DUBLIN, VIRGINIA
COURSE PLAN

Course Number and Title: MTH 167 Precalculus with Trigonometry

Prepared by: NRCC Math Faculty — Fall 2025 (Date)

Approved by: S. Tolbert-Hungoz (Dean) — Fall 2025 (Date)

Course Description

Presents topics in power, polynomial, rational, exponential, and logarithmic functions, systems of equations, trigonometry, and trigonometric applications, including Law of Sines and Cosines, and an introduction to conics. Credit will not be awarded for both MTH 167: Precalculus with Trigonometry and MTH 161/MTH 162: Precalculus I and II or equivalent.
This is a Passport and UCGS transfer course.
Lecture 5 hours. Total 5 hours per week.
5 credits

Introduction

The course satisfies a mathematics requirement for many degree programs. The course is designed to develop the skills and concepts which are needed for MTH 263 Calculus I and other advanced mathematics courses in engineering and mathematics related fields. It does not count toward a degree in engineering.

Student Learning Outcomes

Upon successful completion of this course, the student will be able to:

A. Relations and Functions
   a. Distinguish between relations and functions.
   b. Evaluate functions both numerically and algebraically.
   c. Determine the domain and range of functions in general, including root and rational functions.
   d. Perform arithmetic operations on functions, including the composition of functions and the difference quotient.
   e. Identify and graph linear, absolute value, quadratic, cubic, and square root functions and their transformations.
   f. Determine and verify inverses of one-to-one functions.

B. Polynomial and Rational Functions
    a. Determine the general and standard forms of quadratic functions.
    b. Use formula and completing the square methods to determine the standard form of a quadratic function.
    c. Identify intercepts, vertex, and orientation of the parabola and use these to graph quadratic functions.
    d. Identify zeros (real-valued roots) and complex roots, and determine end behavior of higher order polynomials and graph the polynomial, and graph.
    e. Determine if a function demonstrates even or odd symmetry.
    f. Use the Fundamental Theorem of Algebra, Rational Root test, and Linear Factorization Theorem to factor polynomials and determine the zeros over the complex numbers.
    g. Identify intercepts, end behavior, and asymptotes of rational functions, and graph.
    h. Solve polynomial and rational inequalities.
    i. Interpret the algebraic and graphical meaning of equality of functions ($f(x) = g(x)$) and inequality of functions ($f(x) > g(x)$)
C. Exponential and Logarithmic Functions
    a. Identify and graph exponential and logarithmic functions and their transformations.
    b. Use properties of logarithms to simplify and expand logarithmic expressions.
    c. Convert between exponential and logarithmic forms and demonstrate an understanding of the relationship between the two forms.
    d. Solve exponential and logarithmic equations using one-to-one and inverse properties.
    e. Solve application problems involving exponential and logarithmic functions.
D. Systems of Equations
    a. Solve three variable linear systems of equations using the Gaussian elimination method.
E. Trigonometric Functions

    a. Identify angles in standard form in both degree and radian format and convert from one to the other.
    b. Find the arc length.
    c. Find the value of trigonometric functions of common angles without a calculator using the unit circle and right triangle trigonometry.
    d. Use reference angles to evaluate trig functions.
    e. Find the value of trigonometric functions of angles using a calculator.
    f. Use fundamental trigonometric identities to simplify trigonometric expressions.
    g. Graph the six trigonometric functions using the amplitude, period, phase and vertical shifts.
    h. Use trig functions to model applications in the life and natural sciences.

F. Analytic Trigonometry
    a. Use the fundamental, quotient, Pythagorean, co-function, and even/odd identities to verify trigonometric identities.
    b. Use the sum and difference, double angle, half-angle formulas to evaluate the exact values of trigonometric expressions.

c. Determine exact values of expressions, including composite expressions, involving inverse trigonometric functions.
d. Solve trigonometric equations over restricted and non-restricted domains.

G. Applications of Trigonometry
   a. Solve right triangles and applications involving right triangles.
   b. Use the Law of Sines and Cosines to solve oblique triangles and applications.

H. Conics
   a. Identify the conic sections of the form:Ax^2+By^2+Dx+Ey+F=0.
   b. Write the equations of circles, parabolas, ellipses, and hyperbolas in standard form centered both at the origin and not at the origin.
   c. Identify essential characteristics unique to each conic
   d. Graph equations in conic sections, centered both at the origin and not at the origin.
   e. Solve applications involving conic sections.

I. Sequences and Series (Optional unit at the discretion of the department. Not required for transfer.)

General Education Student Learning Outcomes Included in Course

General education at NRCC provides the educational foundation necessary to promote intellectual and personal development. Upon completing the associate degree, graduates will demonstrate competency in student learning outcomes in 1) civic engagement, 2) critical thinking, 3) professional readiness, 4) quantitative literacy, 5) scientific literacy, and
6) written communication.

This course includes the following general education student learning outcomes:

- Explain numerical information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words)
- Convert relevant information into various mathematical forms (e.g., equations, graphs, diagrams, tables, words)
- Accurately solve mathematical problems

Instructional Methods

The instructional procedures will include lectures, discussions, in class work, homework, reviews and tests

Instructional Materials

Textbook: **College Algebra, 3rd Corrected Edition** by Stitz & Zeager
Trigonometry by Pablo Chalmeta

Software: MyOpenMath

Calculator: Students are allowed to use a TI 30XIIS or equivalent.

Other: Pencils and paper. Ink is not to be used for any graded work

Course Content

- Functions and their graphs
- Polynomial and rational functions
- Exponential functions
- Logarithmic functions
- Conic sections
- Systems of equations
- Matrices
- Trigonometric Functions
- Analytic Geometry

Grading/Evaluation

Students are evaluated on the following and other work as considered appropriate by the instructor:

- *class attendance, participation, and discussion*
- *assignments*
- *quizzes*
- *tests*
- *final exam*

See the course syllabus for details on how grades for this course will be calculated using percentages or points.

Grading scale:

90 - 100 = A
80 - 89 = B
70 - 79 = C
60 - 69 = D
Below 60 = F

Attendance

Regular attendance at classes is required. When absence from a class becomes necessary, it is the responsibility of the student to inform the instructor prior to the absence whenever possible. The student is responsible for the completion of all study missed during an absence. Any instruction missed and not completed will affect the grade of the student regardless of the reason for the absence.

Cheating/Plagiarism Policy

Students are expected to complete their own work and maintain complete academic honesty. Honesty develops into integrity. All aspects of the course are covered by the Academic Honesty section in the New River Community College Student Handbook.

Any student found cheating or plagiarizing will receive a zero for that work and it could result in an "F" for the course. This includes plagiarism, which is defined as "To present another's words or ideas as one's own or without attribution" (American Heritage Dictionary, 2019). Remember that plagiarism includes using words or ideas from Internet sites, as well as copying from print sources.

AI Usage

Different instructors will have different expectations around students' usage of artificial intelligence (AI) tools depending upon the goals and learning outcomes of a course. Students should refer to the class syllabus/addendum for more specific guidelines. It is important to understand that using unauthorized AI tools to complete course work may result in an academic honesty violation. Students should always ask their instructor for guidance if they have any questions about the appropriateness of using a tool.

Withdrawal Policy

Student Initiated Withdrawal Policy

A student may drop or withdraw from a class without academic penalty during the first 60 percent of a session. For purposes of enrollment reporting, the following procedures apply:

If a student withdraws from a class prior to the termination of the add/drop period for the session, the student will be removed from the class roll and no grade will be awarded.

After the add/drop period, but prior to completion of 60 percent of a session, a student who withdraws from a class will be assigned a grade of "W." A grade of "W" implies that the student was making satisfactory progress in the class at the time of withdrawal, that the withdrawal was officially made before the deadline published in the college calendar, or that the student was administratively transferred to a different program.
After that time, if a student withdraws from a class, a grade of "F" or "U" will be assigned. Exceptions to this policy may be made under documented mitigating circumstances if the student was passing the course at the last date of attendance.

A retroactive grade of "W" may be awarded only if the student would have been eligible under the previously stated policy to receive a "W" on the last date of class attendance. The last date of attendance for a distance education course will be the

last date that work was submitted.

Students requesting a late withdrawal due to documented mitigating circumstances should contact the Coordinator of Admissions and Records.

No-Show Policy

A student must either attend face-to-face courses or demonstrate participation in online courses by the last date to drop for a refund. A student who does not meet this deadline will be reported to the Admissions and Records Office and will be withdrawn as a no-show student. No refund will be applicable, and the student will not be allowed to attend/participate in the class or submit assignments. Failure to attend or participate in a course will adversely impact a student's financial aid award.

Instructor Initiated Withdrawal

A student who adds a class or registers after the first day of class is counted absent from all class meetings missed. Each instructor is responsible for keeping a record of student attendance (face-to-face classes) or performance/participation (online classes) in each class throughout the semester.

When a student's absences equal twice the number of weekly meetings of a class (equivalent amount of time for summer session), the student may be dropped for unsatisfactory attendance in the class by the instructor.

Since attendance is not a valid measurement for online courses, a student may be withdrawn due to non-performance. A student should refer to his/her online course plan for the instructor's policy.

In accordance with the No-Show Policy, a student who has not attended class or requested/accessed online learning materials by the last day to drop the class and receive a refund must be withdrawn by the instructor during the following week. No refund will be applicable.

When an instructor withdraws a student for unsatisfactory attendance (face-to-face class) or non-performance (online class), the last date of attendance/participation will be documented. Withdrawal must be completed within five days of a student's meeting the withdrawal criteria. A grade of "W" will be recorded during the first sixty percent (60%) period of a course. A student withdrawn after the sixty percent (60%) period will receive a grade of "F" or "U" except under documented mitigating circumstances when a letter of appeal has been submitted by the student. A copy of this documentation must be placed in the student's academic file.

The student will be notified of the withdrawal by the Admissions and Records Office. An appeal of reinstatement into the class may be approved only by the instructor.

Non-Discrimination Statement

This College promotes and maintains educational opportunities without regard to race, color, national origin, religion, disability, sex, sexual orientation, gender identity, ethnicity, marital status, pregnancy, childbirth or related medical conditions including lactation, age (except when age is a bona fide occupational qualification), veteran status, or other non-merit factors.

Disability Statement

If you are a student with a disability and in need of accommodations for this course, please contact the Center for Disability Services (CDS) for assistance. CDS is located within the Advising Center in Rooker Hall. For more information about disabilities services, see Center for Disability Services Policies and Procedures.

Academic Success Center (Tutoring Center)

Free tutoring is available to all NRCC students in any subject area. In-person, one-on- one, and group tutoring sessions are available both in Dublin (Godbey 131) and at the mall site (room 202). Online tutoring sessions are also available to accommodate students who are unable to attend an in-person tutoring session. In addition, the Academic Success Center offers several online tutorials which are posted in Canvas on the NRCC Tutoring Services tab. For more information about the Academic Success Center at NRCC, please visit https://www.nr.edu/asc/ or call 1-540-674-3664.

General Health Guidelines and Student Expectations

In guarding against the transmission of infectious illnesses, it is imperative that we follow specific health-related best practices.

As a condition for attending class or otherwise using NRCC facilities, I, as a student, agree to the following conditions:

I will follow all CDC, state, and local guidelines pertaining to diseases and health conditions. More information can be found at the links below.

a. CDC Diseases and Conditions: https://www.cdc.gov/nchs/fastats/diseases-and-conditions.htm
b. Virginia Department of Health: https://www.vdh.virginia.gov/
c. New River Health District: https://www.nrvroadtowellness.com/

In the event of health threats or changes in guidelines, I understand in-person classes may be moved online, fully or partially, and I will need to be prepared to access technology and the internet with as little as 24 hours' notice.

By continuing my enrollment in class(es), **I agree to meet each of the expectations outlined above.**

New River Community College encourages all students to fully vaccinate against transmissible illnesses. Information about vaccinations can be found on the Virginia Department of Health website at www.vdh.virginia.gov.

Required Safety Training

Virginia law, effective August 1, 2024, requires campus safety and emergency preparedness training for all students enrolled in on-campus classes at public colleges and universities. The training must focus on an active shooter event and be completed by the last day of their first term in college.

To comply with this legislation, students will view a college-provided awareness and training video during the first two weeks of class for this course.

Evacuation Procedure

Please note the evacuation route posted at the classroom doorway. **Two routes are marked in case one route might be blocked.**