DISCRETE MATHEMATICS
MTH 288-35Z
(Fourteen-Week Course)

Prepared By: Dr. Rachel Keller **Approved By:** Dr. Sarah Tolbert-Hurysz

INSTRUCTOR INFORMATION

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Office Hours: By appointment only

ONLINE STUDENT RESPONSIBILITY:

- ☑ The recommended browser to use with the current version of Canvas is Mozilla Firefox or Google Chrome. Other browsers are inconsistent in their performance with Canvas. When taking tests or quizzes, use a wired connection.
- ☑ Check your VCCS email regularly and respond/keep in touch with your instructor.
- ☑ Students are responsible for addressing and overcoming any technology-related issues that are affecting their ability to participate or complete their college course work. If you are having problems meeting this requirement, please contact your instructor, your student services advisor, or the college's help desk.
- ☑ Please note that cell phones may be inadequate to manage and complete online assignments and are not recommended as students' primary device for course work.

The *Student's Guide to Online Learning* is available on the Online Learning website.

REGULAR AND SUBSTANTIVE INTERACTION:

I, the instructor of the course, will support your learning throughout the semester by communicating and collaborating with you on a regular basis. This communication may be in the form of participation in office hours, direct course instruction, response to questions, email messages, discussion board posts, announcements posted in Canvas, or providing content specific feedback on graded work.

COURSE DESCRIPTION

Description:	Presents topics in sets, counting, graphs, logic, proofs, functions, relations, mathematical induction, Boolean Algebra, and recurrence relations.
Credits:	3
Prerequisite:	Completion of MTH 263 with a grade of C or better or equivalent.
Submissions:	1 per lesson
Assessments:	4+ Introductory Quiz
Proctored Assessments:	1 (Final Exam)
Online Activities:	Required

COURSE MATERIALS

Required Textbook: *Discrete Mathematics: An Open Introduction* by Oscar Levin (**FREE!** Online Interactive e-book)

Required Calculator: A calculator will be necessary for this course, but no instructor designated model is assigned.

Note: NRCC assumes no liability for virus, loss of data, or damage to software or computer when a student downloads software for classes.

COURSE INTRODUCTION

This is an online course designed specifically for students whose learning styles are best served by providing instructional opportunities beyond the traditional classroom setting.

This course satisfies a mathematics requirement for the mathematical, physical, and engineering science programs. Discrete mathematics describes processes that consist of a sequence of individual steps. This contrasts with Calculus which describes processes that change in a continuous fashion. This course presents an introductory study of logic, functions, set theory, counting theory, graph theory, and proofs to give the student a solid grasp of the methods and applications of discrete mathematics to prepare the student for higher level study in mathematics, engineering, computer science, and the sciences.

COURSE OUTCOMES

At the conclusion of this course a student should be able to:

1. Solve problems involving the concepts of sets, including universe set, null set, subset, union, intersection, complement, differences, Cartesian product and the power set.
2. Understand the logical process, methods of proof, and Boolean algebra.
3. Solve problems using the basic principles of counting theory, including permutation, combinations, and the pigeonhole principle.

4. Solve problems involving functions and relations, including operations and properties of functions and using recursive relations to solve problems and develop algorithms.
5. Recognize graphs, represent them as a matrix, solve graph problems and understand related graph algorithms.
6. Understand trees, including spanning trees and tree traversal algorithms.
7. Evaluate sequences.
8. Define sequences recursively.
9. Solve proofs by mathematical induction.

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:

COURSE CONTENT

- Logic
- Mathematical Induction and Recursion
- Set Theory – properties of sets, disproofs, algebraic proofs, Boolean algebra
- Functions and relations defined on general sets
- Relations on sets, reflexivity, symmetry, transitivity, and partial order relations
- Counting theory
- Boolean Algebra
- Graph theory – definitions, trails, paths, trees

INSTRUCTIONAL METHODS

This is an online course designed specifically for students whose learning styles are best served by providing instructional opportunities beyond the traditional classroom setting. The course content will be delivered via instructional videos and textbook excerpts. Assessments will include online homework assignments, discussion boards, and written tests.

GRADING/EVALUATION

Introductory Assignments: There will be a series of introductory assignments that will collectively count for 2% of your final grade. The introductory quiz tests your knowledge of course policies and procedures. The introductory discussion post demonstrates your ability to ask or answer questions in that environment. The “Intro to MyOpenMath” assignment will

familiarize you with the course software. The "Practice Submitting Your Work" assignment tests your ability to create a scanned pdf of your work. **Failure to complete these introductory assignments in the first week of class will result in you being withdrawn from the course for non-participation under the Instructor Initiated Withdrawal policy.**

Homework: Giving your best effort on homework is the single best thing you can do to help your mathematics. As such, the homework will be submitted for each textbook section and will count for a significant portion of the grade (18%). The homework is due in batches (by test content) and is always due by 11:59 pm on the due date. See the course calendar for specific details. Academic Assistance has qualified tutors who can work with you on a regular basis.

Tests: There will be three unit tests. The tests may be taken at home, but you MAY NOT use the internet, the textbook, or any other such materials. You are required to sign an honor pledge indicating that you have followed these policies. Any student suspected of cheating will receive a grade of 0 for that assessment. You will have 3 hours to complete the test and upload your work. You may use a graphing calculator. You must submit a pdf scan of your work for all test questions before submitting the test. **There will be NO make-up tests – for ANY reason!** Any missed test will receive a score of "0". Tests may be taken early or up until the close of business on the due date. The average on all tests will count for 45% of the final course grade. **Only work submitted WITH the exam will be graded. Email submissions will not be accepted.**

Final Exam. There will be one comprehensive final due on/before **DEC 10**. **The final exam must be taken in a proctored environment such as our testing centers**. The score on the final will replace the lowest test score (including any missed test) if that will improve your final average. *The final will count as at least 35% of the course grade.* You will be permitted to use a formula sheet on the final exam.

NOTES on grading and tests:

- Keep in mind that you might hit a trouble spot somewhere, so you should MOVE AS FAST AS YOU COMFORTABLY CAN, BUT AS SLOWLY AS YOU NEED, in order to meet the deadlines for the tests. The tests **MUST** be taken on or before the scheduled dates; however, you are encouraged to "work ahead."
- I do not curve grades. I do not "give" grades. You earn what you get, so plan to work accordingly.

The final grade for the course will be determined as follows:
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Description	Percent of Grade
Introductory Assignments	2%
Homework	18%
Unit Tests (3)	45%
Final Exam	35%

Grading Scale:

Grade	Percent
A	90-100
B	80-89
C	70-79
D	60-69
F	0-59

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."
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. The last date of attendance for an online course will be the last date that work was submitted.

A grade of withdrawal implies that the student was making satisfactory progress in the course at the time of withdrawal, or that the withdrawal was officially made before the deadline date published in the college calendar, or that the student was administratively transferred to a different program.

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. Course attendance requires the student's active participation in an instructional activity related to the course, such as attending a class lecture or lab, or by participating in an online class with an assignment submission, completion of a test or exam, or other substantial course activity. 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, 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), the last date of attendance/participation will be documented. 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 and dean.

CHEATING/PLAGIARISM POLICY

A grade of "F" will be awarded for the semester to any student caught cheating. 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.

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.

Inquiries concerning Title IX (sexual harassment, sexual assault/domestic violence/dating violence, and stalking) may be directed to Tammy Smith (Title IX Coordinator for Students),Interim Dean of Student Services, 268 Rooker Hall, 540-674-3600, ext. 4203,

tsmith@nr.edu. For employees, Melissa Anderson, Interim Vice President for Finance & Administration Office, is the Title IX Coordinator for Employees, Godbey Hall Room 22, 540-674-3600, ext. 3660, manderson@nr.edu.

Inquiries concerning ADA and Section 504 may be directed to Ms. Lucy Howlett, Coordinator of The Center for Disability Services, 275 Rooker Hall, V/TTY 540-674-3619, Videophone 540-585-4724.

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.

ACADEMIC SUCCESS CENTER (TUTORING CENTER)

NRCC offers free tutoring in every subject through the Academic Success Center, our one-stop campus resource for help with coursework. In addition to course-specific tutoring, the Academic Success Center houses the NRCC Writing Center, where students may work with tutors on issues specific to writing, whether for a course, a resume, a job application, or for pleasure.

Students may receive tutoring and/or writing assistance on an as-needed basis (walk-in), or via scheduled appointments. Students unable to come to campus may participate in online sessions by appointment. In addition, online tutorials for many courses are available on the website or through the Canvas portal “NRCC Tutoring Services” that students will find under “My Organizations.”

Tutoring is available during the week Monday-Friday. To schedule an appointment or meet with a tutor, visit the Academic Success Center in Godbey Hall (G131) on campus in Dublin, or the Christiansburg site (C202); students may also call (540) 674-3664 or complete an online tutor request form. For more information, including hours, visit the Academic Success Center webpage.

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:

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
b. Virginia Department of Health
c. New River Health District

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.