

**NEW RIVER COMMUNITY COLLEGE
DUBLIN, VIRGINIA**

COURSE PLAN

Course Number and Title: MTH 245 Statistics I /BUS 216 Statistics for Business

Prepared by: Math Faculty Fall, 2024
(Date)

Approved by: S. Tolbert-Hungry Fall, 2024
(Dean) (Date)

I. Course Description

MTH 245 Statistics. Presents an overview of statistics, including descriptive statistics, elementary probability, probability distributions, estimation, hypothesis testing, correlation, and linear regression. Credit will not be awarded for both MTH 155: Statistical Reasoning and MTH 245: Statistics I or equivalent. This is a Passport and UCGS transfer course. Lecture 3 hours.

BUS 216 Probability and Statistics for Business and Economics. Introduces methods of probability assessment and statistical inference. Includes data collection and presentation; descriptive statistics; basic probability concepts; discrete and continuous probability distributions; decision theory; sampling and estimation; and hypothesis testing. Emphasizes business and economic applications. Utilizes computer software as a tool for problem solving. Lecture 3 hours per week.

II. Introduction

This course is designed to develop the skills of probability and statistics which are needed in a variety of fields. BUS 216 is a part of the Business Administration degree program and both BUS 216 and MTH 245 will fit a general education statistics requirement as well as prepare students for a follow up course in probability or statistics.

III. Student Learning Outcomes

On successful completion of this course, students should be able to:

- Graphical and Numerical Data Analysis
 - Identify the difference between qualitative, discrete quantitative, and continuous quantitative data.
 - Construct and interpret graphical displays of data, including (but not limited to) frequency tables, box plots, line charts, histograms, and bar charts.

- Compute measures of center (mean, weighted mean, median, mode), measures of variation, (range, interquartile range, standard deviation, variance), and measures of position (percentiles, quartiles, standard scores).
 - Apply the Empirical Rule
- Sampling/Experimental Design
 - Recognize a representative sample and describe its importance.
 - Identify methods of sampling.
 - Explain the differences between observational studies and experiments.
 - Recognize and explain the key concepts in experiments.
- Probability Concepts
 - Describe the difference between relative frequency and theoretical probabilities and use each method to calculate probabilities of events.
 - Determine whether two events are mutually exclusive or independent.
 - Determine probabilities of composite events using the complement rule, the addition rule, and the multiplication rule.
 - Apply the Law of Large Numbers.
 - Distinguish between discrete and continuous random variables.
 - Use the binomial, normal, and t distributions to calculate probabilities.
 - Recognize or restate the Central Limit Theorem and use it as appropriate.
 - Identify when the use of the normal distribution is appropriate.
 - Identify when the t distribution is preferable to the normal distribution in statistical inference.
 - Distinguish between the distribution of a random variable and the sampling distributions of its associated sample statistics.
 - Identify the sampling distributions of the sample mean and the sample proportion and use them to make statistical inferences.
- Univariate Statistical Inference
 - Explain the difference between point and interval estimates.
 - Describe the concepts of best estimate and margin of error.
 - Construct confidence intervals for population means and proportions.
 - Interpret the confidence level associated with an interval estimate.
 - Distinguish between a two-tailed, left-tailed, and right-tailed hypothesis tests.
 - Conduct hypothesis tests for population means and proportions.
 - Interpret the meaning of both rejecting and failing to reject the null hypothesis.
 - Describe Type I and Type II errors in the context of specific hypothesis tests.
 - Use a p-value to reach a conclusion in a hypothesis test.
 - Identify the interrelationship between hypothesis tests and confidence intervals.
- Two-Sample Statistical Inference
 - Construct and interpret a confidence interval for the difference between two population means where the samples are independent and the population variances are assumed unequal.
 - Construct and interpret a confidence interval for the difference between two population means where the data consists of matched pairs.
 - Conduct a hypothesis test for the equality of two population means where the samples are independent and the population variances are assumed unequal.
 - Conduct a hypothesis test for the equality of two population means where the data consists of matched pairs.
- Correlation and Regression
 - Analyze scatterplots for patterns, linearity, and influential points.

- Determine the equation of a least-squares regression line and interpret its slope and intercept.
- Calculate and interpret the correlation coefficient and the coefficient of determination.
- Conduct a hypothesis test for the presence of correlation.
- **Technology Application**
 - Construct statistical tables, charts, and graphs using appropriate technology.
 - Calculate descriptive and inferential statistics using an appropriate statistical software package.
 - Complete statistical project. Students are required to complete some form of semester project in their course that is worth a significant portion of the student's grade. This could be either an individual or group effort, and could be completed in stages through the semester or as a single, stand-alone exercise. As a minimum, the project should require students to manipulate and draw statistical inferences from a large, realistic data set using a statistical software package.

IV. 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.
- Identify central issues and assumptions of a problem or issue.
- Seek and evaluate the information needed to fully understand the problem or complex issue.
- Identify complexities of an issue, relevant perspectives 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-reasoned 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

- **eText:** Introductory Statistics, Illowsky & Dean, 2013 (Openstax- the online version is free).

<https://openstax.org/details/books/introductory->

Software: MyOpenMath <https://www.myopenmath.com/>

Microsoft Excel which is available on all NRCC computers.

- **Calculator:** A calculator may or may not be REQUIRED. A graphing calculator *will not be permitted on tests or quizzes.*
- 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
- Two-Sample Statistical Inference
- Hypothesis tests for parameters
- Regression

VIII. Evaluation

The grade for the course will be calculated from Tests, 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. 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. The following person has been designated to handle inquiries regarding the college's non-discrimination policies: Dr. Mark C. Rowh, Vice President for Workforce Development and External Relations and Equal Opportunity Officer, 217 Edwards Hall, 540-674-3600, ext. 4241.

XIII. 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](#).

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.

New River Community College
General Health Guidelines and Student Expectations
Fall 2023 Term

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:

1. 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/>
2. 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.