Course Discipline and Number: MATH 216　　　　　　　　**Year: 2019-2020**
Course Title: Discrete Mathematics　　　　　　　　　　　**Credit Hours: 4**

Attendance Policy: *To maintain good grades, regular attendance in class is necessary. Absence from class is considered a serious matter and absence never excuses a student from class work. It is the responsibility of all instructors to distribute reasonable attendance policies in writing during the first week of class. Students are required to comply with the attendance policy set by each of their instructors. Students are not penalized if they are unable to attend classes or participate in exams on particular days because of religious beliefs, in accordance with Chapter 161, Section 224-a of the Education Law of the State of New York. Students who plan to be absent from classroom activity for religious reasons should discuss the absence in advance with their instructors. See college catalog for more information.*

Services for Students with Disabilities: *It is the College's policy to provide, on an individual basis, appropriate academic adjustments for students with disabilities, which may affect their ability to fully participate in program or course activities or to meet course requirements. Students with disabilities should contact the Coordinator of Access and Equity Services, to discuss their particular need for accommodations. All course materials are available in alternate formats upon request.*

Course Description

This is an introductory course intended primarily for students in the Computer Science programs or the Liberal Arts & Sciences Adolescence Teacher Education concentration in mathematics, but it could serve as a liberal arts math elective for any student. Topics include set theory, functions and relations, logic, methods of proof, induction and recursion, number theory, counting methods and discrete probability, graph theory, trees, and finite state automata. MATH 216 fulfills the SUNY General Education Mathematics requirement. Prerequisites: C or better grade in MATH 120 or equivalent; RDNG 116 if required by placement testing; prior completion or concurrent enrollment in ENGL 100. 4 Cr. (4 Lec.) Spring semester.

Course Context/Audience

MATH 216 is required in the Computer Science programs and is recommended for the Mathematics concentration of the Liberal Arts and Sciences: Adolescence Education (Teacher Education Transfer) A.S. degree program. It also satisfies a liberal arts and sciences elective or SUNY General Education mathematics elective requirement.

Basic Skills/Entry Level Expectations

Writing:　　WC　College level writing skills are required. See course co-requisites or pre-requisites.
Math:　　　MC　College-level mathematics skills are required. See course prerequisites for details.
Reading:　　R4　RDNG 116 if required by placement testing.

Course Goals

After successful completion of MATH 216, students will be able to:

1. Understand the process of Logic and Proofs
2. Construct valid arguments, and apply rules of inference with compound and quantified statements
3. Work with and simplify logic circuits and Boolean expressions
4. Reason inductively and recursively
5. Design, trace, and analyze basic algorithms
6. Use Combinatorics and Discrete Probability in a variety of applications
7. Identify basic principles of Number Theory and work through fundamental proofs

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8. Work with sets, properties of sets, and functions / relations on sets
9. Understand graphs and trees
10. Work with and simplify Finite State Automata

Course Objectives/Topics

Objective/Topic	# Hours
Logic of Compound Statements and Digital Logic Circuits	6 Hours
Logic of Quantified Statements	6 Hours
Number Theory and Methods of Proof	6 Hours
Sequences and Mathematical Induction	8 Hours
Set Theory	6 Hours
Functions and Relations	8 Hours
Counting and Probability	8 Hours
Graphs and Trees	6 Hours
Regular Expressions and Finite State Automata	6 Hours

General Education Goals - Critical Thinking & Social/Global Awareness

CRITICAL THINKING OUTCOMES	HOW DOES THE COURSE ADDRESS THE OUTCOMES (Include required or recommended instructional resources, strategies, learning activities, assignments, etc., that must or could be used to address the goal/outcomes)
Students will be able to: ➤ develop meaningful questions to address problems or issues. ➤ gather, interpret, and evaluate relevant sources of information. ➤ reach informed conclusions and solutions. ➤ consider analytically the viewpoints of self and others.	Logic is the basis for the course. Students learn to form valid, documented, complete arguments and recognize fallacies and errors. They practice translating informal language to formal statement forms and interpret the validity of available information. The use of multiple direct and indirect proof methods provides the ability to generalize, specialize, and recognize contradictions in statement forms. Necessary and Sufficient conditions are examined. Historical problems are introduced and analyzed, and open mathematical problems are presented for consideration. Reasoning, methods of checking a solution, equivalency of statement forms, and analysis of algorithms develop students' skills of evaluating the efficiency and accuracy of multiple approaches to similar problems.
SOCIAL/GLOBAL AWARENESS OUTCOMES	HOW DOES THE COURSE ADDRESS THE OUTCOMES (Include required or recommended instructional resources, strategies, learning activities, assignments, etc., that must or could be used to address the goal/outcomes)
➤ Students will begin to understand how their lives are shaped by the complex world in which they live. ➤ Students will understand that their actions have social, economic and environmental consequences.	Graph Theory visits a variety of environmental and social topics like minimization of consumption, social networks, area coverage, ancestry, etc. Arguments and Argument Proofs stress validity and invalidity of conclusions, especially common fallacies involving stereotype statements and why those are not factually correct. Students learn to develop critical skills for evaluating world views; interpret the intentions of certain structures and statement forms; find counterexamples; and compose appropriate, justified, and clearly stated arguments.

Instructional Methods

The main instructional method should be the lecture format; however, group work should be infused throughout the course.

Methods of Assessment/Evaluation

Method	% Course Grade
Unit tests	20 - 40%
~~Cumulative~~ Final Exam	30 - 40%
Midterm	20 - 40%
Homework	0 - 10%
Readings and Class Participation	0 - 10%

Text(s)

Discrete Mathematics with Applications, Susanna S. Epp., 4th Edition, © 2004 Brooks-Cole Publishing Co.

Bibliography

Discrete Mathematics with Proof, Eric Gossett, © 2003, Prentice Hall. ISBN 0-13-066948-2

Discrete Mathematics, 6th edition, Richard Johnsonbaugh, © 2005, Prentice Hall. ISBN 0-13-117686-2

A Spiral Workbook for Discrete Mathematics, Harris Kwong, SUNY Fredonia, Open SUNY Textbooks

A course in Discrete Structures, Rafael Pass & Wei-Lung Dustin Tseng, Cornell University

Other Learning Resources

Audiovisual No resources specified
Electronic www.cengage.com/math/epp
Other Principles and Standards for School Mathematics, National Council of Teachers of Mathematics, ISBN 0-87353-480-8. Student Solutions Manual and Study Guide, ISBN-10: 0-495-82613-8; ISBN-13: 978-0-495-82613-2