

**NEW RIVER COMMUNITY COLLEGE  
DUBLIN, VIRGINIA**

**COURSE PLAN**

Course Number and Title: \_\_\_\_\_ MTH 155 Statistical Reasoning (3 cr.) \_\_\_\_\_

Prepared by: \_\_\_\_\_ Math Faculty \_\_\_\_\_ Fall 2024  
(Date)

Approved by: S. Tolbert-Hungz \_\_\_\_\_ Fall 2024  
(Dean) (Date)

**I. Course Description**

**MTH 155 – Statistical Reasoning.** Presents elementary statistical methods and concepts including visual data presentation, descriptive statistics, probability, estimation, hypothesis testing, correlation, and linear regression. Emphasis is placed on the development of statistical thinking, simulation, and the use of statistical software. This is a Passport and UCGS course. Lecture 3 hours. Total 3 hours per week. 3 credits.

Prerequisite: Competency in MTE 1-5 as demonstrated through placement or unit completion or equivalent or Co-requisite: MCR 5 Learning Support for Statistical Reasoning. (Credit will not be awarded for both MTH 155 Statistical Reasoning and MTH 245: Statistics I. or equivalent)

**II. Introduction**

This course is designed to introduce students to statistical ideas and concepts that apply to a variety of fields and every-day life. It satisfies the general education mathematics requirement for many degree programs.

**III. Student Learning Outcomes**

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

1. Solve application problems by interpreting the materials presented, including determining the nature and extent of the information needed, and present the answer in standard English
2. Estimate and consider answers to mathematical problems in order to determine reasonableness.
3. Distinguish between population and sample, parameters and statistics.
4. Distinguish between types of data (numerical, categorical, nominal ordinal, interval, ratio).
5. Distinguish between types of statistical studies.
6. Determine the type of sampling that is used in a study and whether biases might result.
7. Simulate different types of sampling techniques.
8. Construct frequency distributions, histograms, bar charts, pie charts, stem plots, and box plots.
9. Read statistical graphs and use the graphs to analyze the data.

10. Calculate the mean, median, mode, range, quartiles, variance and standard deviation for a set of data.
11. Construct tables for two variable data, time plots, and scatter plots.
12. Calculate correlations and regression equations.
13. Use regression equations for prediction.
14. Construct and use discrete probability distributions.
15. Calculate the expected value of a discrete probability distribution.
16. Find probabilities and proportions using the standard normal distribution and the Empirical Rule.
17. Calculate z-scores and percentiles.
18. Use the Central Limit Theorem and the probability distribution of sample statistics to find probabilities.
19. Estimate population means, and proportions using the z-distribution
20. Write a complete, concise interpretation for a confidence interval using standard English
21. Test hypotheses about means and proportions.
22. Calculate and interpret P-values.
23. Conduct a chi-squared test for independence between rows and columns of a two-way contingency table
24. Test hypotheses about regression equations
25. Determine the equation of a least-squares regression line and interpret its slope and intercept
26. Calculate and interpret the correlation coefficient and the coefficient of determination
27. Use a computer application such as Microsoft Excel to do statistical calculations and construct statistical graphs
28. Write a complete, concise conclusion for a hypothesis test for a given significance level using standard English

- IV.** 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.
- Identify central issues and assumptions of problem or issue.
- Seek and evaluate the information needed to fully understand the problem or complex issue.
- Identify complexities of an issue, relevant perspective and/or important relationships when taking a position on a complex issue or problem.
- Analyze various perspectives of a problem or complex issue in order to reach a well-reason conclusion or solution.
- Critically evaluate and integrate qualitative and/or quantitative evidence in written communication.
- 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.
- Use quantitative evidence to support a position or clarify a purpose in writing using appropriate language, symbolism, data, and graphs.
- Distinguish a scientific argument from a non-scientific argument.
- Use given empirical information to generate evidence-based conclusions.

#### V. **Instructional Methods**

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

#### VI. **Instructional Materials**

- **Textbook:** Introductory Statistics, openstax College, ISBN: 978-1-938168-20-8
- **Software:** MyOpenMath <https://www.myopenmath.com>
- **Calculator:** TI-36X Pro, TI-83, or TI-84. There are variations of the TI-83 and TI-84; however, all of them will work for this course.
- **Other:** Note paper, graph paper, pencils etc. Submitted work should be neat, legible and preferably written in pencil.

#### VII. **Course Content**

- Populations, parameters, samples and statistics
- Statistical graphs
- Probability and probability distributions
- Sampling distributions
- Estimation of parameters
- Hypothesis tests for parameters
- Correlation and Regression

#### VIII. **Evaluation**

The grade for the course will be calculated from Tests, Quizzes, homework, a final exam and other work as deemed appropriate by the instructor. See individual syllabus for details on percentages/points.

#### IX. **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 subsequent completion of all study missed during an absence. Any instruction missed and not subsequently completed will necessarily affect the grade of the student regardless of the reason for the absence.

## **X. Cheating Policy**

The giving or receiving of any help from another student or unauthorized individual on any graded portion of the course is considered cheating and will not be tolerated. The use of books, notes, electronic devices or any other unauthorized material during tests is considered cheating, and will not be tolerated. Any student found cheating will receive a grade of “0” on that assignment and may receive an “F” for the course. This “0” cannot be replaced by any other score. Mobile phones are not permitted to be used as calculators.

## **XI. 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:

- a. 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.
- b. 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.
- c. 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.

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.

### **XII. Disability and Non-Discrimination Statements**

If you are a student with a documented disability who will require accommodation in this course, please register with the Disability Services Office located in the Advising Center for assistance in developing a plan to address your academic needs.

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.

### **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.

