**Mathematics/Statistics**

**The following matrix indicates those courses deemed transferable among institutions listed across the top of the matrix. The numbers on the matrix represent the number of semester hours associated with the course at each institution and which institutions have agreed to transfer the commonly numbered course in each row.**

You can view the group leaders at the bottom of the page. If you are interested in printing this page, please note that it is best to print in landscape mode.

**Competency List for Math Majors Prior to MATH 165**

The North Dakota Common Course Numbering Mathematics Discipline Group, made up of math faculty from both public and private institutions, has composed the following list of competencies for students planning to major in math. Prospective math majors should pay close attention to the following competencies and should be proficient with the following mathematical concepts when entering the junior (3rd) year of college:

Relations and functions
Equations and inequalities
Complex numbers
Polynomials
Systems of equations
Matrices and determinants
Sequences and summations
Systems of linear equations and inequalities
Elementary probability and descriptive statistics
Angle measure
Trigonometric and inverse trigonometric functions
Trigonometric identities and equations
Polar coordinates
Polynomial, rational, exponential, logarithmic, and trigonometric functions

| Prefix | Number | GERTA | Course Title | BSC | LRSC | NDSCS | WSC | DCB | DSU | MASU | MISU | NDSU | UND | VCSU | CCCC | NHSC | SBC | TMCC | UTTC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MATH See also: | 102/102L | | Inter-Algebra/Lab (discontinued Fall 2014) | 3/1 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | | 3 | | 3 | 3 |
| ASC | 093 | | Algebra Prep III | 2 | 3 | 2 | 2 | 2 | | | | | | | | | | | |
| MATH | 103 | ND:MATH | College Algebra | 4 | 3 | 3 | 3 | 4 | 4 | 3 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 |
| MATH | 104 | ND:MATH | Finite Math | 3 | | 3 | 3 | 3 | 4 | | 4 | 3 | | | | | | | |
| MATH | 105 | ND:MATH | Trigonometry | 2 | 2 | 2 | 2 | 3 | 2 | 2 | | 3 | 2 | 3 | | 3 | | 3 | 3 |
| MATH | 107 | ND:MATH | PreCalculus | 4 | 4 | 4 | | 4 | 4 | | 4 | 4 | 4 | 3 | | 4 | | | |
| MATH | 132 | | Technical Algebra I | | | 2 | | 3 | | | | | | | | | | | |
| MATH | 146 | ND:MATH | Applied Calculus I | 3 | 3 | 4 | 3 | | 3 | | 3 | 4 | 3 | 3 | | | | | |
| MATH | 147 | ND:MATH | Applied Calculus II | | | 4 | | | | | | 4 | | | | | | | |
| MATH | 165 | ND:MATH | Calculus I | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | | 4 | | 4 | 4 |
| MATH | 166 | ND:MATH | Calculus II | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | | 4 | | 4 | |
| MATH | 208 | | Discrete Mathematics | 3 | | | 3 | | 3 | | 3 | | 3 | | | 4 | | | |
| MATH | 210 | ND:MATH | Elementary Statistics | 3 | 3 | 3 | 3 | | | | | | | | 3 | 4 | 4 | | 3 |
| MATH | 227 | | Applied Linear Algebra | 3 | | | | | | | | | | | | 3 | | | |
| MATH | 265 | ND:MATH | Calculus III | 4 | 4 | 4 | 4 | | 4 | 4 | 4 | 4 | 4 | 4 | | | | | |
| MATH | 266 | ND:MATH | Intro to Differential Equations | 3 | 3 | 3 | 3 | | 3 | | 3 | 3 | 3 | 3 | | | | | |
| MATH | 277 | | Mathematics for Elementary Teachers I | 4 | 3 | | 4 | | 3 | 4 | 3 | | 3 | 4 | | 3 | | | 3 |

## MATH 102/102L Inter-Algebra/Lab – developmental course

**(Effective Fall 2014: All developmental courses are numbered less than 100. See also ASC 093)**

Properties of the real number system, factoring, linear and quadratic equations polynomial and rational expressions, inequalities, systems of equations, exponents, radicals, functional notation, rational equations and absolute value.
Upon completion of the course the learner will be able to:

1. Students will demonstrate an understanding of the real number system as evidenced by classroom activities and objective tests
2. Students will be able to work with polynomials as evidenced by classroom activities and objective tests

3. Students will be able to factor standard expressions as evidenced by classroom activities and objective tests
4. Students will be able to work with rational expressions as evidenced by classroom activities and objective tests
5. Students will be successful in working with exponents and radicals as evidenced by classroom activities and objective tests
6. Students will be able to solve linear and quadratic equations as evidenced by classroom activities and objective tests
7. Students will create and solve systems of linear equations as evidenced by classroom activities and objective tests
8. Students will demonstrate skill in working with functional notation as evidenced by classroom activities and objective tests
9. Students will be able to solve rational equations and inequalities as evidenced by classroom activities and objective tests
10. Students will create and solve absolute value equations and inequalities as evidenced by classroom activities and objective tests

**MATH 103 College Algebra**
Relations and functions, equations and inequalities, complex numbers; polynomial, rational, exponential and logarithmic functions and systems of equations. Prerequisite: Math 093 or placement test

Upon completion of the course the learner will be able to:

1. Students will demonstrate an understanding of relations and functions as evidenced by classroom activities and objective tests
2. Students will be able to work with equations and inequalities as evidenced by classroom activities and objective tests
3. Students will be able to work with complex numbers as evidenced by classroom activities and objective tests
4. Students will be able to work with rational and polynomial expressions as evidenced by classroom activities and objective tests
5. Students will be successful in working with exponential and logarithmic functions as evidenced by classroom activities and objective tests
6. Students will be able to solve systems of linear equations as evidenced by classroom activities and objective tests
7. Students will create and use matrices to solve systems of equations as evidenced by classroom activities and objective tests

**MATH 104 Finite Math**

Systems of linear equations and inequalities, matrices, linear programming, mathematics of Finance, elementary probability and descriptive statistics. Prerequisite: Math 093 or placement test

Upon completion of the course the learner will be able to:

1. Students will be able to work with elementary probability as evidenced by classroom activities and objective tests
2. Students will be able to work with mathematics of finance as evidenced by classroom activities and objective tests
3. Students will be able to solve systems of linear equations as evidenced by classroom activities and objective tests
4. Students will be able to solve systems of linear inequalities as evidenced by classroom activities and objective tests
5. Students will be able to work with linear programming as evidenced by classroom activities and objective tests
6. Students will be able to work with statistics as evidenced by classroom activities and objective tests
7. Students will demonstrate an understanding of matrices as evidenced by classroom activities and objective tests


**MATH 105 Trigonometry**
Angle measure, trigonometric and inverse trigonometric functions, trigonometric identities and equations, parametric and polar coordinates, and general applications. Prerequisite: Math 103 or placement test

Upon completion of the course the learner will be able to:

1. Students will be able to work with angular measure in degrees and radians as evidenced by classroom activities and objective tests
2. Students will be able to work with trigonometric and inverse trigonometric functions as evidenced by classroom activities and objective tests
3. Students will be able to use trigonometric identities as evidenced by classroom activities and objective tests
4. Students will be able to solve trigonometric equations as evidenced by classroom activities and objective tests
5. Students will demonstrate an understanding of how to solve real world problems using trigonometry as evidenced by classroom activities and objective tests
6. Students will be able to graph equations and polar coordinates.

**MATH 107 PreCalculus**

Equations and inequalities, polynomial, rational, exponential, logarithmic, trigonometric and inverse trigonometric functions; trigonometric identities and equations and applications. Prerequisite: Math 093 or placement test

Upon completion of the course the learner will be able to:

1. Students will demonstrate an understanding of relations and functions as evidenced by classroom activities and objective tests
2. Students will be able to work with equations and inequalities as evidenced by classroom activities and objective tests
3. Students will be able to work with complex numbers as evidenced by classroom activities and objective tests
4. Students will be able to work with rational and polynomial expressions as evidenced by classroom activities and objective tests
5. Students will be successful in working with exponential and logarithmic functions as evidenced by classroom activities and objective tests
6. Students will be able to solve systems of linear equations as evidenced by classroom activities and objective tests
7. Students will be able to work with angular measure in degrees and radians as evidenced by classroom activities and objective tests
8. Students will be able to work with trigonometric and inverse trigonometric functions as evidenced by classroom activities and objective tests
9. Students will be able to use trigonometric identities as evidenced by classroom activities and objective tests
10. Students will be able to solve trigonometric equations as evidenced by classroom activities and objective tests
11. Students will demonstrate an understanding of how to solve real world problems using trigonometry as evidenced by classroom activities and objective tests

**MATH 132 Technical Algebra I**
A basic algebra course for students enrolled in technology programs. Topics include properties of real numbers, algebraic expressions, solving equations, polynomials, factoring, formula manipulations and problem solving.

**MATH 146 Applied Calculus I**
Limits, derivatives, integrals, exponential, logarithmic; and applications. Prerequisite: a) Math 103 or placement test or b) Math 103 or Math 104 or placement test

Upon completion of the course the learner will be able to:

1. Students will be able to work with limits as evidenced by classroom activities and objective tests
2. Students will be able to work with derivative functions as evidenced by classroom activities and objective tests
3. Students will be able to work with exponential and logarithmic functions as evidenced by classroom activities and objective tests
4. Students will be able to work with integrals and their applications as evidenced by classroom activities and objective tests
5. Students will demonstrate an understanding of how to solve real world problems using fundamental calculus concepts as evidenced by classroom activities and objective tests

## MATH 147 Applied Calculus II
Definite integrals, trigonometric functions, introduction to differential equations, infinite sequence and series, probability, and applications. Prerequisite: Math 146 or placement test

Upon completion of the course the learner will be able to:

1. Students will be able to work with basic trigonometric functions and their derivatives as evidenced by classroom activities and objective tests
2. Students will be able to work with definite integrals and their applications as evidenced by classroom activities and objective tests
3. Students will be able to work with basic differential equations and their applications as evidenced by classroom activities and objective tests
4. Students will be able to work with infinite sequence and series as evidenced by classroom activities and objective tests
5. Students will be able to work with elementary probability and its applications as evidenced by classroom activities and objective tests
6. Students will demonstrate an understanding of how to solve real world problems using fundamental calculus concepts as evidenced by classroom activities and objective tests

## MATH 165 Calculus I
Limits, continuity, differentiation, Mean Value Theorem, integration, Fundamental Theorem of Calculus, and applications. Prerequisite: Math 105 or Math 107 or placement test

Upon completion of the course the learner will be able to:

1. Students will be able to work with functions, their derivatives, and their applications as evidenced by classroom activities and objective tests
2. Students will be able to work with definite integrals and their applications as evidenced by classroom activities and objective tests
3. Students will be able to work with the notion of limits and their applications as evidenced by classroom activities and objective tests
4. Students will be able to work with continuity as evidenced by classroom activities and objective tests
5. Students will be able to work with the Mean Value Theorem and its applications as evidenced by classroom activities and objective tests
6. Students will demonstrate an understanding of how to solve problems using Fundamental Theorem of Calculus as evidenced by classroom activities and objective tests

**MATH 166 Calculus II**
Applications and techniques of integration, polar equations, parametric equations, sequences and series, power series and applications. Prerequisite: Math 165

Upon completion of the course the learner will be able to:

1. Students will be able to work with techniques of integration and their applications as evidenced by classroom activities and objective tests
2. Students will be able to work with polar equations and their applications as evidenced by classroom activities and objective tests
3. Students will be able to work with parametric equations as evidenced by classroom activities and objective tests
4. Students will be able to work with sequences and series and their applications as evidenced by classroom activities and objective tests
5. Students will demonstrate an understanding of how to work with power series as evidenced by classroom activities and objective tests
6. Students will demonstrate an understanding of how to solve real world problems using fundamental calculus concepts as evidenced by classroom activities and objective tests

**MATH 208 Discrete Mathematics**
Sets, relations and functions, combinatorics, logic, Boolean Algebra, difference equations, introduction to graph theory and automata. Prerequisite: Math 103

Upon completion of the course the learner will be able to:

1. Students will be able to work with sets, relations and functions, and their applications as evidenced by classroom activities and objective tests
2. Students will be able to work with combinatorics and its applications as evidenced by classroom activities and objective tests
3. Students will be able to work with logic and its applications as evidenced by classroom activities and objective tests
4. Students will be able to work with Boolean Algebra as evidenced by classroom activities and objective tests
5. Students will be able to work with difference equations and their applications as evidenced by classroom activities and objective tests
6. Students will demonstrate an understanding of how to solve problems using graph theory as evidenced by classroom activities and objective tests

**MATH 210 Elementary Statistics**
An introduction to statistical methods of gathering, presenting and analyzing data. Topics include probability and probability distributions, confidence intervals, hypothesis testing, and linear regression and correlation. Prerequisite: Math 093

Upon completion of the course the learner will be able to:

1. Students will be able to use statistical methods of gathering, presenting and analyzing data as evidenced by classroom activities and objective tests
2. Students will be able to work with probability and probability distributions and their applications as evidenced by classroom activities and objective tests
3. Students will be able to work with confidence intervals and their applications as evidenced by classroom activities and objective tests
4. Students will be able to work with hypothesis testing as evidenced by classroom activities and objective tests
5. Students will be able to work with linear regression and correlation and its applications as evidenced by classroom activities and objective tests

**MATH 227 Applied Linear Algebra**

Systems of linear equations and inequalities, vectors and matrices, mapping, linear programming, and numerical applications. Prerequisite: Math 146 or Math 165

Upon completion of the course the learner will be able to:

1.  Students will be able to work with systems of linear equations, and their applications as evidenced by classroom activities and objective tests
2.  Students will be able to work with systems of linear inequalities and their applications as evidenced by classroom activities and objective tests
3.  Students will be able to work with vectors and their applications as evidenced by classroom activities and objective tests
4.  Students will be able to work with matrices and their applications as evidenced by classroom activities and objective tests
5.  Students will be able to work with mappings and their applications as evidenced by classroom activities and objective tests
6.  Students will demonstrate an understanding of how to use linear programming as evidenced by classroom activities and objective tests

**MATH 265 Calculus III**
Multivariate and vector calculus including partial derivatives, multiple integration and its applications, line and surface integrals, Green's Theorem and Stoke's Theorem. Prerequisite: Math 166

Upon completion of the course the learner will be able to:

1.  Students will be able to work with Multivariate and vector calculus including partial derivatives, and their applications as evidenced by classroom activities and objective tests
2.  Students will be able to work with multiple integration and its applications as evidenced by classroom activities and objective tests
3.  Students will be able to work with line and surface integrals and their applications as evidenced by classroom activities and objective tests
4.  Students will be able to work with Green's Theorem as evidenced by classroom activities and objective tests
5.  Students will be able to work with Stoke's Theorem and its applications as evidenced by classroom activities and objective tests

**MATH 266 Intro to Differential Equations**

Solution of elementary differential equations by elementary techniques, Laplace transforms, systems of equations, matrix methods, numerical techniques, and applications. Prerequisite: Math 265 or department approval

Upon completion of the course the learner will be able to:

1. Students will be able to work with and solve elementary differential equations, and their applications as evidenced by classroom activities and objective tests
2. Students will be able to work with systems of equations and their applications as evidenced by classroom activities and objective tests
3. Students will be able to work with Laplace transforms and its applications as evidenced by classroom activities and objective tests
4. Students will be able to work with matrix methods and their applications as evidenced by classroom activities and objective tests
5. Students will be able to work with numerical techniques and their applications as evidenced by classroom activities and objective tests

**MATH 277 Mathematics for Elementary Teachers I**

A mathematics content course for prospective elementary school teachers. Topics include problem solving, numeration systems, real numbers, and elementary number theory. Calculators, computers, and manipulatives are used in the course. Prerequisite: Math 103

Upon completion of the course the learner will be able to:

1. Students will understand the content of elementary school mathematics as evidenced by classroom activities and objective tests
2. Students will be able to work with problem solving and its applications as evidenced by classroom activities and objective tests
3. Students will be able to work with numeration systems and their applications as evidenced by classroom activities and objective tests
4. Students will be able to work with real numbers as evidenced by classroom activities and objective tests
5. Students will be able to work with elementary number theory as evidenced by classroom activities and objective tests

6.  The application of calculators and manipulatives will be stressed in the course, and their use is expected in the course

## Academic Skills Courses

Credits for courses listed on the matrix below do not count towards any degree, nor do these courses transfer. While ASC courses are developmental in nature and are intended to help students become more efficient and effective learners, many of these courses serve as prerequisites to enroll in other college level courses.
Institutions are listed across the top of the matrix. The numbers on the matrix represent the number of semester hours associated with the course at each institution. Again, these courses are not transferable; however, they may be used to fulfill prerequisites to enroll in other college level courses.

| Prefix | Number | Course Title | BSC | DCB | LRSC | NDSCS | WSC |
|--------|--------|--------------|-----|-----|------|-------|-----|
| ASC | 091 | Algebra Prep I | 2 | 2 | | 2 | 2 |
| ASC | 092 | Algebra Prep II | 2 | 2 | 3 | 2 | 2 |
| ASC | 093 | Algebra Prep III | 2 | 2 | 3 | 2 | 2 |

## ASC 091 Algebra Prep I
This course begins with the development of the fundamental skills required for the successful completion of studies in college level mathematics courses. Topics include operations with whole numbers and fractions, orders of operation, simplification and evaluation of expressions, and evaluations of one and two step linear equations. Study skills will be incorporated throughout the course. Credit earned does not count towards any degree, nor does it transfer. Placement is according to placement scores or on a voluntary basis.

## ASC 092 Algebra Prep II
This course continues the development of the fundamental skills required for the successful completion of studies in college level mathematics courses. Topics include the solutions of linear equations and inequalities, formula manipulation, Cartesian geometry and the graphing of linear equations and inequalities throughout the course. Credit earned does not count toward any degree, nor does it transfer. Prerequisites: Placement by appropriate test score or completion of ASC 091 with a grade of "C" or better.

## ASC 093 Algebra Prep III

This course continues the development of the fundamental skills required for the successful completion of studies in college level mathematics courses. Topics include exponents and radicals, algebraic manipulation involving polynomial and rational forms, and unit analysis. Study skills will be incorporated throughout the course. Credit earned does not count towards any degree, nor does it transfer. Prerequisites: Placement by appropriate test score or completion of ASC 092 with a grade of "C" or better.

The following individuals are leaders for this discipline. Those marked with an asterisk (*) are chairs.

| Name | Institution | Email Address | Phone Number |
|---|---|---|---|
| Liz Braunagel | BSC | elizabeth.braunagel@bismarckstate.edu | 701-224-2578 |
| Chris Dahlen | CCCC | Chris.dahlen@littlehoop.edu | |
| Karen Saari | CCCC | Karen.saari@littlehoops.edu | |
| Tracy Chisholm | DCB | tracy.chisholm@dakotacollege.edu | 701-228-5424 |
| Scott Johnson | DCB | scott.johnson@dakotacollege.edu | 701-228-5474 |
| Paul Johanson | DSU | paul.johanson@dickinsonstate.edu | 701-483-2744 |
| Dan Johnson | LRSC | dan.johnson@lrsc.edu | 701-662-1556 |
| Alaina Schmid | LRSC | alaina.schmid@lrsc.edu | 701-662-1690 |
| Fred Strand | MaSU | fred.strand@mayvillestate.edu | 701-788-4684 |
| Laurie Geller | MiSU | laurie.geller@minotstateu.edu | 701-858-3282 |
| Kevin Vang | MiSU | kevin.vang@minotstateu.edu | 701-858-3305 |
| Larry Merbach | NDSCS | larry.merbach@ndscs.edu | 701-671-2231 |
| Mohamed Baghzali | NDSU | mohamed.baghzali@ndsu.edu | 701-231-8286 |
| Benton Duncan | NDSU | benton.duncan@ndsu.edu | 701-231-8175 |
| Marie Gordon | NDSU | marie.gordon@ndsu.edu | 701-231-6430 |

| | | | |
|---|---|---|---|
| Claire Gunwall | NDUS | claire.gunwall@ndus.edu | 701-328-4140 |
| Jen Janecek-Hartman | NHSC | jjanec@nhsc.edu | 701-627-8049 |
| Melody Azure | SBC | melody.azure@sittingbull.edu | 701-854-8020 |
| Terri Martin-Parisien | TMCC | tmartinparisien@tm.edu | 701-477-7862 ext. 2961 |
| Richard Millspaugh | UND | richard.millspaugh@und.edu | 701-777-4603 |
| Charles Gitter | UTTC | cgitter@uttc.edu | 701-255-3285 ext. 3101 |
| Preston Bush | VCSU | preston.bush@vcsu.edu | 701-845-7151 |
| Amanda Davis | WSC | amanda.k.davis@willistonstate.edu | 701-774-4504 |
| Faye Krogen | WSC | faye.krogen@willistonstate.edu | 701-774-4236 |
| Lance Olson | WSC | lance.olson@willistonstate.edu | 701-774-4230 |

Click here to email everyone on the above list.

Director of Academic Affairs