

Mathematical Sciences (MASC)

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Department of Mathematical Sciences Website (<http://fulbright.uark.edu/departments/math/>)

The Department of Mathematical Sciences is committed to high-level mathematics instruction, preparing students for careers in secondary education, actuarial science and industry, and for entrance into graduate studies in mathematics and statistics. The department offers two majors, one leading to a Bachelor of Arts degree and a second leading to a Bachelor Science degree.

The Bachelor of Arts degree is often sought by future secondary education majors or by students wishing a broader exposure to the humanities. The Bachelor of Science degree is sought by students who intend to go on to graduate studies or who would like a deeper and broader understanding of higher mathematics. The Department of Mathematical Sciences is committed to the values of a broad, interdisciplinary education, highlighting the utility and value of the mathematics degree in a wide variety of careers and disciplines.

Enrollment in or completion of any course at the level of MATH 24004 or higher is required to enter into the mathematics program.

Requirements for a Major in Mathematics, B.A. Degree:

Students must complete 120 degree credit hours to include the minimum University Core requirements (<http://catalog.uark.edu/undergraduatecatalog/academicregulations/universitycore/>), the Fulbright College of Arts and Sciences Graduation Requirements (<http://catalog.uark.edu/undergraduatecatalog/collegesandschools/jwilliamfulbrightcollegeofartsandsciences/>), and the following course requirements. Bolded courses from the list below may be applied to portions of the University Core requirements.

Eight hours from the following science courses:

ANTH 10143	Introduction to Biological Anthropology	8
& ANTH 10141	and Introduction to Biological Anthropology Laboratory	
ASTR 20003	Survey of the Universe (ACTS Equivalency =	8
& ASTR 20001	PHSC 1204 Lecture)	
	and Survey of the Universe Laboratory (ACTS Equivalency = PHSC 1204 Lab)	
BIOL 10103	Principles of Biology (ACTS Equivalency =	8
& BIOL 10101	BIOL 1014 Lecture)	
	and Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)	
BIOL 10503	Principles of Zoology (ACTS Equivalency =	8
& BIOL 10501	BIOL 1054 Lecture)	
	and Principles of Zoology Laboratory (ACTS Equivalency = BIOL 1054 Lab)	
BIOL 10303	Plant Biology (ACTS Equivalency = BIOL 1034	8
& BIOL 10301	Lecture)	
	and Plant Biology Laboratory (ACTS Equivalency = BIOL 1034 Lab)	

BIOL 20003 General Microbiology (ACTS Equivalency =
& **BIOL 20001** **BIOL 2004 Lecture)**
and General Microbiology Laboratory (ACTS
Equivalency = BIOL 2004 Lab)

CHEM 14103 University Chemistry I (ACTS Equivalency =
& **CHEM 14101** **CHEM 1414 Lecture)**
and University Chemistry I Laboratory (ACTS
Equivalency = CHEM 1414 Lab)

CHEM 14203 University Chemistry II (ACTS Equivalency =
& **CHEM 14201** **CHEM 1424 Lecture)**
and University Chemistry II Laboratory (ACTS
Equivalency = CHEM 1424 Lab)

GEOL 11103 Physical Geology (ACTS Equivalency = GEOL
& **GEOL 11101** **1114 Lecture)**
and Physical Geology Laboratory (ACTS
Equivalency = GEOL 1114 Lab)

GEOL 11203 Earth Science (ACTS Equivalency = GEOL 1124
& **GEOL 11201** **Lecture)**
and Earth Science Laboratory (ACTS
Equivalency = GEOL 1124 Lab)

PHYS 20304 University Physics I (ACTS Equivalency =
PHYS 2034)

PHYS 20404 University Physics II (ACTS Equivalency =
PHYS 2044 Lecture)

An approved course with substantial programming experience, typically satisfied by CSCE 20004. Other courses may be applied towards this requirement with prior departmental approval. 3-4

Completion of a minor other than in Mathematics or Statistics, 15-30+ completion of the STEM Education minor, completion of an additional major or completion of the Four-Year Fulbright Honors Core for a Bachelor of Arts. Hours required will vary.

Major Course Requirements

MATH 26004	Calculus III (MATH 24004 and MATH 25004 are prerequisites)	4
MATH 28003	Transition to Advanced Mathematics	3
MATH 30903	Abstract Linear Algebra	3
MATH 31103	Introduction to Abstract Algebra I	3
MATH 35103	Elementary Analysis	3
MATH 49303	Mathematics Major Seminar	3

Twelve semester hours of courses in mathematics selected from MATH 25804, CSCE 41303 or MATH and STAT courses numbered at the 3000-level or higher. 12

The completion of a senior writing project under the direction of a faculty member. This is typically carried out in MATH 49303, or is satisfied by an honors thesis.

It is recommended that MATH 28003 be taken as early as possible in the program.

Mathematics B.A. Eight-Semester Degree Program

Students wishing to follow the eight-semester degree plan should see the Eight-Semester Degree Policy (<http://catalog.uark.edu/undergraduatecatalog/academicregulations/eightsemesterdegreecompletionpolicy/>) for university requirements of the program. Core requirement hours may vary by individual, based on placement and previous credit granted. Once all core requirements are

met, students may substitute a three-hour (or more) general elective in place of a core area.

First Year	Units	
	Fall	Spring
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1) ^{1,2}	4	
Fine Arts or Humanities State Minimum Core requirement (Satisfies General Education Outcome 3.1 or 3.2) ^{3,4}	3	
Social Science State Minimum Core requirement (Satisfies General Education Outcome 3.3) ⁵	3	
General Elective or coursework to be applied towards minor (as needed)	3	
ENGL 10203 Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.1)		3
MATH 25004 Calculus II ¹		4
MATH 28003 Transition to Advanced Mathematics ¹		3
General elective or coursework to be applied towards minor (as needed)		4
Year Total:	16	14

Second Year	Units	
	Fall	Spring
MATH 26004 Calculus III ¹	4	
MATH 30903 Abstract Linear Algebra ^{1,6}	3	
Social Sciences State Minimum Core requirement (Select a course which satisfies General Education Outcomes 3.3 and 4.1) ⁷	3	
U.S. History or Government State Minimum Core requirement (Satisfies General Education Outcome 4.2)	3	
General Elective or coursework to be applied towards minor (as needed)	3	
CSCE 20004 Programming Foundations I		4
MATH/STAT Elective above 3000 level ^{1,6}		3
Science State Minimum Core Lecture with Corequisite Lab requirement (Satisfies General Education Outcome 3.4)		4
Humanities or Fine Arts State Minimum Core requirement (as needed) (Satisfies General Education Outcome 3.2 or 3.1) ^{4,3}		3
Year Total:	16	14

Third Year	Units	
	Fall	Spring
MATH 31103 Introduction to Abstract Algebra I ^{1,6}	3	
Social Sciences State Minimum Core requirement (Select a course which satisfies General Education Outcomes 3.3 and 5.1) ⁸	3	

Science University/State Core Lecture with Corequisite Lab requirement (Satisfies General Education Outcome 3.4)	4	
General Electives or coursework to be applied towards minor (as needed)	6	
MATH 35103 Elementary Analysis ^{1,6}		3
MATH/STAT Elective above 3000 Level ^{1,6}		3
General Electives or coursework to be applied towards minor (as needed)		9
Year Total:	16	15

Fourth Year	Units	
	Fall	Spring
MATH/STAT Elective Above 3000 level ^{1,6}	6	
General Elective or coursework to be applied towards minor (as needed)	3	
3000-4000 Level Electives ¹	6	
MATH 49303 Mathematics Major Seminar (Satisfies General Education Outcomes 1.2 and 6.1) ^{1,6}		3
MATH/STAT Elective Above 3000 Level ^{1,6}		3
General Electives As Needed		8
Year Total:	15	14

Total Units in Sequence: 120

¹ Meets 40-hour advanced credit hour requirement. See College Academic Regulations (<http://catalog.uark.edu/undergraduatecatalog/collegesandschools/jwilliamfulbrightcollegeofartsandsciences/>).

² Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 24004.

³ The Fine Arts Elective courses which satisfy General Education Outcome 3.1 include: ARCH 10003, ARHS 10003, COMM 10003, DANC 10003, LARC 10003, MUSC 10003, MUSC 100H3, MUSC 10103, MUSC 101H3, MUSC 13303, THTR 10003, THTR 10103, or THTR 101H3.

⁴ The Humanities Elective courses which satisfy General Education Outcome 3.2 include: AAST 20203, ANTH 10303, ARCH 10103, CLST 10003, CLST 100H3, CLST 10103, COMM 12303, DANC 10003, ENGL 12103, GNST 20003, HIST 11193, HIST 111H3, HIST 11293, HIST 112H3, HIST 20003, HIST 20103, HUMN 112H4, HUMN 22103, LALS 20103, MRST 20103, MUSY 20003, MUSY 200H3, PHIL 20003, PHIL 200H3, PHIL 21003, PHIL 23003, THTR 10003, THTR 10103, THTR 101H3, ENGL 11103, ENGL 11203, or intermediate-level world language.

⁵ The Social Sciences Elective courses which satisfy General Education Outcome 3.3 include: AGECE 11003, AGECE 21003, ANTH 10203, COMM 10203, ECON 21003, ECON 22003, ECON 21403, EDST 20003, HDFS 14003, HDFS 24103, HDFS 26003, HIST 11193, HIST 111H3, HIST 11293, HIST 112H3, HIST 20003, HIST 20103, HIST 20903, HUMN 111H4, HUMN 211H4, INST 28103, INST 281H3, PLSC 20003, PLSC 20103, PLSC 21003, PLSC 28103, PLSC 281H3, PSYC 20003, RESM 28503, SOCI 10103, SOCI 101H3, or SOCI 20103.

⁶ Meets 24-hour rule (24 hours of 3000-4000 level courses in Fulbright College), in addition to meeting the 40-hour rule. See College

Academic Regulations (<http://catalog.uark.edu/undergraduatecatalog/collegesandschools/jwilliamfulbrightcollegeofartsandsciences/>).

⁷ The Social Sciences Elective courses which satisfy General Education Outcomes 3.3 and 4.1 include: ANTH 10203, COMM 10203, HDFS 14003, HDFS 24103, HIST 11193, HIST 111H3, HIST 11293, HIST 112H3, HIST 20903, HUMN 111H4, HUMN 211H4, INST 28103, INST 281H3, PLSC 20103, PLSC 28103, PLSC 281H3, RESM 28503, SOCI 10103, SOCI 101H3, or SOCI 20103.

⁸ The Social Sciences Elective courses which satisfy General Education Outcomes 3.3 and 5.1 include: HDFS 14003, HDFS 26003, HIST 20903, HUMN 111H4, HUMN 211H4, INST 28103, INST 281H3, PLSC 28103, or PLSC 281H3.

Requirements for a Bachelor of Science in Mathematics

The following credit hour requirements must be met (see Degree Completion Program Policy for additional information).

State minimum core (<http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/>) requirements may vary by individual, based on placement and previous course credit earned. Once all core requirements are met, students may substitute with general electives in consultation with their academic adviser.

State Minimum Core	35
Eight credit hours from one of the following natural science sequences:	8

Biology:

BIOL 10103 & BIOL 10101	Principles of Biology (ACTS Equivalency = BIOL 1014 Lecture) and Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)
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and choose one of the following:

BIOL 10503 & BIOL 10501	Principles of Zoology (ACTS Equivalency = BIOL 1054 Lecture) and Principles of Zoology Laboratory (ACTS Equivalency = BIOL 1054 Lab)
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BIOL 10303 & BIOL 10301 Plant Biology (ACTS Equivalency = BIOL 1034 Lecture) and Plant Biology Laboratory (ACTS Equivalency = BIOL 1034 Lab)

BIOL 20003 & BIOL 20001	General Microbiology (ACTS Equivalency = BIOL 2004 Lecture) and General Microbiology Laboratory (ACTS Equivalency = BIOL 2004 Lab)
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Chemistry:

CHEM 14103 & CHEM 14101	University Chemistry I (ACTS Equivalency = CHEM 1414 Lecture) and University Chemistry I Laboratory (ACTS Equivalency = CHEM 1414 Lab)
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and

CHEM 14203 & CHEM 14201	University Chemistry II (ACTS Equivalency = CHEM 1424 Lecture) and University Chemistry II Laboratory (ACTS Equivalency = CHEM 1424 Lab)
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Geology:

GEOL 11103 & GEOL 11101 Physical Geology (ACTS Equivalency = GEOL 1114 Lecture) and Physical Geology Laboratory (ACTS Equivalency = GEOL 1114 Lab)

and

GEOL 11203 & GEOL 11201 Earth Science (ACTS Equivalency = GEOL 1124 Lecture) and Earth Science Laboratory (ACTS Equivalency = GEOL 1124 Lab)

Physics:

PHYS 20304 University Physics I (ACTS Equivalency = PHYS 2034)

and

PHYS 20404 University Physics II (ACTS Equivalency = PHYS 2044 Lecture)

27 credit hours in core mathematics, to include the following: 27

MATH 26004 Calculus III

MATH 25804 Elementary Differential Equations

MATH 28003 Transition to Advanced Mathematics ¹

MATH 30903 Abstract Linear Algebra

MATH 31103 Introduction to Abstract Algebra I

MATH 45103 Advanced Calculus I

MATH 49303 Mathematics Major Seminar

CSCE 20004 Programming Foundations I

Concentration Requirements 18-19

General Electives 31-32

Total Hours 120

¹ It is recommended that MATH 28003 be taken as early as possible in the program.

Concentration 1 (Applied)

A program for the student who wishes to prepare for either applied work in mathematics or graduate work in mathematical sciences or some other field. Requirements:

STAT 30133 Introduction to Probability 3

MATH 44203 Introduction to Partial Differential Equations 3
or MATH 35803 Foundations of Applied Mathematics

MATH 43503 Numerical Linear Algebra 3

MATH 43603 Numerical Analysis 3

Two MATH or STAT electives numbered 30000 or higher (students may also take CSCE 41303) 6

Total Hours 18

A 2.00 cumulative grade-point average on all work completed in the Department of Mathematical Sciences will be required for graduation with a B.A. or B.S. degree.

Mathematics, B.S., Concentration 1 (Applied) Eight-Semester Degree Program

Students enrolling in the eight-semester degree plan should review the Eight-Semester Degree Completion Policy (<http://catalog.uark.edu/undergraduatecatalog/academicregulations/eightsemesterdegreecompletionpolicy/>).

State minimum core requirements may vary by individual, based on placement and previous credit granted. Once all core requirements are met, students may substitute with general electives in consultation with their academic adviser.

First Year	Units	
	Fall	Spring
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) ¹	3	
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) ¹	4	
U.S. History or Government State Minimum Core (Satisfies General Education Outcome 4.2) ¹	3	
Social Sciences State Minimum Core (Satisfies General Education Outcome 3.3) ¹	3	
General elective or coursework, as needed	3	
ENGL 10203 Composition II (ACTS Equivalency = ENGL 1023) ¹		3
MATH 25004 Calculus II ¹		4
MATH 28003 Transition to Advanced Mathematics		3
Science State Minimum Core lecture with corequisite lab (Satisfies General Education Outcome 3.4) ¹		4
Year Total:	16	14

Second Year	Units	
	Fall	Spring
MATH 26004 Calculus III	4	
CSCE 20004 Programming Foundations I	4	
Social Sciences State Minimum Core (Satisfies General Education Outcomes 3.3 and 4.1) ¹	3	
Science State Minimum Core lecture with corequisite lab (Satisfies General Education Outcome 3.4) ¹	4	
MATH 25804 Elementary Differential Equations		4
MATH 30903 Abstract Linear Algebra		3
Social Sciences State Core (Satisfies General Education Outcomes 3.3 and 5.1) ¹		3
Fine Arts State Minimum Core (Satisfies General Education Outcome 3.1) ¹		3
General Elective or coursework, as needed ¹		3
Year Total:	15	16

Third Year	Units	
	Fall	Spring
MATH 31103 Introduction to Abstract Algebra I	3	
STAT 30133 Introduction to Probability	3	
MATH 44203 Introduction to Partial Differential Equations	3	
General Electives or coursework, as needed ¹	6	
MATH 43503 Numerical Linear Algebra		3
MATH or STAT Electives numbered 30000 or higher, or CSCE 41303		3
Humanities State Minimum Core (Satisfies General Education Outcomes 3.2 and 4.1) ¹		3

General Electives or coursework, as needed ¹		6
Year Total:	15	15

Fourth Year	Units	
	Fall	Spring
MATH 45103 Advanced Calculus I	3	
MATH 43603 Numerical Analysis	3	
MATH or STAT Electives numbered 30000 or higher, or CSCE 41303	3	
General Electives or coursework, as needed ¹	6	
MATH 49303 Mathematics Major Seminar		3
General Electives or coursework, as needed to complete 120 degree credit hours ¹		11
Year Total:	15	14
Total Units in Sequence:		120

¹ Students must complete the State Minimum Core (<https://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/>) and the requirements of their major(s) as outlined in the Catalog of Studies. These courses also fulfill many, if not all, of the General Education Requirements (<https://nam111.safelinks.protection.outlook.com/?url=http%3A%2F%2Fcatalog.uark.edu%2Fundergraduatecatalog%2Fgened%2Fgeneraleducation%2F&data=04%7C01%7Crc003%40uark.edu%7C92f936f375f845bf930708d8e3ec5fa1%7C79c742c4e61c4fa5be89a3cb566a8%7CTWfPbGZsb3d8eyJWljoIMC4wLjAwMDAiLCJQIjoIV2luMzliLCJBTil6lk1haWV%7C1000&sdata=r35av68n3oEQW9FslqBgmbstnUENpJF7EoP4AD4Bks%3D&reserved=0>). Please visit these pages in the links provided and consult with your academic adviser when making course selections to fulfill these requirements.

Requirements for a Bachelor of Science in Mathematics

The following credit hour requirements must be met (see Degree Completion Program Policy for additional information).

State minimum core (<http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/>) requirements may vary by individual, based on placement and previous course credit earned. Once all core requirements are met, students may substitute with general electives in consultation with their academic adviser.

State Minimum Core	35
Eight credit hours from one of the following natural science sequences:	8

Biology:

BIOL 10103 Principles of Biology (ACTS Equivalency = BIOL & BIOL 10101 1014 Lecture)
and Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)

and choose one of the following:

BIOL 10503 Principles of Zoology (ACTS Equivalency = BIOL & BIOL 10501 1054 Lecture)
and Principles of Zoology Laboratory (ACTS Equivalency = BIOL 1054 Lab)

BIOL 10303 & BIOL 10301	Plant Biology (ACTS Equivalency = BIOL 1034 Lecture) and Plant Biology Laboratory (ACTS Equivalency = BIOL 1034 Lab)
BIOL 20003 & BIOL 20001	General Microbiology (ACTS Equivalency = BIOL 2004 Lecture) and General Microbiology Laboratory (ACTS Equivalency = BIOL 2004 Lab)

Chemistry:

CHEM 14103 & CHEM 14101	University Chemistry I (ACTS Equivalency = CHEM 1414 Lecture) and University Chemistry I Laboratory (ACTS Equivalency = CHEM 1414 Lab)
CHEM 14203 & CHEM 14201	University Chemistry II (ACTS Equivalency = CHEM 1424 Lecture) and University Chemistry II Laboratory (ACTS Equivalency = CHEM 1424 Lab)

Geology:

GEOL 11103 & GEOL 11101	Physical Geology (ACTS Equivalency = GEOL 1114 Lecture) and Physical Geology Laboratory (ACTS Equivalency = GEOL 1114 Lab)
GEOL 11203 & GEOL 11201	Earth Science (ACTS Equivalency = GEOL 1124 Lecture) and Earth Science Laboratory (ACTS Equivalency = GEOL 1124 Lab)

Physics:

PHYS 20304	University Physics I (ACTS Equivalency = PHYS 2034)
PHYS 20404	University Physics II (ACTS Equivalency = PHYS 2044 Lecture)

27 credit hours in core mathematics, to include the following: 27

MATH 26004	Calculus III
MATH 25804	Elementary Differential Equations
MATH 28003	Transition to Advanced Mathematics ¹
MATH 30903	Abstract Linear Algebra
MATH 31103	Introduction to Abstract Algebra I
MATH 45103	Advanced Calculus I
MATH 49303	Mathematics Major Seminar
CSCE 20004	Programming Foundations I

Concentration Requirements	18-19
General Electives	31-32
Total Hours	120

¹ It is recommended that MATH 28003 be taken as early as possible in the program.

Concentration 2 (Pure)

A program for the student who is seeking a broad background in mathematics or who wishes to study mathematics at the graduate level. Requirements:

Students must select three courses for a total of nine hours from the following list: 9

MATH 32003	Number Theory	
MATH 41103	Introduction to Abstract Algebra II	
MATH 45003	Differential Geometry	
MATH 45203	Advanced Calculus II	
MATH 44403	Complex Variables	3
Two MATH or STAT electives numbered 30000 or higher (students may also take CSCE 41303).		6
Total Hours		18

A 2.00 cumulative grade-point average on all work completed in the department of mathematical sciences will be required for graduation with a B.A. or B.S. degree.

Mathematics, B.S., Concentration 2 (Pure) Eight-Semester Degree Program

Students enrolling in the eight-semester degree plan should review the Eight-Semester Degree Completion Policy (<http://catalog.uark.edu/undergraduatecatalog/academicregulations/eightsemesterdegreecompletionpolicy/>).

State minimum core requirements may vary by individual, based on placement and previous credit granted. Once all core requirements are met, students may substitute with general electives in consultation with their academic adviser.

First Year	Units	
	Fall	Spring
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) ¹	3	
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405)	4	
Science State Minimum Core lecture with corequisite lab (Satisfies General Education Outcome 3.4) ¹	4	
Social Sciences State Minimum Core (Satisfies General Education Outcome 3.3) ¹	3	
ENGL 10203 Composition II (ACTS Equivalency = ENGL 1023) ¹		3
MATH 25004 Calculus II		4
MATH 28003 Transition to Advanced Mathematics		3
Science State Minimum Core lecture with corequisite lab (Satisfies General Education Outcome 3.4) ¹		4
Year Total:	14	14

Second Year	Units	
	Fall	Spring
MATH 26004 Calculus III	4	
MATH 30903 Abstract Linear Algebra	3	
U.S. History or Government State Minimum Core (Satisfies General Education Outcome 4.2) ¹	3	
Fine Arts State Minimum Core (Satisfies General Education Outcome 3.1) ¹	3	
General elective or coursework, as needed	3	
MATH 25804 Elementary Differential Equations		4

MATH or STAT Elective numbered 30000 or higher	3	
CSCE 20004 Programming Foundations I	4	
General elective or coursework, as needed ¹	4	
Year Total:	16	15

Third Year	Units	
	Fall	Spring
MATH 31103 Introduction to Abstract Algebra I	3	
MATH 32003 Number Theory or MATH 41103 Introduction to Abstract Algebra II or MATH 45003 Differential Geometry or MATH 45203 Advanced Calculus II	3	
Humanities State Minimum Core (Satisfies General Education Outcomes 3.2 and 4.1) ¹	3	
General Electives or coursework, as needed ¹	6	
MATH 32003 Number Theory or MATH 41103 Introduction to Abstract Algebra II or MATH 45003 Differential Geometry or MATH 45203 Advanced Calculus II		3
MATH or STAT Elective numbered 30000 or higher		3
Social Sciences State Minimum Core (Select a course which satisfies General Education Outcomes 3.3 and 4.1) ¹		3
General Electives or coursework, as needed ¹		6
Year Total:	15	15

Fourth Year	Units	
	Fall	Spring
MATH 44403 Complex Variables	3	
MATH 45103 Advanced Calculus I	3	
MATH 32003 Number Theory	3	
Social Sciences State Minimum Core (Select a course which satisfies General Education Outcomes 3.3 and 5.1) ¹	3	
Humanities State Minimum Core (Satisfies General Education Outcomes 3.2 and 4.1) ¹	3	
MATH 49303 Mathematics Major Seminar		3
MATH 32003 Number Theory or MATH 41103 Introduction to Abstract Algebra II or MATH 45003 Differential Geometry or MATH 45203 Advanced Calculus II		3
General Electives or coursework, as needed to meet 120-hour requirement ¹		10
Year Total:	15	16

Total Units in Sequence: 120

¹ Students must complete the State Minimum Core (<https://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/>) and the requirements of their major(s) as outlined in the Catalog of Studies. These courses also fulfill many, if not all, of the General Education Requirements (<https://nam11.safelinks.protection.outlook.com/?url=http%3A%2F%2Fcatalog.uark.edu%2Fundergraduatecatalog%2Fgened%2Fgeneraleducation%2F&data=04%7C01%7Crc003%40uark.edu%7C92f936f375f845bf930708d8e3ec5fa1%7C79c742c4e61c4fa5be89a3cb%7C7CTWfPbGZsb3d8eyJWljoIMC4wLjAwMDAiLCJQIjoIjV2luMzIlLCJBtIl6lk1Phy5wC-CJXVCi6Mn0%3D>).

%7C1000&sdata=r35av68n3oEQW9FslqBgmbstnUENpJF7EoP4AD4Bks%3D&reserved=0). Please visit these pages in the links provided and consult with your academic advisor when making course selections to fulfill these requirements.

Requirements for a Bachelor of Science in Mathematics

The following credit hour requirements must be met (see Degree Completion Program Policy for additional information).

State minimum core (<http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/>) requirements may vary by individual, based on placement and previous course credit earned. Once all core requirements are met, students may substitute with general electives in consultation with their academic advisor.

State Minimum Core	35
Eight credit hours from one of the following natural science sequences:	8

Biology:

BIOL 10103 Principles of Biology (ACTS Equivalency = BIOL & BIOL 10101 1014 Lecture)
and Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)

and choose one of the following:

BIOL 10503 Principles of Zoology (ACTS Equivalency = BIOL & BIOL 10501 1054 Lecture)
and Principles of Zoology Laboratory (ACTS Equivalency = BIOL 1054 Lab)

BIOL 10303 Plant Biology (ACTS Equivalency = BIOL 1034 & BIOL 10301 Lecture)
and Plant Biology Laboratory (ACTS Equivalency = BIOL 1034 Lab)

BIOL 20003 General Microbiology (ACTS Equivalency = BIOL & BIOL 20001 2004 Lecture)
and General Microbiology Laboratory (ACTS Equivalency = BIOL 2004 Lab)

Chemistry:

CHEM 14103 University Chemistry I (ACTS Equivalency = & CHEM 14101CHEM 1414 Lecture)
and University Chemistry I Laboratory (ACTS Equivalency = CHEM 1414 Lab)

and

CHEM 14203 University Chemistry II (ACTS Equivalency = & CHEM 14201CHEM 1424 Lecture)
and University Chemistry II Laboratory (ACTS Equivalency = CHEM 1424 Lab)

Geology:

GEOL 11103 Physical Geology (ACTS Equivalency = GEOL & GEOL 11101 1114 Lecture)
and Physical Geology Laboratory (ACTS Equivalency = GEOL 1114 Lab)

and

GEOL 11203 Earth Science (ACTS Equivalency = GEOL 1124 & GEOL 11201 Lecture)
and Earth Science Laboratory (ACTS Equivalency = GEOL 1124 Lab)

Physics: CJXVCi6Mn0%3D

PHYS 20304	University Physics I (ACTS Equivalency = PHYS 2034)	
and		
PHYS 20404	University Physics II (ACTS Equivalency = PHYS 2044 Lecture)	
27 credit hours in core mathematics, to include the following:		27
MATH 26004	Calculus III	
MATH 25804	Elementary Differential Equations	
MATH 28003	Transition to Advanced Mathematics ¹	
MATH 30903	Abstract Linear Algebra	
MATH 31103	Introduction to Abstract Algebra I	
MATH 45103	Advanced Calculus I	
MATH 49303	Mathematics Major Seminar	
CSCE 20004	Programming Foundations I	
Concentration Requirements		18-19
General Electives		31-32
Total Hours		120

¹ It is recommended that MATH 28003 be taken as early as possible in the program.

Concentration 3 (Statistics)

A program for the student who wishes to emphasize statistics or who intends to study statistics at the graduate level. **Requirements:**

STAT 30133	Introduction to Probability	3
STAT 31133	Introduction to Mathematical Statistics	3
STAT 30043	Statistical Methods	3
STAT 30041	Statistics Methods Laboratory	1
	or STAT 41031 Introduction to R	
STAT 40333	Nonparametric Statistical Methods	3
Two MATH or STAT electives numbered 30000 or higher (students may also take CSCE 41303).		6
Total Hours		19

A 2.00 cumulative grade-point average on all work completed in the department of mathematical sciences will be required for graduation with a B.A. or B.S. degree.

Mathematics, B.S., Concentration 3 (Statistics)

Eight-Semester Degree Program

Students enrolling in the eight-semester degree plan should review the Eight-Semester Degree Completion Policy (<http://catalog.uark.edu/undergraduatecatalog/academicregulations/eightsemesterdegreecompletionpolicy/>).

State minimum core requirements may vary by individual, based on placement and previous credit granted. Once all core requirements are met, students may substitute with general electives in consultation with their academic adviser.

First Year		Units
	Fall	Spring
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) ¹	3	

MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) ¹	4	
Science State Minimum Core lecture with corequisite lab (Satisfies General Education Outcome 3.4) ¹	4	
Social Sciences State Minimum Core (Satisfies General Education Outcome 3.3) ¹	3	
ENGL 10203 Composition II (ACTS Equivalency = ENGL 1023) ¹		3
MATH 25004 Calculus II		3
MATH 28003 Transition to Advanced Mathematics		3
Science State Minimum Core lecture with corequisite lab (Satisfies General Education Outcome 3.4) ¹		4
Year Total:	14	13

Second Year		Units
	Fall	Spring
MATH 26004 Calculus III	3	
MATH 30903 Abstract Linear Algebra	3	
CSCE 20004 Programming Foundations I	4	
General elective or coursework, as needed ¹	6	
MATH 25804 Elementary Differential Equations		4
MATH 31103 Introduction to Abstract Algebra I		3
U.S. History or Government State Minimum Core (Satisfies General Education Outcome 4.2) ¹		3
Fine Arts State Minimum Core (Satisfies General Education Outcome 3.1) ¹		3
General elective or coursework, as needed		3
Year Total:	16	16

Third Year		Units
	Fall	Spring
STAT 31133 Introduction to Mathematical Statistics	3	
STAT 30043 Statistical Methods	3	
STAT 30041 Statistics Methods Laboratory or STAT 41031 Introduction to R	1	
Social Sciences State Minimum Core (Select a course which satisfies General Education Outcomes 3.3 and 4.1) ¹	3	
General Electives or coursework, as needed ¹	6	
STAT 30133 Introduction to Probability		3
MATH or STAT Elective numbered 30000 or higher.		3
Social Sciences State Minimum Core (Select a course which satisfies General Education Outcomes 3.3 and 5.1) ¹		3
General Electives or coursework, as needed ¹		6
Year Total:	16	15

Fourth Year		Units
	Fall	Spring
MATH 45103 Advanced Calculus I	3	
STAT 40333 Nonparametric Statistical Methods	3	

Humanities State Minimum Core (Satisfies General Education Outcomes 3.2 and 4.1) ¹	3	
General Electives or coursework to be applied towards minor, as needed ¹	6	
MATH 49303 Mathematics Major Seminar	3	
MATH or STAT Elective numbered 30000 or higher	3	
General Electives or coursework, as needed to meet 120 hour requirement ¹	9	
Year Total:	15	15
Total Units in Sequence:		120

¹ Students must complete the State Minimum Core (<https://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/>) and the requirements of their major(s) as outlined in the Catalog of Studies. These courses also fulfill many, if not all, of the General Education Requirements (<https://nam11.safelinks.protection.outlook.com/?url=http%3A%2F%2Fcatalog.uark.edu%2Fundergraduatecatalog%2Fgened%2Fgeneraleducation%2F&data=04%7C01%7Ccc003%40uark.edu%7C92f936f375f845bf930708d8e3ec5fa1%7C79c742c4e61c4fa5be89a3cb56ba80f%7C0%7C0%7C637509951644628245%7CUnknown%7CTWFPbGZsb3d8eyJWljoicM4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IjR1aW50VGVldm9%3D%7C1000&sdata=r35av68n3oEQW9FslqBgmbstnUENpJF7EoP4AD4Bks%3D&reserved=0>). Please visit these pages in the links provided and consult with your academic adviser when making course selections to fulfill these requirements.

Requirements for a Minor in Mathematics

A grade of C or better in the following courses:

MATH 25004	Calculus II	4
MATH 26103	Discrete Mathematics	3
	or MATH 2800: Transition to Advanced Mathematics	
	or MATH 4420: Introduction to Partial Differential Equations	
	or MATH 3580: Foundations of Applied Mathematics	
3 courses selected from the following:		9-12
MATH 26004	Calculus III	
MATH 25804	Elementary Differential Equations	
	Any MATH courses at the 3000-level or higher of at least 3 credit hours each.	
Total Hours		16-19

Requirements for a Minor in Statistics:

Coursework used toward the mathematics major may not be applied toward a statistics minor.

MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
12 hours of STAT courses, including 9 hours in courses numbered 3000 and above.		12
Total Hours		16

Requirements for Departmental Honors in Mathematics: The Departmental Honors Program in Mathematics is designed to help an undergraduate student with a solid academic background develop a deeper and more comprehensive view of the nature of mathematics or statistics. The program provides a vehicle for the recognition of the achievements of work beyond the usual course of study and earns the student the distinction "Mathematics Scholar *Cum Laude*" at graduation.

Higher degree distinctions are recommended only in truly exceptional cases and are based upon the whole of the candidate's program of honors studies.

The candidate must satisfy the requirements set forth by the Fulbright Honors Council. In addition, the candidate must receive a grade of "C" or higher in all 2000-level or higher MATH/STAT courses required for the degree.

Candidates must take between 2 and 6 hours of MATH 399HV. This course will require significant progress toward an honors thesis, which is to be presented and defended before the student's honors committee. A faculty research adviser should be identified by the beginning of the junior year. The quality of this paper and its defense, along with the execution of the rest of the student's honors program and overall academic performance, will be used in determining the distinction between Honors and High Honors.

Mathematics Teacher Licensure Requirements:

Students interested in pursuing a minor in STEM Education (<http://catalog.uark.edu/undergraduatecatalog/collegesandschools/collegesofeducationandhealthprofessions/stemeducation/#minorinstemeducation>) or a minor in STEM Education with Secondary Teacher Licensure in mathematics, biology, chemistry, physics, or computer science at the undergraduate level should consult with their assigned academic adviser or find more information at stem.uark.edu (<http://stem.uark.edu>). Another option to obtain secondary teacher licensure is to complete the one-year Master of Arts in Teaching (<http://catalog.uark.edu/graduatecatalog/programsofstudy/teachereducation/>).

Faculty

Al Faouri, Radwan, Ph.D., M.S. (University of Arkansas), M.S. (Al-Balqa Applied University), B.S. (Yarmouk University), Instructor, 2023.

Arnold, Mark E., Ph.D., B.S. (Northern Illinois University), A.S. (Rock Valley College), Associate Professor, 1993, 1999.

Barton, Ariel, Ph.D., M.S. (University of Chicago), B.S. (Harvey Mudd College), Associate Professor, 2016, 2021.

Bergdall, John, Ph.D. (Brandeis University), B.S. (University of Minnesota), Assistant Professor, 2022.

Bradshaw, Zachary, Ph.D. (University of Virginia), B.S. (Virginia Commonwealth University), Associate Professor, 2017, 2022.

Chakraborty, Avishek, Ph.D. (Duke University), M.S., B.S. (Indian Statistical Institute), Associate Professor, 2014, 2020.

Chen, Jiahui, Ph.D. (Southern Methodist University), Assistant Professor, 2023.

Clay, Matt, Ph.D., M.S. (University of Utah), B.S. (University of Oregon), Professor, 2012, 2021.

Davanzo, Monica Lynn, M.S. (University of Arkansas), B.S. (University of Central Arkansas), Instructor, 2021.

Davis, Shannon, M.S. (Arkansas State University), B.A. (University of Arkansas), Instructor, 2022.

Day, Matthew B., Ph.D., M.S. (University of Chicago), B.S. (University of Texas), Associate Professor, 2011, 2016.

Del Barco-Lopez, Celia, M.S. (Georgia Institute of Technology), B.A. (Instituto Politecnico Nacional), Instructor, 2013.

Dick, Raymond, M.S. (Texas Tech University), B.S. (Bethany College), Instructor, 2014.

Dick, Susan, M.S. (University of Arkansas), B.A. (Texas Tech University), Instructor, 2017.

Dickerson, Elizabeth B., M.S. (University of Arkansas), B.S. (Mississippi State University), Instructor, 2013.

Dingman, Shannon Wayne, Ph.D., M.S. (University of Missouri-Columbia), M.S. (Pittsburg State University), Professor, 2007, 2020.

Duffy, Michael, Ph.D. (University of Arkansas), B.S., M.A. (Adelphi University), Instructor, 2021.

Fatema, Jinat, M.S. (Sam Houston State University), B.S. (University of Dhaka), Instructor, 2014.

Girshner, Joshua M., M.A., B.A. (University of Arkansas), Instructor, 2012.

Harrington, Phil, Ph.D., M.S. (University of Notre Dame), B.S. (Whitworth College), Professor, 2009, 2019.

Harriss, Edmund O., Ph.D. (Imperial College, London), M.M. (University of Warwick), Assistant Professor, 2010, 2022.

Hood, Shanda, Ph.D. M.S. (University of Arkansas), B.S. (University of Arkansas-Fort Smith), Teaching Assistant Professor, 2008, 2013.

Johnson, Mark, Ph.D. (Michigan State University), M.S. (Purdue University), B.S. (City University of New York, Brooklyn College), Professor, 1995, 2015.

Kaman, Tulin, Ph.D. (Stony Brook University), M.S. (Istanbul Technical University), B.S. (Yildiz Technical University), Associate Professor, 2017, 2023.

Kruse, Audrey, M.S. (Arkansas State University), B.S. (Brigham Young University), Instructor, 2014.

Mantero, Paolo, Ph.D. (Purdue University), M.Sc., B.Sc. (University of Genova, Italy), Associate Professor, 2015, 2021.

Miller, Lance E., Ph.D. (University of Connecticut), M.S. (New Mexico State University), Associate Professor, 2013, 2019.

Namakshi, Nama, Ph.D., M.Ed. (Texas State University), B.S. (Angelo State University), Teaching Assistant Professor, 2016.

Nicolas, Carlos, Ph.D. (University of Kentucky), B.S. (Universidad Simon Bolivar), Teaching Assistant Professor, 2023.

Niu, Wenbo, Ph.D. (University of Illinois at Chicago), M.S., B.S. (Fudan University, China), Associate Professor, 2015, 2021.

Parkman, Virginia, Ph.D., M.S. (Florida State University), B.S. (University of Tennessee), Teaching Assistant Professor, 2023.

Payton, Zachary, M.S. (University of Arkansas), B.S. (University of Missouri), Instructor, 2021.

Petris, Giovanni, Ph.D., M.S. (Duke University), B.S. (Universita degli Studi di Milano, Italy), Professor, 1999, 2016.

Plummer, Sean, Ph.D., M.S. (Texas A&M University), B.S. (North Carolina State University), Assistant Professor, 2022.

Raich, Andrew Seth, Ph.D., M.A. (University of Wisconsin-Madison), B.A. (Williams College), Professor, 2008, 2018.

Raoux, Katherine, Ph.D. (Brandeis University), B.A. (New College of Florida), Assistant Professor, 2022.

Rickard, Brian, Ph.D., M.Ed., B.S. (University of Arkansas), Teaching Associate Professor, 2010, 2022.

Rieck, Yo'av, Ph.D. (University of Texas at Austin), B.A. (Israel Institute of Technology), Professor, 2000, 2010.

Roddy, James, M.S., B.S. (University of Arkansas), Instructor, 2021.

Ross, Mohades, Ph.D., M.S. (University of Arkansas), M.S. (IUST University), B.S. (Shahrud University), Instructor, 2023.

Ryburn, Tori, M.S. (University of Arkansas), B.S. (University of Arkansas-Monticello), Instructor, 2013.

Schroeder, Melinda, M.A. (University of Arkansas), B.S. (Northeastern State University), Instructor, 2015.

Scroggin, Sloan, M.S. (University of Arkansas), B.B.A. (University of Arkansas-Little Rock), Instructor, 2013.

Shields, Thomas, M.S. (University of Chicago), B.S. (Carnegie-Mellon University), Instructor, 2021.

Tjani, Maria, Ph.D. (Michigan State University), M.S. (Purdue University), B.S. (University of Ioannina, Greece), Professor, 2003, 2020.

Uraltsev, Gennady, Ph.D. (Universitat Bonn), Assistant Professor, 2023.

Van Horn-Morris, Jeremy, Ph.D. (University of Texas at Austin), B.S. (University of Oregon), Associate Professor, 2012, 2018.

Whitmire, Daniel, Ph.D. (University of Texas), M.S. (University of Texas at El Paso), B.S. (Midwestern State University), Instructor, 2013.

Woodland, Janet C., Ph.D., M.A. (State University of New York at Stony Brook), B.A. (King's College), Teaching Assistant Professor, 1993.

Zhang, Qingyang, Ph.D. (Northwestern University), M.S. (Loyola University-Chicago), B.S. (Beijing Normal University), Associate Professor, 2015, 2021.

Courses

MATH 00101. College Algebra Laboratory I. 1 Hour.

This course provides additional support and instruction for students enrolled in MATH 11003 who are required to take it based on the placement requirements stipulated for that course. Credit earned in this course will not be applied to the total hours required for a degree. One lab hour. (Typically offered: Fall, Spring and Summer)

MATH 00202. College Algebra Laboratory II. 2 Hours.

This course provides additional support and instruction for students enrolled in MATH 11003 who are required to take it based on the placement requirements stipulated for that course. Credit earned in this course will not be applied to the total hours required for a degree. Two lab hours. (Typically offered: Fall, Spring and Summer)

MATH 01101. Quantitative Reasoning Laboratory. 1 Hour.

This course provides additional support and instruction for students enrolled in MATH 11103 who are required to take it based on the placement requirements stipulated for that course. Credit earned in this course will not be applied to the total hours required for a degree. One lab hour. (Typically offered: Fall, Spring and Summer)

MATH 11003. College Algebra (ACTS Equivalency = MATH 1103). 3 Hours.

Topics include the solution and application of linear and quadratic equations and inequalities; functions, graphs, and theory of equations; matrix solutions of systems of equations and basic properties of matrices. Prerequisite: A score of at least 46 on ALEKS, at least 22 on the math component of the ACT exam, at least 540 on the math component of the new SAT or old SAT, at least 63 on the Accuplacer Classic College Math, at least 263 on the Accuplacer Next Generation QAS, at least 254 on the Accuplacer NG AAF, or at least 66 on the Compass Algebra. Students who score at least 30 on ALEKS, at least 19 on the math component of the ACT exam, at least 510 on the math component of the new SAT or 460 on the math component of the old SAT, at least 42 on the Accuplacer Classic College Math, at least 255 on the Accuplacer Next Generation QAS, at least 235 on the Accuplacer NG AAF, or at least 41 on the Compass Algebra must also register for MATH 00101 as a corequisite. Students who score below 30 on ALEKS, below 19 on the math component of the ACT exam, below 510 on the math component of the new SAT or 460 on the math component of the old SAT, below 42 on the Accuplacer Classic College Math, below 255 on the Accuplacer Next Generation QAS, below 235 on the Accuplacer NG AAF, or below 41 on the Compass Algebra must also register for MATH 00202 as a corequisite. (Typically offered: Fall, Spring and Summer)

MATH 11103. Quantitative Reasoning (ACTS Equivalency = MATH 1113). 3 Hours.

Reasoning about quantitative information, and the use of mathematical tools and models as citizens, consumers, entrepreneurs and employees in today's complex technological society. Topics include modeling with functions; quantity, measurement and indices; finance; counting, probability, odds and risk. Prerequisite: A score of at least 40 on ALEKS, at least 19 on the ACT exam, at least 510 on the math component of the new SAT, at least 460 on the math component of the old SAT, at least 42 on the Accuplacer Classic College Math, at least 255 on the Accuplacer Next Generation QAS, at least 235 on the Accuplacer Next Generation AAF, or at least 41 on Compass Algebra. Students who score below 40 on ALEKS, below 19 on the math component of the ACT exam, below 510 on the math component of the new SAT, below 460 on the math component of the old SAT, below 42 on the Accuplacer Classic College Math, below 255 on the Accuplacer Next Generation QAS, below 235 on the Accuplacer Next Generation AAF, or below 41 on Compass Algebra must also register for MATH 01101 as a corequisite. (Typically offered: Fall and Spring)

MATH 12003. Plane Trigonometry (ACTS Equivalency = MATH 1203). 3 Hours.

Basic topics in trigonometry including identities, formulas, and polar coordinate system. Credit will be allowed for only one of either MATH 12003 or MATH 13004. Prerequisite: MATH 11003 with a grade of C or better, or a score of at least 60 on the Math Placement Test, or a score of at least 26 on the math component of the ACT exam, or a score of at least 600 on the math component of the old SAT or 620 on the math component of the new SAT. (Typically offered: Fall, Spring and Summer)

MATH 13004. Precalculus Mathematics (ACTS Equivalency = MATH 1305). 4 Hours.

Topics in algebra and trigonometry. To be taken by students who expect to take MATH 24004. Corequisite: Drill component. Prerequisite: MATH 11003 with a grade of C or better, or a score of at least 60 on the Math Placement Test, or a score of at least 26 on the math component of the ACT exam, or a score of at least 600 on the math component of the old SAT or 620 on the math component of the new SAT. (Typically offered: Fall, Spring and Summer)

MATH 15104. Calculus with Algebra and Trigonometry I. 4 Hours.

Topics in algebra, trigonometry and precalculus are integrated with elementary differential calculus. Part of a two semester sequence with MATH 25104; these two courses together are equivalent to MATH 13004 and MATH 24004. MATH 15104 BY ITSELF NOT EQUIVALENT TO EITHER Math 1284C OR Math 2554C. This course must be taken with MATH 25104. Intended for students who place into MATH 13004, but who would profit from an earlier exposure to calculus concepts. Closed to students with credit for MATH 24004. Prerequisite: MATH 11003 with a grade of C or better, or a score of at least 60 on the Math Placement Test, or a score of at least 26 on the math component of the ACT exam, or a score of at least 600 on the math component of the old SAT or 620 on the math component of the new SAT. (Typically offered: Fall)

MATH 20503. Finite Mathematics. 3 Hours.

Selected topics in probability and statistics, review of algebraic matrices, and graphic analysis of linear programming for students in business, agriculture, and social sciences. Prerequisite: MATH 11003 or MATH 12003 or MATH 13004 or MATH 22003 with a grade of C or better, or a score of at least 60 on the Math Placement Test, or a score of at least 26 on the math component of the ACT exam, or a score of at least 600 on the math component of the old SAT or 620 on the math component of the new SAT. (Typically offered: Fall, Spring and Summer)

MATH 21003. Principles of Statistics (ACTS Equivalency = MATH 2103). 3 Hours.

A problem-oriented course with applications from many fields. Emphasis on understanding the nature of statistical orderliness implied by probability laws. Statistical analysis is treated as a means of decision making in the face of uncertainty. Prerequisite: MATH 11003 with a grade of C or better, or MATH 11103 with a grade of C or better, or a score of at least 50 on the Math Placement Test, or a score of at least 26 on the math component of the ACT exam, or a score of at least 600 on the math component of the old SAT or 620 on the math component of the new SAT. (Typically offered: Fall, Spring and Summer)

MATH 21803. Mathematical Reasoning in a Quantitative World. 3 Hours.

Mathematical and statistical reasoning are required in contexts of growing complexity and sophistication. The purpose of this course is to cause students to possess the power and habit of mind to search out quantitative information, critique it, reflect upon it, and apply it in their public, personal and professional lives. Prerequisite: MATH 11003, or MATH 11103, or a score of at least 60 on the Math Placement Test, or a score of at least 26 on the math component of the ACT exam, or a score of at least 600 on the math component of the old SAT or 620 on the math component of the new SAT. (Typically offered: Fall and Spring)

MATH 22003. Survey of Calculus (ACTS Equivalency = MATH 2203). 3 Hours.

Selected topics in elementary calculus and analytic geometry for students in business, agriculture, and social sciences. Credit will be allowed for only one of MATH 22003 and MATH 24004. Prerequisite: MATH 11003 or MATH 12003 or MATH 13004 or MATH 20503 with a grade of C or better, or a score of at least 60 on the Math Placement Test, or a score of at least 26 on the math component of the ACT exam, or a score of at least 600 on the math component of the old SAT or 620 on the math component of the new SAT. (Typically offered: Fall, Spring and Summer)

MATH 22103. Survey of Mathematical Structures I. 3 Hours.

Sets and logic, systems of numerations, number systems and operations, and elementary number theory. Prerequisite: A grade of C or better in any of MATH 11003, MATH 12003, MATH 13004, MATH 11103, MATH 22003, MATH 20503, MATH 21803 or MATH 24004, or a score of at least 80% on the University of Arkansas Mastery of Algebra Exam, or a score of at least 26 on the math component of the ACT exam, or a score of at least 600 on the math component of the old SAT or 620 on the math component of the new SAT. (Typically offered: Fall, Spring and Summer)

MATH 22203. Survey of Mathematical Structures II. 3 Hours.

Geometry and measurement, and statistics and probability. Prerequisite: A grade of C or better in MATH 22103. (Typically offered: Fall, Spring and Summer)

MATH 24004. Calculus I (ACTS Equivalency = MATH 2405). 4 Hours.

Derivative of functions of one variable, applications of the derivative, introduction of the integral, and applications. Credit will be allowed for only one of MATH 24004 and MATH 22003. Corequisite: Drill component. Prerequisite: MATH 12003 with a grade of C or better, or MATH 13004 with a grade of C or better, or a score of at least 76 on the Math Placement Test, or a score of at least 28 on the math component of the ACT exam, or a score of at least 640 on the math component of the old SAT or 660 on the math component of the new SAT, or a score of at least 2 on the Calculus AB or BC Advanced Placement Exam. (Typically offered: Fall, Spring and Summer)

MATH 24005. Calculus I with Review (ACTS Equivalency = MATH 2405). 5 Hours.

Derivative of functions of one variable, applications of the derivative, introduction of the integral, and applications. Credit will be allowed for only one of MATH 24005, MATH 24004 or MATH 22003. Prerequisite: MATH 12003 with a grade of C or better, or MATH 13004 with a grade of C or better, or a score of at least 70 on the Math Placement Test, or a score of at least 28 on the math component of the ACT exam, or a score of at least 640 on the math component of the old SAT or 660 on the math component of the new SAT, or a score of at least 2 on the Calculus AB or BC Advanced Placement Exam. (Typically offered: Fall, Spring and Summer)

MATH 240H4. Honors Calculus I. 4 Hours.

Topics in analytic geometry and calculus presented in a rigorous manner suitable for an honors student. Students may not receive credit for both MATH 22003 and MATH 24004. Corequisite: Drill component. Prerequisite: Honors standing or departmental consent; and a score of at least 30 on the math component of the ACT exam, or a score of at least 680 on the math component of the old SAT or 710 on the math component of the new SAT. (Typically offered: Fall and Spring)

MATH 25004. Calculus II. 4 Hours.

Integral calculus of one variable and infinite series. Three hours of lecture and two hours of drill (recitation) per week. Corequisite: Drill component. Prerequisite: MATH 24004 with a grade of C or better. (Typically offered: Fall, Spring and Summer)

MATH 250H4. Honors Calculus II. 4 Hours.

Integral calculus of one variable and infinite series. Prerequisite: MATH 24004 with a grade of A, or MATH 240H4 with a grade of A or B, or a score of 5 on the AP AB Calculus Exam. (Typically offered: Spring)

MATH 25104. Calculus with Algebra and Trigonometry II. 4 Hours.

Continuation of MATH 15104. Topics in algebra, trigonometry and precalculus are integrated with elementary differential and integral calculus. Completion of MATH 15104 and MATH 25104 is equivalent to completion of MATH 13004 and MATH 24004. This course is meant exclusively for students who have previously taken MATH 15104. MATH 25104 BY ITSELF NOT EQUIVALENT TO EITHER MATH 13004 OR MATH 24004. Closed to students with credit for MATH 24004. Prerequisite: MATH 15104 with a grade of C or better. (Typically offered: Spring)

MATH 25804. Elementary Differential Equations. 4 Hours.

First and second order ordinary differential equations, the Laplace transform, and matrix systems of ordinary differential equations. Three hours of lecture and two hours of drill (recitation) per week. Corequisite: Drill component. Prerequisite: MATH 25004 with a grade C or better. (Typically offered: Fall, Spring and Summer)

MATH 258H4. Honors Elementary Differential Equations. 4 Hours.

Topics in ordinary differential equations, systems of differential equations and the Laplace transform presented with an emphasis on modeling. Prerequisite: MATH 25004 with a grade of A, or MATH 250H4 with a grade of A or B, or a score of 5 on the AP BC Calculus exam. (Typically offered: Irregular)

MATH 26004. Calculus III. 4 Hours.

Differential and integral calculus of several variables, and vector calculus. Three hours of lecture and two hours of drill (recitation) per week. Corequisite: Drill component. Prerequisite: MATH 25004 with a grade of C or better. (Typically offered: Fall, Spring and Summer)

MATH 260H4. Honors Calculus III. 4 Hours.

Differential and integral calculus of several variables, and vector calculus. Prerequisite: MATH 25004 with a grade of A, or MATH 250H4 with a grade of A or B, or a score of 5 on the AP BC Calculus exam. (Typically offered: Fall and Spring)

MATH 26103. Discrete Mathematics. 3 Hours.

Introductory study of sets, relations, logic, proofs, algorithms, counting methods, graph theory, trees, and Boolean algebras. Prerequisite: MATH 24004 with a grade of C or better or the equivalent. (Typically offered: Fall, Spring and Summer)

MATH 28001. Transition to Advanced Mathematics Laboratory. 1 Hour.

Introduction to mathematical software and application to career opportunities in mathematics. Pre- or corequisite: MATH 28003. (Typically offered: Fall and Spring)

MATH 28003. Transition to Advanced Mathematics. 3 Hours.

An introduction to concepts encountered in advanced mathematics. Emphasis is placed on developing the student's problem solving skills and ability to correctly communicate abstract concepts. Topics to include set theory, logic, relations, functions and mathematical induction presented in the context of intriguing mathematical problems. Pre- or Corequisite: MATH 28001 and (MATH 24004 or MATH 24004). (Typically offered: Fall and Spring)

MATH 29003. Functions, Foundations and Models. 3 Hours.

An in-depth study of topics from secondary school mathematics, emphasizing the development of the concept function, function patterns in data sets, connections among the main topics associated with a secondary school curriculum, and the appropriate use of technology. Pre- or Corequisite: MATH 25004. (Typically offered: Fall and Spring)

MATH 30103. Introduction to Probability. 3 Hours.

A calculus-based introduction to probability. Discrete probability spaces and counting techniques, discrete and continuous probability distributions, random variables, random samples, law of large numbers, central limit theorem. Prerequisite: MATH 25004. (Typically offered: Fall, Spring and Summer)

MATH 30803. Linear Algebra. 3 Hours.

Systems of linear equations, vector spaces, linear transformations, matrices, and determinants. Only one of MATH 30803 and MATH 30903 will count for credit. Prerequisite: MATH 24004 or MATH 22003, with a grade of C or better. (Typically offered: Fall, Spring and Summer)

MATH 30903. Abstract Linear Algebra. 3 Hours.

A proof-based course on vector spaces, linear transformations, matrices, determinants, eigenspaces and eigenvalues, with applications. Recommended for mathematics majors. Only one of MATH 30803 and MATH 30903 may be counted for credit. Pre- or Corequisite: MATH 25004 with a C or better. Prerequisite: MATH 28003 with a C or better. (Typically offered: Fall and Spring)

MATH 31003. Combinatorics. 3 Hours.

Basic combinatorial techniques including the study of the principle of inclusion and exclusion and generating functions. Additional topics may include modular arithmetic, algebraic coding theory, Polya's method of enumeration, and an introduction to abstract algebraic structures. Prerequisite: MATH 26103 or MATH 28003. Pre- or Corequisite: MATH 30803 or MATH 30903. (Typically offered: Fall and Spring)

MATH 31103. Introduction to Abstract Algebra I. 3 Hours.

Introduction to algebraic structures with emphasis on rigorous justification of results. Prerequisite: MATH 28003 with a grade of C or better; and MATH 30803 or MATH 30903 with a grade of C or better. (Typically offered: Fall and Spring)

MATH 31303. History of Mathematics. 3 Hours.

Survey of the development of mathematical ideas from the ancient to the modern times. Prerequisite: MATH 24004, and MATH 26103 or MATH 28003, both with a grade of C or better. (Typically offered: Spring)

MATH 32003. Number Theory. 3 Hours.

Topics in elementary number theory. Prerequisite: MATH 24004, and MATH 26103 or MATH 28003, both with a grade of C or better. (Typically offered: Irregular)

MATH 35103. Elementary Analysis. 3 Hours.

A first rigorous course in analysis. The formal basis of the real number system, sequences and series, the Bolzano-Weierstrass Theorem, limits and continuity, the Intermediate Value Theorem, Rolle's Theorem, differentiation, the Mean Value Theorem and its consequences, Taylor's Theorem, L'Hopital's rules, convexity, Riemann integration, the Fundamental Theorem of Calculus. Only one of MATH 35103 and MATH 45103 may be counted for credit toward the major. Prerequisite: A grade of C or better in each of MATH 24004, MATH 25004, MATH 26004, MATH 30803 or MATH 30903, and MATH 28003. (Typically offered: Fall)

MATH 35803. Foundations of Applied Mathematics. 3 Hours.

Introduction to the derivation and analysis of physical models. Topics include dimensional analysis, perturbation methods, the method of characteristics, continuum mechanics, and elastic, material and fluid equations. Case studies come from biology, fluid dynamics, engineering, chemistry and other areas. Prerequisite: MATH 26004 and MATH 25804. (Typically offered: Fall)

MATH 37703. Foundations of Geometry I. 3 Hours.

Axiomatic method; Euclidean geometry; non-Euclidean geometry. Prerequisite: MATH 24004, and MATH 26103 or MATH 28003, each with a grade of C or better. (Typically offered: Fall)

MATH 399HV. Honors Mathematics Course. 1-6 Hour.

Honors thesis research and writing under the direction of a faculty member in the department. Prerequisite: Departmental consent. (Typically offered: Fall, Spring and Summer) May be repeated for up to 12 hours of degree credit.

MATH 4000V. Directed Readings. 1-7 Hour.

Directed readings. Prerequisite: Departmental consent. (Typically offered: Fall, Spring and Summer) May be repeated for up to 7 hours of degree credit.

MATH 4050V. Internship in Professional Practice. 1-3 Hour.

Professional work experience involving significant use of mathematics or statistics in business, industry or government. Prerequisite: Departmental consent. (Typically offered: Fall, Spring and Summer) May be repeated for up to 3 hours of degree credit.

MATH 41003. Advanced Linear Algebra. 3 Hours.

Linear functionals, matrix representation of linear transformations, scalar product, and spectral representation of linear transformations. Prerequisite: MATH 30803 or MATH 30903. (Typically offered: Irregular)

MATH 41103. Introduction to Abstract Algebra II. 3 Hours.

Topics in abstract algebra including finite abelian groups, linear groups, factorization in commutative rings and Galois theory. Prerequisite: MATH 31103. (Typically offered: Spring)

MATH 41503. Mathematical Modeling. 3 Hours.

Mathematical techniques for formulating, analyzing, and criticizing deterministic models taken from the biological, social, and physical sciences. Techniques include graphical methods, stability, optimization, and phase plane analysis. Prerequisite: MATH 25804. (Typically offered: Irregular)

MATH 41603. Dynamic Models in Biology. 3 Hours.

Mathematical and computational techniques for developing, executing, and analyzing dynamic models arising in the biological sciences. Both discrete and continuous time models are studied. Applications include population dynamics, cellular dynamics, and the spread of infectious diseases. Prerequisite: MATH 24004. (Typically offered: Irregular)

MATH 42503. Symbolic Logic I. 3 Hours.

Rigorous analyses of the concepts of proof, consistency, equivalence, validity, implication, and truth. Full coverage of truth-functional logic and quantification theory (predicate calculus). Discussion of the nature and limits of mechanical procedures (algorithms) for proving theorems in logic and mathematics. Informal accounts of the basic facts about infinite sets. Prerequisite: MATH 26103, MATH 28003, or PHIL 22003. (Typically offered: Fall)

MATH 43003. Ordinary Differential Equations. 3 Hours.

Existence, uniqueness, stability, qualitative behavior, and numerical solutions. Prerequisite: MATH 25804 and (MATH 45103 or MATH 35103). (Typically offered: Fall)

MATH 43403. Introduction to Scientific Computing. 3 Hours.

Provides an understanding of a diverse set of problems, as well as algorithms for solving them and implementing the algorithms using high performance computing resources and environments. The emphasis is on problem solving and offers multiple projects concerning applications in science and engineering. Prerequisite: MATH 30803 or MATH 30903. (Typically offered: Spring)

MATH 43503. Numerical Linear Algebra. 3 Hours.

Numerical methods for problems of linear algebra, including the solution of very large systems, eigenvalues, and eigenvectors. Prerequisite: MATH 30803 or MATH 30903. (Typically offered: Spring)

MATH 43603. Numerical Analysis. 3 Hours.

General iterative techniques, error analysis, root finding, interpolation, approximation, numerical integration, and numerical solution of differential equations. Prerequisite: MATH 25804. (Typically offered: Fall)

MATH 43703. Finite Element Methods and Solution of Sparse Linear Systems. 3 Hours.

Provides an in-depth understanding of numerical methods for the solution of partial differential equations using Finite Element Methods, Direct and Iterative Methods for the Sparse Linear Systems. Prerequisite: MATH 43503. (Typically offered: Spring)

MATH 44003. Numerical Linear Algebra II. 3 Hours.

Provides an in-depth understanding of numerical methods for the solution of large scale eigenvalue problems arising in science and engineering applications including theory, implementation and applications. Prerequisite: MATH 43503. (Typically offered: Fall)

MATH 44203. Introduction to Partial Differential Equations. 3 Hours.

Separation of variables, Fourier transform, and Laplace transform methods for the solution of partial differential equations. Topics include Fourier series, Fourier-Bessel series, orthogonal expansions, and the error function. Prerequisite: MATH 25804 with a grade of C or better; and MATH 26004 with a grade of C or better. (Typically offered: Fall, Spring and Summer)

MATH 44403. Complex Variables. 3 Hours.

Complex analysis, series, and conformal mapping. Additional applications for graduate credit. Prerequisite: MATH 26103 or MATH 28003, and MATH 25804. (Typically offered: Fall)

MATH 45003. Differential Geometry. 3 Hours.

Topics include: classical differential geometry of curves and surfaces in 3-space, differential forms and vector fields. Prerequisite: MATH 26004. (Typically offered: Irregular)

MATH 45103. Advanced Calculus I. 3 Hours.

The real and complex number systems, basic set theory and topology, sequences and series, continuity, differentiation, and Taylor's theorem. Emphasis is placed on careful mathematical reasoning. Only one of MATH 35103 and MATH 45103 may be counted for credit toward the major. Prerequisite: MATH 26004, MATH 28003 and MATH 30803 or MATH 30903. (Typically offered: Fall and Spring)

MATH 45203. Advanced Calculus II. 3 Hours.

The Riemann-Stieltjes integral, uniform convergence of functions, Fourier series, implicit function theorem, Jacobians, and derivatives of higher order. Prerequisite: MATH 45103. (Typically offered: Spring)

MATH 47003. Introduction to Point-Set Topology. 3 Hours.

A study of topological spaces including continuous transformations, connectedness and compactness. Prerequisite: MATH 45103. (Typically offered: Irregular)

MATH 49303. Mathematics Major Seminar. 3 Hours.

Weekly seminars on topics of historical or cross-disciplinary interest, designed to address students' mathematical knowledge, problem-solving and communication skills, in which student presentations play a part. Also serves as a forum for sharing information about career opportunities and preparation for employment. Prerequisite: Senior standing and a mathematics major, or departmental consent. (Typically offered: Spring)

MATH 4980V. Senior Thesis. 1-6 Hour.

Senior thesis. (Typically offered: Fall, Spring and Summer)

MATH 4990V. Research Topics in Mathematics. 1-3 Hour.

Current research interests in mathematics, at an advanced undergraduate or beginning graduate level. Prerequisite: Departmental consent. (Typically offered: Irregular) May be repeated for up to 12 hours of degree credit.