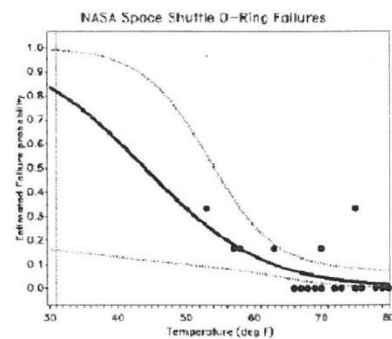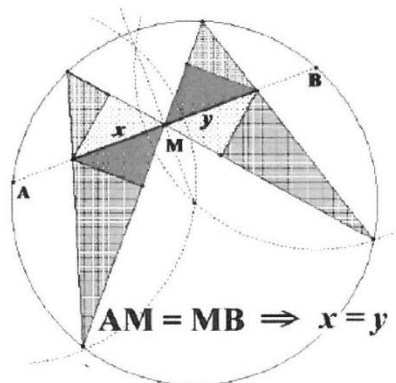# A STUDENT HANDBOOK FOR
UNC ASHEVILLE MATHEMATICS MAJORS

Department of Mathematics, CPO #2350
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Asheville, NC 28804-8511

Fall 2021 - Spring 2022 - Summer 2022

(Cover image: A two-affine-transformation fractal, A visual representation of the Butterfly Theorem,
An example of logistic regression)

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WELCOME

To Prospective Mathematics and Statistics Students:

Welcome to the Department of Math and Statistics! You are at home here. I am delighted to know you are considering a math major, math minor, or even taking a few more math classes. You have found a department full of amazing people and opportunities. We are a community that celebrates math!

A math major supports any career you are interested in – math, math education, statistics, genetics, biology, biostatistics, physics, philosophy, drama, English, engineering, analysis, digital arts, journalism. Math is everywhere, and our majors go on to all kinds of positions as well as graduate and professional programs. Our alumni have become successful business owners, actuaries, award-winning teachers, and active research professionals.

As a math major, our curriculum gives you both breadth and depth in each of our four tracks: statistics, applied math, pure math, and teacher licensure. Our department strives to keep all of our tracks current and relevant.

Math is the original Liberal Art! The liberal arts topics in ancient Greece were arithmetic (number), geometry (number and space), music (number and time), and astronomy (number, space, and time). Math is the language of science. Math allows us to recognize, codify, and predict patterns. Math teaches you how to solve problems. In a world where your career may not have been invented yet or may change five or six times before you retire, the skills of learning technical material, solve problems, and making predictions from data are invaluable.

Our majors have the opportunity to engage in undergraduate research, service learning, attend local math conferences, and enroll in internships. We also have an active Math Club and Association of Women in Mathematics.

We are located on the third floor of Robinson Hall. Please come by and look at our facilities, including the Parsons Math Lab, a great place to learn and study mathematics. Visit us on the web (math.unca.edu) or Facebook (@mathematics.asheville).

If you have any questions concerning mathematics at UNC Asheville, please feel free to contact me atskaplan@unca.edu or call the math department at (828) 251-6556.

Dr. Samuel R. Kaplan, Chair

Mathematics Department

math.unca.edu

EDUCATIONAL RESOURCES

Information Resources
Centrally located on campus is **D.H. Ramsey Library**. It has a wide selection of traditional reference resources. It maintains the portals *JSTOR* and *MathSciNet,* which allow you to access hundreds of scientific journals using UNC Asheville's campus-wide wireless Internet.

The campus's Information Services also maintains site licenses to several essential mathematical software tools, including *Mathematica*. *SAS*, and *Minitab*.

Parsons Math Lab
The Mathematics Department maintains a professionally staffed learning resource center known as the Math Lab. Designed for students, the center provides additional help for introductory mathematics courses or a place for students can collaborate on classwork. Students have an open invitation to drop in at any time to study, obtain help, and work in groups. Computers with mathematical software are also available.

In addition to staff members, the Math Lab employs mathematics majors to help tutor students. This facility is open Monday - Thursday from 8:30 a.m. to 9:00 p.m, Friday from 8:30 a.m. to 5:00 p.m., and Sunday from 4:30 p.m. to 8:00 p.m. Follow the link to the Math Lab page for more information. https://math.unca.edu/learn/math-lab/

Scholarships
The Math Department has three student scholarships awarded each year to Junior and Senior Math majors. Regardless of track, eligible students should consider applying for the **Parsons Scholarship** and the **Jane Oliver Swafford Scholarship**. Teaching track students may apply for the **Martha Games Scholarship**. Math majors may send an application in the s**pring semester** for awards given for the following academic year. The committee chair sends application due dates and information to all Math majors by email.

Regional Math Conferences
The department encourages its majors to participate in professional mathematics conferences.

Past students who presented at the regional and national MAA (Mathematics Association of America) and SMURCHOM (Smoky Mountain Undergraduate Research Conference on the History of Mathematics) received financial support from the department.

ADDITIONAL PROFESSIONAL OPPORTUNITIES

Math Clubs

We have two student Math Clubs. One affiliated with the Mathematical Association of America (MAA) and the other affiliated with the Association for Women in Mathematics (AWM). The clubs organize social events and as well as mathematics events. Examples of activities involve potlucks, hiking adventures, Pi-Day, and teaching Super Saturday classes.

Parsons Lecture

The Math department celebrates exceptional teaching at UNC Asheville—past, present, and future.

In 1998, a Mathematics alumnus from UNC Asheville provided an endowment, in honor of Joe Parsons, to fund this annual lecture series. The department invites speakers to present a mathematics lecture for the general public and raise awareness of the relevance of Mathematics.

Summer Research Programs

Every summer, several of our students participate in summer math programs across the country and abroad. Many of these are fully supported and offer a stipend. The NSF-REU programs have students spend eight weeks at another campus doing math research. These programs cover room andboard as well as a stipend. Participants are typically between their junior and senior years.

Study Abroad

Students may complete mathematical study programs at universities overseas. Two popular programs are the Budapest Semester in Mathematics and the Math in Moscow Program, and national math societies endorse both.

One of our faculty, Dr. Boudreaux, led four study abroad trips to Greece, Turkey,and Italy. Students take a university course, typically History of Mathematics, while visiting the historical sites on these trips.

Math Recital

Every spring, the Math Department hosts a recital. Everyone is welcome! If you dance, sing, recite poetry, juggle, play an instrument, tell jokes, do magic tricks, tell stories, etc., please share your talent and enjoy the talent of others.

FACULTY PROFILE

BAHLS, Patrick – Professor; University Honors Program Director, BS, 1998, University of Denver; MS, 2000 and Ph.D., 2002, Vanderbilt University.
Interests: graph theory and combinatorics, algebra, number theory, math and writing.
Additional Responsibilities: National MAA involvement, Project NExT Sectional Co-Director, Director of Prison Education Programs, and Algebra al Fresco.

BEHARRYSINGH, Rudy – Director of the Joe Parsons Assistance Center (Math Lab); BS, 1984, McGill University; MS, 2002, Western Carolina University.
Interests: Applied mathematics, environmental applications, alternative energy, economics.

BOUDREAUX, Gregory – Associate Professor; BS, 1987, Loyola University; MS, 1996, Ph.D.,2001, University of Louisiana at Lafayette.
Interests: abstract algebra, topology and mathematics informed by history.
Additional Responsibilities: Coordinator of Study Abroad in Greece/Turkey; Putnam/VTRMC Math Contests; Faculty Standing Committees; Science Olympiad scorekeeper; Faculty Senate member.

CHENG, Kedai – Assistant Professor; BA of Economics, 2013, Indiana University Bloomington, BS of Mathematics, 2013, Indiana University Bloomington, MS of Economics, 2015, IndianaUniversity Bloomington, MS of Statistics, 2017, University of Kentucky, Ph.D. of Statistics, 2020, University of Kentucky.
Interests: Tolerance Regions, Time Series Analysis, Nonparametric Statistics and Methodology, Machine Learning Algorithms, Regression Analysis, Statistical Quality Control.

KAPLAN, Samuel – Professor; BS, 1990, University of North Carolina; MA, 1992, Boston University; Ph.D., 1996, Boston University.
Interests: differential equations, chaos, math and music.
Additional Responsibilities: Chair of the Mathematics & Statistics Department, Director of the Asheville Initiative in Math, Co-Director of the Marvelous Math Club.

LEE, Jimin –Professor; BS, 1996, Kyungpook National University, Korea; MS, 2006,and Ph.D., 2008, University of North Carolina Charlotte.
Interests: applied statistics, survival analysis, application of statistical models to real problems.

McCLURE, Mark C. – Professor; BS, 1988, and Ph.D., 1994, Ohio State University.
Interests: fractal geometry and measure theory.

PEIFER, David E. – Professor; BA, 1986, Northeastern Illinois University; Ph.D., 1992, University of Illinois.
Interests: modern algebra and geometric group theory.

POWELL, Megan – Assistant Professor; BS, 2000, University of Michigan; MS, 2003, Oregon StateUniversity; Ph.D., 2011, University of Toledo.
Interests: Mathematical biology, infectious disease dynamics, sports analytics.

SANFT, Becky – Assistant Professor; BS, 2003, College of William and Mary; Ph.D., 2009, University of Arizona.
Interests: mathematical biology, applied mathematics, biomechanics.

WEBSTER, Julia – Lecturer; BS, 2001, Haverford College; MAT, 2008, Western Carolina University.
Interests: mathematics education, applied mathematics.

WHITLOCK, Cathy – Lecturer; BS, 1989, Salem College, Winston-Salem, NC; MS, 1995, North Carolina State University.
Interests: applied mathematics and mathematics education.

ADJUNCT FACULTY

CODD, Trent – AA, 1968, Miami-Dade College; BS, 1971, University of Miami; MA, 1974, (Mathematics) University of Miami; EASGC, 1982, (Educational Administration & Supervision) Florida International University; BSCS, 1985, (Computer Science) Florida International University; Graduate Study, 1988, (Technology in Education) Western Carolina University.

KOH, Eunmee – BS, 1981, Seoul National University; MS, 1985, and Ph.D., 1989 (Statistics) University of Wisconsin - Madison.

RASCHE, Michael – B.S., 2007, Rose-Hulman Inst. of Tech.; MS, 2010, and Ph.D., 2015 (Chemical Engineering) University of Illinois.

SPICUZZA, Bob – BS, 1969, Worcester Polytech Institute; MS, 1972, and Ph.D., 1976 (Physics) University of Connecticut.

WEBB, Robby – BA 1986, University of North Carolina Asheville; MAEd, 1996, Western Carolina University.

THE CURRICULUM

Declaration of Major
Declaring a major in mathematics requires a student first to complete LANG 120. Once established, the student needs to complete and submit a *Declaration of Major* form to the departmental Chair. Forms are available under the web page for Office of the Registrar, https://registrar.unca.edu/forms/.

The department designed the mathematics major to provide the student with a foundation in mathematics while giving the student a deeper understanding of a specific concentration. There are fourconcentrations to choose from: Pure (theoretical) Mathematics, Applied Mathematics, Mathematics with Teacher Licensure, and Statistics.

Course Requirements
All students, in addition to the Liberal Arts Core Requirements, must complete the following coursework. For specific courses, see individual programs. The assumption is a student's mathematical background is sufficient to start with calculus. If this is not the case, he or she must take MATH 167, Precalculus.

I. **Required courses in the major**: 39-40 hours, including **MATH 191**, **192**, and **291** (*Calculus I, II,and III*), **MATH 280** (*Math Foundations*), **MATH 365** (*Linear Algebra I*), MATH 381 (*Problems in Mathematics*),**MATH 480** (*Senior Seminar*), and 18-19 additional hours of courses in mathematics or statistics. See specific concentrations for exact courserequirements.

II. **Required courses outside the major**: 9-31 hours, including 3 hours in CSCI 182 or 183 (*Intro to Prog for Numeric Appl* or *Intro Prog for MediaAppl*). See specific concentrations for possible options.

III. **Other departmental requirements**: passing score on the comprehensive mathematics exam.

The comprehensive exam consists of a standardized two-hour exam, usually given at the end of MATH 381, *Problems in Mathematics*. If a student fails to attain a passing score, he or she may need to do additional work in mathematics tofulfill this requirement. Students take this exam during their next to last semester.

Concentration in Applied Mathematics

The department structured the Applied Mathematics Concentration around the premise that Mathematics is avaluable tool in many academic areas. The program requires students to take upper-level courses in a second discipline of their choosing and encourages students to explore the connections between mathematics and their chosen second discipline. By developing expertise in two areas, students increase their future studies and employment options after they graduate.

I. **Required courses in the major**: 39-40 hours, including: **MATH 191**, **192**, **280**, **291**, **365**, **381**, **394**, **480**, **491**; **STAT 225** or **425**; one course from **MATH 366**, **395**, **441**, **452**or **STAT 426**; and 6 additional hours in Mathematics or Statistics at the 300-400 level.

II. **Required courses outside the major**: 18 hours, including **CSCI 182** or **183**, and at least15 additional hours from a discipline in which mathematical applications are essential. The department chair must approve these courses. 9 of the 15 hours must be at the 300-400 level.

III. **Other departmental requirements**: a satisfactory performance on a comprehensive Mathematics exam and the satisfactory presentation of one seminar in **MATH 480**.Successful completion of **MATH 480** demonstrates oral competency. Successful completion of **CSCI 182** or **183** demonstrates computer competency.

Concentration in Pure Mathematics

This area consists of a traditional Mathematics major. It serves well as a solid liberal arts major. The appropriate selection of the major options will give the student adequate preparation for graduate study in mathematics.

I. **Required courses in the major**: 39-40 hours, including **MATH 191**, **192**, **280**, **291**, **365**, **381**, **394**, **461**, **480**, **491,** and an additional 9-10 hours chosen from **STAT 225** andMathematics or Statistics at the 300-400 level. These last hours must include either: one from **MATH 366**, **462**, **492**; or the sequence **STAT 425-426**.

II. **Required courses outside the major**: 9–11 hours, consisting of **CSCI 182** or **183**, and one of the following groups of courses: **CHEM 111**, **132**, **145** and **236**; or **ECON 101** and **102**; or **PHYS 221** and **222**; or at least 6 credit hours of courses at the 300-level or above, approved by the department chair, from disciplines in which mathematics plays asignificant role.

III. **Other departmental requirements**: Satisfactory performance on a comprehensive Mathematics exam and the satisfactory presentation of one seminar in **MATH 480**.Successful completion of **MATH 480** demonstrates oral competency. Successful completion of **CSCI 182** or **183** demonstrates computer competency.

Concentration in Statistics

The department designed this program for students who have an interest in probability and statistics. Graduatesmay pursue a career in actuarial science, quality control or related fields, or enter a graduate program in statistics, mathematics, or a related discipline.

I. **Required courses in the major**: 40 hours, including **MATH 191**, **192**, **280**, **291**, **365**, **381**, **480**; **STAT 185** or **225**, and **325**, **326**, **425**, **426**; and an additional 3-hour Mathematics orStatistics course numbered above 300. The department strongly advises students intending to pursue graduate study to take **MATH 491**.

II. **Required courses outside the major**: 9 hours, including **CSCI 182** or **183**, and either **ACCT 215** and **ECON 306,** or **ECON 102** and **305**, or **MGMT 220** and **380**, or 6 hours atthe 300-400 level approved by the department chair from disciplines which routinely employ statistical methodology. Students interested in actuarial science are strongly encouraged to take **ACCT 215**, **ECON 101**, **102**, **305**, and **306**.

III. **Other departmental requirements**: Satisfactory performance on a comprehensive Mathematics exam and the satisfactory presentation of one seminar in **MATH 480**. Successful completion of **MATH 480** demonstrates oral competency. Successful completion of **CSCI 182** or **183** demonstrates computer competency.

Concentration in the Teaching of Mathematics

The department designed this area to provide a good mathematics background for those students planning toteach mathematics at the secondary level. Completing this program also satisfies the requirementsfor secondary licensure in mathematics. Students seeking middle school licensure should review requirements found in the Education section of the catalog and see the appropriate licensure advisor for additional information.

I. **Required courses in the major**: 40 hours, including **MATH 191**, **192**, **280**, **291**, **332**, **365**, **381**, **461**, **480, STAT 225**, and an additional 9 hours chosen from **MATH 251** andMathematics or Statistics courses numbered at or above the 300-level.

II. **Required courses outside the major**: 32 hours, consisting of **CSCI 182** or **183**, **PSYC319**, and **EDUC 210**, **211**, **314**, **346**, **383**, **455**, **456**. Please see the Education curriculumfor more detail.

III. **Other departmental requirements**: Satisfactory performance on a comprehensive Mathematics exam and the satisfactory presentation of one seminar in **MATH 480**. Successful completion of **MATH 480** demonstrates oral competency. Successful completion of **CSCI 182** or **183** demonstrates computer competency.

Mathematics Minor

The minor requires 21 hours in mathematics or statistics, including **MATH 191**, **192**, and **291**. Choose the remaining 9 hours from 300-400 level MATH or STAT courses. C o m p l e t e ½ of thehours required for a minor at UNC Asheville. For all minors, complete a minimum of 6 semester hours of 300-400 level courses at UNC Asheville.

Preparation for Graduate School

Students who wish to continue their mathematics studies in graduate school should consider completing **MATH 461**, **462**, **491**, and **492**. They should also elect additional upper-level mathematics courses in fields of their interest to broaden their understanding. The requirements for graduation listed in the catalog reflect minimum standards. A student who wishes to have a sound education in mathematics should use the opportunities provided by this university and its Mathematics Department to broaden his or her knowledge base. The best preparation for advanced studies in mathematics is to understand the different branches of mathematics.

Undergraduate Research

The department does not require undergraduate research in the mathematics major; however, it is an excellent opportunity for students who plan to continue to graduate studies or enjoy doing research. If you are interested, talk with a mathematics professor to discuss possible topics.

Most research students work one or two semesters and typically begin in the second semester of their junior year. Below is a list of a few of the past student research projects and the faculty advisors.

Cylindrical Braids and Knots (Peifer)
Longitudinal Study of Chemical Properties and Macroinvertebrate Diversity in WesternNorth Carolina Streams from 2005 to 2009 (Patch)
Estimating the worst case of the Dedekind-MacNeille completion (Bahls)
Moebius inversion in subgraph lattices (Bahls)
Connectivity properties of random regular graphs (Bahls)
Analysis of Taxicab Geometry (Atkinson)
The Geometry of the Roots of a Polynomial (Bahls)
Dynamics of Frisbee Flight (Kaplan)
The Maney Force and Satellite Motion (Kaplan)
Aperiodic Fractal Tilling (McClure)
Evaluating the Relationship Between Chemical Properties and Macroinvertebrate Diversity in Western North Carolina Streams 2005-2009 (Patch)
Rewriting Systems for Knot Groups (Peifer)
Classifying Cylindrical Braids (Peifer)
Survival Analysis of time to Declare a Major for Undergraduate Students (Lee)
Pythagorean Magic Squares Triples (Boudreaux)
Using History of Mathematics to Introduce Topics in K-12 Math Courses (Boudreaux)
Mathematics and Music (Boudreaux)
The Trifid Transformation (Boudreaux)
A Horn Angle Approach to Calculus (Boudreaux)
Topics in Endomorphism Near-Rings (Boudreaux)
Measuring functions and Arc Length (Boudreaux)
Using Flanking Circles to Investigate Tangency (Boudreaux)
The Derivation of Johann Hudde (Boudreaux)
Race, Gender, and Profiling: An Examination of Traffic Stop Data in Asheville, North Carolina (Lee)
Predicting blood pressure using demographics and consumers' behaviors (Lee)
The structure of Pythagorean sequences (Bahls)
Clawfreeness of powers of graphs (Bahls)

Sample Academic Program by Mathematical Concentration					
Sem		Subject	Applied	Pure	Licensure	Stats
Freshman	Fall	Calculus I	MATH 191	MATH 191	MATH 191	MATH 191
		Fr. Colloquium	LA 178	LA 178	LA 178	LA 178
		Academic Writing	LANG 120	LANG 120	LANG 120	LANG 120
		Foreign Lang[1] or Elective	For. Lang.	For. Lang.	For. Lang.	For. Lang.
		Total Hours	15	15	15	15
	Spring	Calculus II	MATH 192	MATH 192	MATH 192	MATH 192
		Intro Programming[2]	CSCI 182/183	CSCI 182/183	CSCI 182/183	CSCI 182/183
		Humanities: Ancient World	HUM 124	HUM 124	HUM 124	HUM 124
		Foreign Lang[1] or Elective	For. Lang.	For. Lang.	For. Lang.	For. Lang.
		Total Hours	15	15	15	15
Sophomore	Fall	Calculus III	MATH 291	MATH 291	MATH 291	MATH 291
		Foundations of Math or Stats	MATH 280	MATH 280	MATH 280	STAT 225
		Humanities: Renaissance World	HUM 214	HUM 214	HUM 214	HUM 214
		Math application outside major[3,4]	Check with advisor	PHYS 221	EDUC 210/211	ECON 102
		(Alternative sequence)		CHEM 132/111		MGMT 130
		Total Hours	14	15	15	15
	Spring	Linear Algebra I	MATH 365	MATH 365	MATH 365	MATH 365
		Calculus-Based Statistics	STAT 225	STAT 225*	STAT 225	MATH 280
		Math applications outside major[3,4]	Check with advisor	PHYS 222	EDUC 314	ECON 305
		(Alternative sequence)		CHEM 233/145		MGMT 380
		LAC: Social Science[4]	See Catalog	See Catalog	PSYC 319	See Catalog
		Elective	Gen Elective	Gen Elective	Gen Elective	Gen Elective
		Total Hours	16	17	16	15

* Course is optional for a Pure Math student; the student may substitute a 300 level mathematics class in its place.

[1] Student can place out of the foreign language by showing proficiency through the second semester.

[2] This course meets the "scientific perspective" requirement of the LAC.

[3] Other options are available depending on the concentration. Check with your advisor for more detail.

[4] Lab Science and Social Science requirements may meet the *Math application outside major*.

Sample Academic Program by Mathematical Concentration					
Sem	Course Name	Applied	Pure	Licensure	Stats
Junior - Fall	Problem Solving	---	---	MATH 380	---
	Specific Required Math course	MATH 394	MATH 461	MATH 332[5]	STAT 325[5]
	Math Elective (300+ Level)	MATH Elective	MATH Elective	MATH Elective	MATH Elective
	Lab Science[4] or Elective	See Catalog	Gen. Elective	See Catalog	See Catalog
	Diversity Intensive	See Catalog	See Catalog	EDUC 346	See Catalog
	Elective	Gen. Elective	Gen. Elective	Gen. Elective	Gen. Elective
	Total Hours (max)	16	15	17	16
Junior - Spring	Math course	MATH Elective	MATH 394	MATH Elective	STAT 326[5]
	Additional Course	Math Application[6]	Gen. Elective	MATH Elective	Gen. Elective
	Humanities: Modern World	HUM 324	HUM 324	HUM 324	HUM 324
	Arts Elective	See Catalog	See Catalog	See Catalog	See Catalog
	Elective	Gen. Elective	Gen. Elective	Gen. Elective	Gen. Elective
	Total Hours	16	16	16	16
Senior - Fall	Problem Solving / Seminar	MATH 381	MATH 381	MATH 480	MATH 381
	Senior Level Math Course	MATH 491	MATH 491	MATH 461	STAT 425[5]
	Senior Capstone	HUM 414	HUM 414	HUM 414	HUM 414
	Additional Course	Math Application[6]	Gen. Elective	EDUC 430	Gen. Elective
	Additional Course	Math Application[6]	Gen. Elective	EDUC 435	Gen. Elective
	Elective	Gen. Elective	Gen. Elective	Gen. Elective	Gen. Elective
	Total Hours	14	14	14	14
Senior - Spring	Senior Seminar	MATH 480	MATH 480	---	MATH 480
	Math Sequence	MATH 395 or 452[7]	MATH 366, 462 or 492	Student Teaching EDUC 455 EDUC 456	STAT 426[5]
	Elective (Except Licensure)	Gen. Elective	Gen. Elective		Gen. Elective
	Elective (Except Licensure)	Gen. Elective	Gen. Elective		Gen. Elective
	Elective (Except Licensure)	Gen. Elective	Gen. Elective		Gen. Elective
	Total Hours	14	14	12	14

[4] Lab Science and Social Science requirements may meet the *Math application outside major*.

[5] Courses offered in alternate years.

[6] The applied concentration requires 15 hours in another discipline. 9 of these credit hours should be at the 300 level.

[7] Other options are available, including MATH 366, 441, and STAT 425.

Applied
Required for Major
Within Major Department

___ MATH 191	4	_____	_____	
___ MATH 192	4	_____	_____	
___ MATH 280	3	_____	_____	
___ MATH 291	4	_____	_____	
___ MATH 365	3	_____	_____	
___ MATH 381	1	_____	_____	
___ MATH 394	3	_____	_____	
___ MATH 480	2	_____	_____	
___ MATH 491	3	_____	_____	

___ STAT 225 or 425   4 _____ _____

____ Must include one of MATH 366, MATH 395, MATH 441, MATH 452, or the sequence STAT 425-426.

	3	_____	_____
	3	_____	_____
	3	_____	_____

Required Outside of Major Department

_____ CSCI 182 or 183   3 _____ _____

_____ 15-17 hours in area of concentration***** (9 hours must be at the 300-400 level)

*Approved by the department chair

Pure
Required for Major
Within Major Department

___ MATH 191	4	_____	_____	
___ MATH 192	4	_____	_____	
___ MATH 280	3	_____	_____	
___ MATH 291	4	_____	_____	
___ MATH 365	3	_____	_____	
___ MATH 381	1	_____	_____	
___ MATH 394	3	_____	_____	
___ MATH 461	3	_____	_____	
___ MATH 480	2	_____	_____	
___ MATH 491	3	_____	_____	

____ 9-10 hours chosen from STAT 225 or 300-400 level MATH *or* STAT.

Must include one course from MATH 366, MATH 462, MATH 492, or the sequence STAT 425-426

_____	_____
_____	_____
_____	_____

Required Outside of Major Department

_____ CSCI 182 or 183   3 _____ _____

_____ One of the following sequences:
CHEM 111/132/145/236
ECON 101/102
PHYS 221/222
or 6 hours 300-400 level courses*

_____	_____	_____
_____	_____	_____
_____	_____	_____

*Approved by the department chair

Statistics
Required for Major

Within Major Department

____ MATH 191	4	____	____	
____ MATH 192	4	____	____	
____ MATH 280	3	____	____	
____ MATH 291	4	____	____	
____ MATH 365	3	____	____	
____ MATH 381	1	____	____	
____ MATH 480	2	____	____	
____ STAT 185 or 225	4	____	____	
____ STAT 325	3	____	____	
____ STAT 326	3	____	____	
____ STAT 425	3	____	____	
____ STAT 426	3	____	____	

____ 3 hours from 300-400 level MATH or STAT

3	____	____

Required Outside of Major Department

____ CSCI 182 or 183	3	____	____

____ 6 hours from one sequence:
    ACCT 215/ECON306
    ECON 102/305
    MGMT 220/380
    300-400 level statistical courses*

3	____	____
3	____	____

*Approved by department chair

Recommended Course:
MATH 491

Mathematics with Teacher Licensure (6-9 & 9-12)
Required for Major
Within Major Department

____ MATH 191	4	____	____	
____ MATH 192	4	____	____	
____ MATH 280	3	____	____	
____ MATH 291	4	____	____	
____ MATH 332	3	____	____	
____ MATH 365	3	____	____	
____ MATH 381	1	____	____	
____ MATH 461	3	____	____	
____ MATH 480	2	____	____	
____ STAT 225	4	____	____	

____ 9 hours from 300-400 Level MATH or STAT

3	____	____
3	____	____
3	____	____

Required Outside of Major Department

____ CSCI 182 or 183	3	____	____
____ PSYC 319	3	____	____

Teacher Licensure

____ EDUC 210	3	____	____
____ EDUC 211	1	____	____
____ EDUC 314	3	____	____
____ EDUC 320*	3	____	____
____ EDUC 346	3	____	____
____ EDUC 430	3	____	____
____ EDUC 435	2	____	____
____ EDUC 455	8	____	____
____ EDUC 456	4	____	____

*6-9 Licensure only

Liberal Arts Core Requirements - Summary and Checklist

Done	Requirement	Hours	Courses
	First-Year Colloquium	3-4	LA 178 or DEPT 178
	Academic Writing and Critical Inquiry	4	LANG 120
	Humanities (3 courses)	4	HUM 124
		4	HUM 214
		4	HUM 324
	Laboratory Science (do not use the same course to fulfill both the Laboratory Science and the Scientific Perspectives requirements)	4	ASTR 102+112 or 113 ASTR 103+112 or 113 ATMS 111+113 BIOL 125+126, 136, 223 CHEM 109, 111+132, 145+231, 145+233, 222+232 ENVR 105 HWP 295 PHYS 101+121, 102+122, 131, 221 PSYC 362
	Scientific Perspectives (do not use the same course to fulfill both the Laboratory Science and the Scientific Perspectives requirements)	3-4	ASTR 102, 103 ATMS 103, 113 BIOL 107, 108, 110, 125, 135, 136 CHEM 109, 132, 323 CSCI 107, 182, 183, 185 EDUC 322 ENVR 106, 130 HWP 225, 420 JEM 484 PHIL 307 PHYS 101, 102, 131, 221 POLS 396 SOC 362
	Quantitative Perspective	4	MATH or STAT—any 4-hour course
	Social Science	3-4	Any 3-4 credit course with the following prefixes: ANTH, ECON, POLS, PSYC, SOC AFST 130, 364, 433 ASIA 100, 320, 330 EDUC 210 ESI 101 HWP 250, 333 INTS 201, 301, 320, 330 MCOM 104 MGMT 300, 360, 398 WGSS 100
	Second Language (proficiency through the 2nd semester)	0-4	ASIA 102 CLAS 102, 104, 106 FREN 120 or 130 GERM 120 or 130 PORT 120 SPAN 130 WLNG 120
	Arts and Ideas	3-4	ARTS 310 or 3 hours of course work designated as ARTS
	Senior Capstone	4	HUM 414 or LA 478
	Diversity Intensive	3-4	A course from across the curriculum designated as DI
	Information Literacy Competency	0	Information Literacy Competency fulfilled in the major
	Writing Competency	0	Writing competency fulfilled in the major

LIST OF COURSE OFFERINGS IN MATHEMATICS

The following is a list of courses that the department regularly offers over two years. Faculty teaches special topic courses, software training, internships, and undergraduate research periodically. Courses included in every concentration are in bold. For a complete description, check your catalog.

MATH 155	Nature of Mathematics	(F&S)
MATH 167	Precalculus	(F&S)
MATH 191	**Calculus I**	(F&S)
MATH 192	**Calculus II**	(F&S)
MATH 211	Structure of Math I	(F)
MATH 215	Structure of Math II	(S)
MATH 251	Discrete Mathematics	(S)
MATH 280	**Introduction to Foundations of Mathematics**	**(F & S)**
MATH 291	**Calculus III**	**(F & S)**
MATH 303	History of Math	(S-even)
MATH 332	Geometry	(F-odd)
MATH 365	**Linear Algebra I**	**(F & S)**
MATH 366	Linear Algebra II	(S-even)
MATH 368	Number Theory	(S-odd)
MATH 381	**Problems in Mathematics**	**(F)**
MATH 391	Advanced Calculus	(S-even)
MATH 394	Differential Equations	(F & S)
MATH 395	Partial Differential Equations	(S-odd)
MATH 397	Chaos and Fractals	(F-odd)
MATH 398	Complex Variables	(F-even)
MATH 431	Topology	(S-even)
MATH 441	Numerical Analysis (CSCI 441)	(S-even)
MATH 452	Introduction to Mathematical Models	(S-odd)
MATH 461	Abstract Algebra I	(F)
MATH 462	Abstract Algebra II	(S-odd)
MATH 480	**Senior Seminar**	**(F & S)**
MATH 491	Analysis I	(F)
MATH 492	Analysis II	(S-even)

STAT 185	Introductory Statistics	(F&S)
STAT 220	Introduction to Applied Probability	(F)
STAT 225	Introduction to Calculus-Based Statistics	(F & S)
STAT 321	Applied Data Analysis	(F-even)
STAT 325	Introduction to Regression Models	(F-odd)
STAT 326	Statistics for Experimenters	(S-even)
STAT 327	Applied Multivariate Analysis	(S-odd)
STAT 329	Big Data Analytics	(S-even)
STAT 425	Introduction to Probability Theory	(F-even)
STAT 426	Introduction to Mathematical Statistics	(S-odd)

CAREERS IN MATHEMATICS AND STATISTICS

The University of North Carolina Asheville is a school that strives toward giving the student the best possible liberal education. Mathematics is one of the traditional liberal arts. The department does not train for particular jobs or professions but instead equips graduates with theproblem-solving and analytical thinking skills necessary for a wide range of careers. There are boundless opportunities for a mathematics major when the undergraduate combines her or his mathematics background with a specialty in an applied field and more advanced graduate-level training.

Each year about one-third of the UNC Asheville mathematics graduates become teachers—about a third go on to graduate school, and about a third seek employment in industry andgovernment. The following list gives examples of the types of professions some of our graduates have pursued.

Professions of Former UNC Asheville Mathematics Majors

Actuarial Scientist	Emergency Planner
Assistant Professor of Agronomy	International Project Manager
	Market Analyst
Biomedical Technician/ Statistician	Product Planner
	Quality Processor
Business Systems Manager	Small Business Owner
Computer Analyst	Software Engineer
Computer Systems Manager	Systems Analyst

In the past, mathematics majors found employment in banks, computer companies, telephone or power companies, government, medicine, and the military. There is no specific training in today's highly technological and ever-changing world, which will guarantee you a job. Many companies look for a workforce with diverse educational backgrounds and are interested in people whose expertise is mathematics.

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