

# MATHEMATICS (APPLIED MATHEMATICS) - BACHELOR OF SCIENCE

The Applied Mathematics concentration is intended to prepare students planning a mathematically oriented career upon graduation. The coursework in this concentration provides a foundation in mathematics important in many scientific and engineering applications.

Students must complete all University degree requirements, which include: General Education requirements, Viewing a Wider World requirements, and elective credits to total at least 120 credits with 48 credits in courses numbered 300 or above. Developmental coursework will not count towards the degree requirements and/or elective credits, but may be needed in order to take the necessary English and Mathematics coursework.

Prefix	Title	Credits
<b>General Education</b>		
<i>Area I: Communications</i>		
<i>English Composition - Level 1</i>		
ENGL 1110G	Composition I	4
<i>English Composition - Level 2</i>		
Choose one from the following:		3
ENGL 2130G	Advanced Composition	
ENGL 2210G	Professional & Technical Communication	
ENGL 2215G	Advanced Technical and Professional Communication	
<i>Oral Communication</i>		
Choose one from the following:		3
ACOM 1130G	Effective Leadership and Communication in Agriculture	
COMM 1115G	Introduction to Communication	
COMM 1130G	Public Speaking	
HNRS 2175G	Introduction to Communication Honors	
<i>Area II: Mathematics</i>		
MATH 1511G	Calculus and Analytic Geometry I (Departmental/College Requirement) <sup>1</sup>	4
<i>Area III/IV: Laboratory Sciences and Social/Behavioral Sciences</i> 10-11		
<i>Area III: Laboratory Sciences Course (4 credits)<sup>2</sup></i>		
<i>Area IV: Social/Behavioral Sciences Course (3 credits)<sup>2</sup></i>		
Either an Area III/IV: Laboratory Sciences or Social/Behavioral Sciences Course (4 credits or 3 credits) <sup>2</sup>		
<i>Area V: Humanities<sup>2</sup></i> 3		
<i>Area VI: Creative and Fine Arts<sup>2</sup></i> 3		
<i>General Education Elective</i>		
MATH 1521G	Calculus and Analytic Geometry II (Departmental/College Requirement)	4
<b>Viewing a Wider World<sup>3</sup></b> 6		
<b>Departmental/College Requirements</b>		
MATH 1531	Introduction to Higher Mathematics	3
MATH 2415	Introduction to Linear Algebra	3
MATH 2530G	Calculus III	3
MATH 377	Introduction to Numerical Methods	3
MATH 392	Introduction to Ordinary Differential Equations	3
MATH 471	Complex Variables	3

MATH 472	Fourier Series and Boundary Value Problems	3
STAT 371	Statistics for Engineers and Scientists I	3
STAT 470	Probability: Theory and Applications	3
<i>Departmental Electives</i>		
Select at least 6 credits of approved additional upper-division courses prefixed MATH or STAT (one must be 400-level), excluding the following:		6
MATH 300	Readings	
MATH 313	Fundamentals of Algebra and Geometry I	
MATH 400	Undergraduate Research	
MATH 459	Survey of Geometry	
MATH 498	Directed Reading	
STAT 400	Undergraduate Research	
<b>Non-Departmental Requirements (in addition to Gen.Ed/VWW)</b>		
C S 172	Computer Science I (C- or better)	4
Select a minimum of 9 credit hours of electives to form a coherent cluster in an applied area from the following: <sup>4</sup>		9
Examples of acceptable clusters:		
<i>Signals</i>		
E E 320	Signals and Systems I	
E E 395	Introduction to Digital Signal Processing	
E E 496	Introduction to Communication Systems	
<i>Structures</i>		
PHYS 1310G	Calculus-Based Physics I <sup>5</sup>	
C E 233	Mechanics-Statics	
C E 315	Structural Analysis	
<i>Operations Research</i>		
I E 311	Engineering Data Analysis	
I E 365	Quality Control	
I E 413	Engineering Operations Research I	
I E 423	Engineering Operations Research II	
I E 460	Evaluation of Engineering Data	
<i>Algorithm Theory</i>		
C S 272	Introduction to Data Structures	
C S 370	Compilers and Automata Theory	
C S 372	Data Structures and Algorithms	
<i>Bioinformatics</i>		
BIOL 2110G	Principles of Biology: Cellular and Molecular Biology <sup>5</sup>	
BIOL 2110L	Principles of Biology: Cellular and Molecular Biology Laboratory <sup>5</sup>	
C S 486	Bioinformatics	
Choose one from the following:		
C S 272	Introduction to Data Structures	
C S 370	Compilers and Automata Theory	
C S 371	Software Development	
C S 372	Data Structures and Algorithms	
<i>Computer Systems</i>		
C S 271	Object Oriented Programming	
or C S 272	Introduction to Data Structures	
C S 371	Software Development	
C S 370	Compilers and Automata Theory	
C S 474	Operating Systems I	
C S 475	Artificial Intelligence I	
C S 476	Computer Graphics I	
C S 482	Database Management Systems I	
C S 484	Computer Networks I	

C S 485	Human-Centered Computing
<b>Second Language Requirement: (not required)</b>	
<b>Electives, to bring the total credits to 120<sup>6</sup></b>	<b>34</b>
9-15 credits must be Upper-Division	
<b>Total Credits</b>	<b>120-121</b>

<sup>1</sup> MATH 1511G Calculus and Analytic Geometry I is required for the degree but students may need to take any prerequisites needed to enter MATH 1511G first.

<sup>2</sup> See the General Education (<http://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/>) section of the catalog for a full list of courses.

<sup>3</sup> See the Viewing a Wider World (<http://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/#viewingawiderworldtext>) section of the catalog for a full list of courses.

<sup>4</sup> A grade of C- or better must be earned. Students may propose clusters subject to departmental approval. A cluster must contain C S 172 Computer Science I. A major or minor in any of the following fields (along with C S 172 Computer Science I) will also fulfill the Cluster Electives requirement: Computer Science, Physics, Biology, Chemistry and Biochemistry, Chemical Engineering, Engineering Physics, Electrical and Computer Engineering, Industrial Engineering, Mechanical Engineering, Civil Engineering, Economics and Finance.

<sup>5</sup> If these courses are selected, they could count towards the General Education Area III requirement.

<sup>6</sup> Elective credit may vary based on prerequisites, dual credit, AP credit, double majors, and/or minor coursework. The amount indicated in the requirements list is the amount needed to bring the total to 120 credits and may appear in variable form based on the degree. However students may end up needing to complete more or less on a case-by-case basis and students should discuss elective requirements with their advisor.

## Second Language Requirement

For the Bachelor of Science with a major in Mathematics with a Concentration in Applied Mathematics, there is no second language requirement for the degree.

## A Suggested Plan of Study for Students

This roadmap assumes student placement in MATH 1511G Calculus and Analytic Geometry I and ENGL 1110G Composition I. The contents and order of this roadmap may vary depending on initial student placement in mathematics and english. It is only a suggested plan of study for students and is not intended as a contract. Course availability may vary from fall to spring semester and may be subject to modification or change.

Some students may be able to bypass one or more courses in the calculus sequence MATH 1511G - MATH 1521G - MATH 2530G. The calculus sequence, Introduction to Higher Mathematics, and Linear Algebra provide knowledge that is basic to further work, and students are advised to complete them or their equivalent as early as possible.

First Year	Credits	
ENGL 1110G	Composition I (C- or better)	4
MATH 1511G	Calculus and Analytic Geometry I (C- or better) <sup>1</sup>	4
Area III: Laboratory Science Course <sup>2</sup>		4
C S 172	Computer Science I (C- or better)	4
Choose one from the following:		3

ENGL 2130G	Advanced Composition	
ENGL 2210G	Professional & Technical Communication	
ENGL 2215G	Advanced Technical and Professional Communication	
MATH 1521G	Calculus and Analytic Geometry II (C- or better)	4
Either an Area III/IV: Laboratory Science Course or Social/Behavioral Science Course <sup>2</sup>		3-4
Area V: Humanities Course <sup>2</sup>		3
Elective Course <sup>3</sup>		1
<b>Credits</b>		<b>30-31</b>

### Second Year

Choose one from the following:		3
ACOM 1130G	Effective Leadership and Communication in Agriculture	
COMM 1115G	Introduction to Communication	
COMM 1130G	Public Speaking	
HNRS 2175G	Introduction to Communication Honors	
Area VI: Creative and Fine Arts Course <sup>2</sup>		3
MATH 2415	Introduction to Linear Algebra (C- or better)	3
MATH 2530G	Calculus III (C- or better)	3
Elective Course(s) <sup>3</sup>		6
Area IV: Social/Behavioral Science Course <sup>2</sup>		3
MATH 1531	Introduction to Higher Mathematics	3
MATH 392	Introduction to Ordinary Differential Equations	3
Cluster Course (C- or better)		3
<b>Credits</b>		<b>30</b>

### Third Year

VWW - Viewing a Wider World Course <sup>4</sup>		3
STAT 371	Statistics for Engineers and Scientists I (C- or better)	3
MATH 471	Complex Variables (C- or better)	3
Cluster Course (C- or better)		6
Elective Course(s) <sup>3,5</sup>		9
MATH 377	Introduction to Numerical Methods (C- or better)	3
MATH 472	Fourier Series and Boundary Value Problems (C- or better)	3
<b>Credits</b>		<b>30</b>

### Fourth Year

VWW - Viewing a Wider World <sup>4</sup>		3
MATH/STAT Elective Course: 300-level or higher (C- or better) <sup>6,7</sup>		3
STAT 470	Probability: Theory and Applications (C- or better)	3
Elective Course - Upper Division <sup>3</sup>		12
MATH/STAT Elective Course: 400-level (C- or better) <sup>7</sup>		3
Elective Course(s) <sup>3</sup>		6
<b>Credits</b>		<b>30</b>

**Total Credits** **120-121**

<sup>1</sup> Math Placement: MATH 1511G Calculus and Analytic Geometry I is the starting Math course for the degree, however, students may need to complete any prerequisites prior to enrolling into this course.

<sup>2</sup> See the General Education (<http://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/>) section of the catalog for a full list of courses.

<sup>3</sup> Elective credit may vary based on prerequisites, dual credit, AP credit, double majors, and/or minor coursework. The amount indicated in the requirements list is the amount needed to bring the total to 120

credits and may appear in variable form based on the degree. However students may end up needing to complete more or less on a case-by-case basis and students should discuss elective requirements with their advisor.

- <sup>4</sup> See the Viewing a Wider World (<http://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/#viewingawiderworldtext>) section for a full list of courses.
- <sup>5</sup> Students who plan to get a Masters in MATH should take MATH 332 Introduction to Analysis as an elective.
- <sup>6</sup> MATH/STAT 300-level courses that cannot be taken to fulfill this requirement: MATH 300 Readings and MATH 313 Fundamentals of Algebra and Geometry I.
- <sup>7</sup> MATH/STAT 400-level courses that cannot be taken to fulfill this requirement: MATH 400 Undergraduate Research, MATH 459 Survey of Geometry, MATH 498 Directed Reading, STAT 400 Undergraduate Research.