-education-requirements/</a> )		

### Academic Foundations

First Year Experience requirement		4
English Composition requirement		6-7
Mathematics requirement		3-4
Interdisciplinary requirement		3
Diverse Communities requirement		3
Ethics requirement		3

### Distributed Disciplinary Foundations

Science requirement		6-8
Behavioral & Social Science requirement		6
Humanities requirement		6
Arts requirement		3

**ADDITIONAL BACCALAUREATE REQUIREMENTS** (<http://catalog.wcupa.edu/undergraduate/general-education-requirements/>)

### University Requirements

Writing Emphasis requirement		9
Speaking Emphasis requirement		9

### Degree Requirements

Capstone requirement		1-15
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## MAJOR REQUIREMENTS

### Major Courses

MAT 125	Introduction to Statistics and Probability	3
MAT 161	Calculus I	4
MAT 162	Calculus II	4
MAT 200	The Nature of Mathematics	3
MAT 261	Calculus III	4
MAT 311	Linear Algebra <sup>1</sup>	3
STA 319	Applied Statistics	3
MAT 325	Numerical Analysis I	3
MAT 343	Differential Equations	3
MAT 413	Computer Algebra	3
MAT 425	Numerical Analysis II	3
MAT 443	Applied Analysis I	3
MAT 445	Complex Variables	3
or MAT 441	Real Analysis I	

### Related/Cognate Requirements

Select one of the following:		
ENG 368	Business and Organizational Writing	
ENG 371	Technical Writing	
ENG 375	Strategies for Writing in the Workplace	
CSC 141	Computer Science I <sup>1</sup>	3
PHY 170	Physics I <sup>1</sup>	3-4

or BIO 110	General Biology I	
or CHE 103	General Chemistry I	
or ESS 101	Introduction to Geology	

Select 12-13 credits of science cognates (PHY, BIO, CHE, CSC, or ESS) under the guidance of an advisor. At least two cognates must be at the 200-level or above.

### Free Electives or Internship

Select 13-15 credits of electives chosen under advisement.		13-15
MAT 491	Internship in Applied Mathematics <sup>2</sup>	2-4

### Capstone Requirement

MAT 455	Industrial Mathematics Practicum <sup>3</sup>	3
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**Total Minimum Credits Required** **120**

<sup>1</sup> Indicates course satisfies a general education requirement.

<sup>2</sup> MAT 491 is an elective and not a requirement. It may be taken for variable credit and repeated for credit.

<sup>3</sup> This course fulfills the Capstone requirement.

## Accelerated B.S. Mathematics - Applied and Computational Mathematics to M.S. Applied and Computational Mathematics Program

To be considered for the accelerated program, students must have attained (completed) 75 credits with a minimum of 24 mathematics credits. Students must have a minimum cumulative GPA of 3.00 including a minimum GPA of 3.00 for mathematics courses. Once admitted to the graduate program, graduate policies apply, including minimum GPA (3.00). *See the Graduate Catalog for further details.*

Students in the accelerated program can take up to 15 credits of graduate coursework to satisfy the B.S. program requirements. The course list below provides the approved graduate substitutions for undergraduate courses. The remaining graduate courses can be taken in place of free electives in the B.S. program.

Code	Title	Credits
<b>Major Requirements</b> <sup>1</sup>		
MAT 545	Real Analysis I <sup>2</sup>	3
or MAT 575	Complex Analysis I	
<b>Free Electives or Internship</b>		
The remaining 9 credits of graduate courses may be taken in place of Free Electives.		9

<sup>1</sup> MAT 500 (Fundamentals of Applied Mathematics) and one of the Industrial Mathematics Practicum courses (MAT 555 or MAT 556) are waived for students in the accelerated program.

<sup>2</sup> Choose one (but not both) of these substitutions since the B.S. program requires only one analysis class (real or complex).

All math major courses must be passed with a C or better.

## Sample Course Plan

To track their individual degree progress, students are advised to access their Degree Progress Report (DPR) via myWCU regularly. For more information, visit [wcupa.edu/DegreeProgressReport](http://wcupa.edu/DegreeProgressReport) (<http://wcupa.edu/degreeprogressreport/>).

The following is a sample suggested course sequence for this program; course offerings and availability are not guaranteed. Students should consult their academic advisor with any questions.

**B.S. in Mathematics - Applied and Computational Mathematics Concentration**

Course	Title	Credits
<b>Year One</b>		
<b>Fall</b>		
MAT 125	Introduction to Statistics and Probability	3
MAT 161	Calculus I	4
CSC 141	Computer Science I	3
WRT 120 or WRT 123	Effective Writing I or Effective Writing with Supplemental Writing Workshop	3
FYE 100X	First Year Experience	4
<b>Credits</b>		<b>17</b>
<b>Spring</b>		
MAT 162	Calculus II	4
MAT 200	The Nature of Mathematics	3
PHY 170 or BIO 110 or CHE 103 or ESS 101	Physics I or General Biology I or General Chemistry I or Introduction to Geology	4
Behavioral/Social Science Gen Ed		3
Humanities Gen Ed		3
<b>Credits</b>		<b>17</b>
<b>Year Two</b>		
<b>Fall</b>		
MAT 261	Calculus III	4
MAT 311	Linear Algebra	3
WRT 2XX	200-Level WRT Course	3
Cognate 1 <sup>1</sup>		3
Humanities Gen Ed		3
<b>Credits</b>		<b>16</b>
<b>Spring</b>		
MAT 343	Differential Equations	3
MAT 325	Numerical Analysis I	3
Cognate 2 <sup>1</sup>		3
JW Course		3
Behavioral/Social Science Gen Ed		3
<b>Credits</b>		<b>15</b>
<b>Year Three</b>		
<b>Fall</b>		
MAT 413	Computer Algebra	3
MAT 425	Numerical Analysis II	3
Cognate 3 <sup>1</sup>		3
Arts Gen Ed		3
Free Elective <sup>3</sup>		3
<b>Credits</b>		<b>15</b>
<b>Spring</b>		
MAT 443	Applied Analysis I	3
STA 319	Applied Statistics	3
ENG 368 or ENG 371 or ENG 375	Business and Organizational Writing (W) or Technical Writing or Strategies for Writing in the Workplace	3
Free Elective <sup>3</sup>		3

Free Elective <sup>3</sup>		3
<b>Credits</b>		<b>15</b>
<b>Year Four</b>		
<b>Fall</b>		
MAT 441 or MAT 445	Real Analysis I or Complex Variables	3
Cognate 4 <sup>1</sup>		3
IW Course		3
Free Elective <sup>3</sup>		3
Free Elective <sup>3</sup>		3
<b>Credits</b>		<b>15</b>
<b>Spring</b>		
MAT 455	Industrial Mathematics Practicum	3
MAT 491	Internship in Applied Mathematics <sup>2</sup>	2-4
Free Elective <sup>3</sup>		3
Free Elective <sup>3</sup>		3
<b>Credits</b>		<b>11-13</b>
<b>Total Credits</b>		<b>121-123</b>

<sup>1</sup> Select four Science Cognates (PHY, BIO, CHE, CSC, ESS) under guidance of advisor. At least two cognates must be at the 200-level or above. Discuss with your advisor any prerequisites, for example, CSC 220 requires MAT 151.

<sup>2</sup> May be taken for variable credit and repeated for credit.

<sup>3</sup> Must be approved by advisor. A minor may be obtained by electing appropriate additional classes in a single scientific discipline. Discuss this option with your advisor.

**Accelerated B.S. in Mathematics - Applied and Computational Mathematics to M.S. in Applied and Computational Mathematics**

Course	Title	Credits
<b>Year One</b>		
<b>Fall</b>		
MAT 161	Calculus I	4
MAT 125	Introduction to Statistics and Probability	3
CSC 141	Computer Science I	3
Humanities Gen Ed		3
Behavioral/Social Science Gen Ed		3
<b>Credits</b>		<b>16</b>
<b>Spring</b>		
MAT 162	Calculus II	4
MAT 200	The Nature of Mathematics	3
WRT 120	Effective Writing I	3
SPK 230	Business and Professional Speech Communication	3
Science Gen Ed		3
<b>Credits</b>		<b>16</b>
<b>Year Two</b>		
<b>Fall</b>		
MAT 261	Calculus III	4
MAT 311	Linear Algebra	3
WRT 200	Critical Writing and Research	3
Cognate 1		3
JW Course		3
<b>Credits</b>		<b>16</b>

<b>Spring</b>		
MAT 343	Differential Equations	3
MAT 325	Numerical Analysis I	3
Cognate 2		3
Behavioral/Social Science Gen Ed		3
Free Elective		3
<b>Credits</b>		<b>15</b>
<b>Year Three</b>		
<b>Fall</b>		
MAT 413	Computer Algebra	3
MAT 425	Numerical Analysis II	3
Cognate 3		3
Humanities Gen Ed		3
Science Gen Ed		3
<b>Credits</b>		<b>15</b>
<b>Spring</b>		
STA 319	Applied Statistics	3
MAT 443	Applied Analysis I	3
ENG 368	Business and Organizational Writing	3
IW Course		3
Gen Ed Elective		3
<b>Credits</b>		<b>15</b>
<b>Year Four</b>		
<b>Fall</b>		
MAT 548	Industrial Mathematics - Continuous Models	3
MAT 554	Scientific Computing	3
STA 505	Mathematical Statistics I	3
Cognate 4		3
Gen Ed Elective		3
<b>Credits</b>		<b>15</b>
<b>Spring</b>		
MAT 491	Internship in Applied Mathematics	3
MAT 575	Complex Analysis I (elective)	3
MAT 549	Industrial Mathematics - Discrete Models	3
MAT 455	Industrial Mathematics Practicum	3
Arts Gen Ed		3
<b>Credits</b>		<b>15</b>
<b>Year Five</b>		
<b>Fall</b>		
MAT 552	Operations Research	3
STA 511	Intro Stat Computing & Data Management	3
500-level MAT or STA Elective		3
<b>Credits</b>		<b>9</b>
<b>Spring</b>		
MAT 553	Stochastic Modeling	3
MAT 555	Industrial Practicum - Continuous Models	3
<b>Credits</b>		<b>6</b>
<b>Total Credits</b>		<b>138</b>