The mission of Concord University is to provide quality, liberal arts based education, to foster scholarly and creative activities and to serve the regional community (http://www.concord.edu/academics/).

Course Prefix, Number and Title: Math 219, Discrete Mathematics

Course CRN # and Section: 20196 sec 01

Semester Taught: Spring 2019

Credit Hours: 3

Prerequisites: Math 103 and CS 201

Course Time: 11:00 – 11:50 MWF

Building and Room Number: S101

Professor: Dr. Dan Krider,
Professor of Mathematics

Office Location: S100-G

Office Hours: 9:30-11:00 MTWRF

Email: kriderd@concord.edu

Phone: 384-5329

Office Fax: 384-6225

College/Department Website
math.concord.edu

Course Description/Rationale:

Math 219 is a required course in the Computer Information Systems program. It introduces students to fundamental concepts and notation in computer science.

Course Management System: None

Hardware/Software Needed: None

Text requirements: *Discrete Mathematics with Applications*, 4th edition by Susanna Epp

Concord University Educational Goals

Skills: (1) Effective inter-communication skills and literacy adapted as needed for the demands of various kinds of discourse.

(2) An ability to employ appropriate observational, logical, analytical, computational, creative, and critical thinking skills within and across academic disciplines; and to apply these skills in problem-solving.

Knowledge: (4) Acquaintance with principles underlying languages, for example linguistic, mathematical, and computer-language systems.

National Standards

MATH 219 comprises all of the discrete mathematics topics required by the NCTM in its 2012 Mathematics Content for Secondary Mathematics Teachers:

Specific Learning Outcomes

Learning Objective 1: Demonstrate basic understanding of sets, logic, functions, and combinatorial graphs. Apply elementary methods of enumeration and proof.

- Construct truth tables for compound statements that are composed of negations, conjunctions, disjunctions, conditionals, and biconditionals.
- Relate a statement, with or without quantifiers, to its converse, inverse, and contrapositive, using DeMorgan's Laws where appropriate.
- Prove and disprove statements by using direct proof and indirect proof, as well as examples and counterexamples where appropriate.
- Prove elementary statements about integers, natural numbers, even numbers, odd numbers, and prime numbers.
- Use definitions, Venn Diagrams, and DeMorgan's Laws to simplify expressions with unions, intersections, differences, and complements.
- Apply the sum and product principles to compute the cardinalities of disjoint unions and cartesian products of sets.
- Determine subsets, power set, and size of the power set and establish the equality of two sets by using proof by double inclusion.
- Determine whether a relation or rule of assignment is a function, and count the number of functions with a specified finite domain and target.
- Determine whether a function is injective, surjective, and/or bijective, and use the pigeonhole principle to prove existence theorems.
- Identify the order, size, vertex degrees, adjacency matrix, and degree sequence for combinatorial graphs, and apply the handshaking lemma.
- Produce and analyze examples of graphs, including paths, cycles, trees, forests, complete graphs, and complete bipartite graphs.
- Identify the subgraphs, complements, and connected components of graphs and determine whether a pair of graphs is isomorphic.

Learning Objective 2: Identify equivalence relations. Implement algorithms, including ciphers. Generate sequences and their closed forms from recurrence relations. Prove, by mathematical induction, statements about numbers, sets, and graphs.

- Prove whether a given relation on numbers, sets, or graphs is an equivalence relation and identify equivalence relations with partitions.
- Implement and analyze algorithms, including ciphers based on modular arithmetic.
- Use a recurrence relation to generate terms of a sequence, including the use of Σ notation, Π notation, factorials, and the Fibonacci numbers.
- Use finite differences to derive closed form expressions for first order recurrence relations with polynomial differences.
- Use characteristic polynomials to derive closed form expressions for linear homogeneous recurrence relations.
- Prove, by mathematical induction, the validity of closed form expressions for recurrence relations.
- Prove, by mathematical induction, statements about numbers, sets, and graphs.

Course Requirements

Students must complete the course with a passing average on the tests and final exam

Grading Policy and Scale, Make-up Policy, Late Work

Homework will be assigned, collected, and graded. Homework grades will be used to determine bonus points on the tests and the final. After the answer to a homework assignment is discussed in class, late submission of the assignment will not be accepted. Occasionally, a student may have a valid reason for not being able to turn in a homework assignment on time. In this situation, the student might receive an excuse for the assignment but it is the responsibility of the student to explain the reason for not being able to complete the assignment on time. The course grade is determined as follows:

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

Course Timeline

There will be three tests worth 100 point each plus a comprehensive final worth one and a half tests. The chapters covered on each test are as follows:

Test 1: Chapters 1 – 4
Test 2: Chapters 5 – 8
Test 3: Chapters 9 – 10

After the third test, Chapter 11 and some of Chapter 12 will be covered.

Accessibility/Accommodations:

Concord University is committed to responding to the needs of students with disabilities as defined by the Americans with Disabilities Act. Please inform your instructor at the beginning of the class semester if you have a disability and are requesting accommodations. It is your responsibility to self-disclose that you are requesting accommodations. The University and instructor will provide you with a reasonable accommodation. You should register with CU's Disability Services Office, located in the Athens campus Jerry and Jean Beasley Student Center, Bottom Floor, across from the Campus Post Office. The Disability Services Office phone is 304-384-6086 or you can email the Director, Nancy Ellison, at nellison@concord.edu for assistance.

Academic Dishonesty

Academic dishonesty is morally unacceptable as well as destructive to the learning and teaching atmosphere. Academic dishonesty includes the giving or receiving of improper help on examinations or assignments, falsifying documents, and plagiarism (the act of stealing and using, as one's own, the ideas or the expression of the ideas of another). Such dishonesty can lead to a variety of penalties — including but not limited to failure of assignment, failure of course, loss of institutional privileges, or dismissal from the University. (See University Catalog Academic Policies and Procedures.)

Concord University Honor Code

A Concord University Honor Code was approved by students, staff, faculty, administration, and the CU Board of Governors. The Code states:

"As a member of the Concord University Community I will act with honesty and integrity in accordance with our fundamental principles and I will respect myself and others while challenging them to do the same."

The Honor Code is intended to unite the Concord community behind a culture of honesty, integrity, and civility.

Class/Online Attendance Policy

Regular class attendance is part of a student's academic obligation at Concord. Irregular attendance may affect academic performance adversely and is detrimental to the atmosphere of a class. (See University Catalog Academic Policies and Procedures.)

Emergency Alert System

In an effort to increase safety and security on our campus, Concord University encourages everyone to register for instant text message alerts. Alerts will only be used for security and safety notices. All students, faculty, and staff are eligible to receive text message alerts on their cell phones or email alerts. Please contact the IT Help Desk for further assistance (304-384-5291).

Emergency Information

Emergency/courtesy telephones are located at the main entrance of each residence hall and at various other locations on campus. Emergency telephones can be identified by the flashing blue light and will provide the user with a direct link to Public Safety at the press of a button. To report an on-campus emergency, call 304-384-5357 or 911. The Office of Public Safety is located on the bottom floor of the Rahall Technology Center. For further emergency information go to: http://www.concord.edu/administration/office-public-safety.

Inclement Weather Policy

As a general policy, the University will remain in normal operations during adverse weather conditions. In the event of severe weather conditions, the following may occur:

University Closure
No students or employees are to report.

Classes Cancelled
Students do NOT report BUT employees are expected to report to work at their normal time.

Operating on an Inclement Weather Delay
Under this schedule, all 8 a.m. classes will start at 10 a.m. Students and faculty will follow the Inclement Weather Schedule. (See http://www.concord.edu/emergency-alerts for Athens/Beckley Inclement Weather Schedules.)

**Announcements invoking the late schedule or other options referenced above are aired on area radio and television stations and are sent as text and email messages to those enrolled for this service.*

Student Conduct

In classrooms, online, laboratories, and during any activities that are part of course requirements, students are expected to observe reasonable rules of conduct.

Sexual Harassment & Assault

Federal law, Title IX, and Concord University policy prohibits discrimination, harassment, and violence based on sex and gender (Including sexual harassment, sexual assault, domestic/dating violence, stalking, sexual exploitation, and retaliation). If you or someone you know has been harassed or assaulted, you can receive confidential counseling support through the Concord University Counseling Center (304-384-5290). Alleged Violations can be reported non-confidentially to the Concord University Title IX Coordinator at 304-384-6327 or titleix@concord.edu. Reports to Campus Security can be made at (304-384-5357). As an employee at Concord University, I am a mandatory reporter which means I must report any sexual misconduct I am made aware of. This includes verbal or written (such as in an assignment) disclosures of sexual harassment or sexual assault.

Technology Services

Contact the CU Help Desk at extension 5291 from campus or 304-384-5291 off campus. You may also e-mail cuhelpdesk@concord.edu.

Syllabus Disclaimer: This syllabus is subject to change based on the needs of the class.