DUBLIN, VIRGINIA
COURSE PLAN

Course Number and Title: MTH 154 Quantitative Reasoning

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

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

Course Description

Presents topics in proportional reasoning, modeling, financial literacy and validity studies (logic and set theory). Focuses on the process of taking a real-world situation, identifying the mathematical foundation needed to address the problem, solving the problem and applying what is learned to the original situation. This is a Passport and UCGS transfer course.
Lecture 3 hours. Total 3 hours per week.
3 credits

Introduction

The Quantitative Reasoning course is organized around big mathematical concepts. The course's nontraditional treatment of content will help students develop conceptual understanding by supporting them in making connections between concepts and applying previously learned material to new contexts. The course will help to prepare students for success in future courses, gain skills for the workplace, and participate as productive citizens in our society.

- Encourage students to do mathematics with real data. This includes recognizing the real world often has less than perfect data, ambiguities and multiple possible solutions. It also means equipping students to be intelligent consumers of quantitative data and reports.
- Encourage students to engage in productive struggle to learn mathematics and make connections to the world in which they live.

Student Learning Outcomes

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

1. Use appropriate mathematical language in oral, written and graphical forms.
2. Define interest and understand related terminology.
3. Develop simple interest formula.
4. Use simple interest formulas to analyze financial issues
5. Compound Interest

6. Describe how compound interest differs from simple interest.
7. Explain the mechanics of the compound interest formula addressing items such as why the exponent and (1+r/n) is used.
8. Use compound interest formulas to analyze financial issues
9. Show the difference between compound interest and simple interest using a table or graph.
10. Borrowing
11. Compute payments and charges associated with loans.
12. Identify the true cost of a loan by computing APR
13. Evaluate the costs of buying items on credit
14. Compare loans of varying lengths and interest rates.
15. Investing
16. Calculate the future value of an investment and analyze future value and present value of annuities (Take into consideration possible changes in rate, time, and money.)
17. Calculate profit from a sale of an investment
18. Compare various investment options and understand when it is appropriate utilize them
19. Solve real-life problems requiring interpretation and comparison of complex numeric summaries which extend beyond simple measures of center.
20. Solve real-life problems requiring interpretation and comparison of various representations of ratios.
21. Distinguish between proportional and non-proportional situations and, when appropriate, apply proportional reasoning. Recognize when proportional techniques do not apply.3
22. Solve real-life problems requiring conversion of units using dimensional analysis.
23. Apply scale factors to perform indirect measurements (e.g., maps, blueprints, concentrations, dosages, and densities).
24. Order real-life data written in scientific notation. The data should include different significant digits and different magnitudes.
25. Give cardinality of unions, intersections, and Venn diagram regions.
26. Solve survey problems.
27. Compare the predictions of a mathematical model with actual measurements obtained
28. Quantitatively compare linear and exponential growth
29. Assemble measurements and data gathered into tables, displays, charts, and simple graphs.
30. Determine the appropriateness of interpolation and/or extrapolation.
31. Identify and distinguish linear and non-linear data sets arrayed in graphs.
32. Correctly associate a linear equation in two variables with its graph on a numerically accurate set of axes
33. Identify a mathematical model's boundary values and limitations
34. Use data gathered, and a computer program to create different regressions, determine the best model, and use the model to estimate future values.
35. Identify logical fallacies in popular culture.
36. Describe the differences between verbal expression of truth and mathematical expression of truth.
37. Determine the logical equivalence between two different verbal statements (simple and compound) in real-world context.

38. Relate the language of conditionals to the language of quantified statements
39. Apply concepts of symbolic logic and set theory to examine compound statements and apply that to decision making of real-world applications.

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:

- Identify the problem or complex issue and its various parts.
- 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.
- Make judgements and draw relevant conclusions from quantitative analysis of data and predict future trends when appropriate.

Instructional Methods

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

Instructional Materials

Textbook: Math in Society, v. 2.6 Lippman & Rasmussen

Software: MyOpenMath and Microsoft Excel

Calculator: A scientific calculator. TI 30XIIS preferred.

Course Content

- Arithmetic and order of operations
- Operations with fractions, percentages, and decimals
- Exponents
- Formulas
- Units and measurement
- Simplifying algebraic expressions and solving linear equations
- Using technology including calculators and spreadsheet software.

Grading/Evaluation

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

The grade for the course will be calculated from assigned assessments as deemed appropriate by the instructor and is outlined in detail in the Syllabus for the course. A grade of “S” will be awarded to students earning at least a 70% weighted total on course assignments. Students receiving less than a 70% will receive a “U” grade.

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.**