Rowan College at GLOUCESTER COUNTY
SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM) DIVISION
1400 TANYARD ROAD, SEWELL, NJ 08080
856-468-5000

MAT 201: DISCRETE MATHEMATICS
SYLLABUS
LECTURE HOURS/CREDITS: 3/3

CATALOG DESCRIPTION
Prerequisite: MAT 107 – Pre-Calculus and Mathematical Analysis

This course is directed toward computer science and mathematics majors. Topics include sets, relations, functions, logic, induction, combinatorics, Boolean algebra, recurrence relations digraphs, and trees. Emphasis is on the solution of problems.

TEXTBOOK AND COURSE MATERIALS
It is the **responsibility of the student** to confirm with the bookstore and/or their instructor the textbook, handbook and other materials required for their specific course and section.

Please see current textbook prices at rcgc.bncollege.com

EVALUATION AND ASSESSMENT

Grading Distribution

Individual instructors may include the following assessment(s): • Exams • Quizzes • Class Discussions • Written Assignments • Attendance and Participation	Grading to be determined by individual instructors

Grading Scale Example
The grading scale for each course and section will be determined by the instructor and distributed the first day of class.

ROWAN COLLEGE AT GLOUCESTER COUNTY CORE COMPETENCIES

(Based on the NJCC General Education Foundation - August 15, 2007; Revised 2011)

This comprehensive list reflects the *core* competencies that are essential for all RCGC graduates; however, each program varies regarding competencies required for a specific degree. Critical thinking is embedded in all courses, while teamwork and personal skills are embedded in many courses.

	RCGC Core Competencies
1	**Written and Oral Communication** Students will communicate effectively in both speech and writing.
2	**Quantitative Knowledge and Skills** Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.
3	**Scientific Knowledge and Reasoning** Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.
4	**Technological Competency** Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.
5	**Society and Human Behavior** Students will use social science theories and concepts to analyze human behavior and social and political institutions and to act as responsible citizens.
6	**Humanistic Perspective** Students will analyze works in the fields of art, history, music, or theater; literature; philosophy and/or religious studies; and/or will gain competence in the use of a foreign language
7	**Historical Perspective** Students will understand historical events and movements in World, Western, non-Western or American societies and assess their subsequent significance.
8	**Global and Cultural Awareness** Students will understand the importance of a global perspective and culturally diverse peoples.
9	**Ethical Reasoning and Action** Students will understand ethical issues and situations.
10	**Information Literacy** Students will address an information need by locating, evaluating, and effectively using information

MAT 201 CORE COMPETENCIES

This course focuses on two of RCGC's Core Competencies:

- Quantitative Knowledge and Skills
- Scientific Knowledge and Reasoning

STUDENT LEARNING OUTCOMES: MAT 201 – DISCRETE MATHEMATICS

Successful completion of MAT 201 will help students:	**RCGC Core Competencies**	**Evaluation / Assessment** **(Additional means of evaluation may be included by individual instructors)**
1. Understand and apply the concepts of set, subset, induction, and recursion.	- Quantitative Knowledge and Skills - Scientific Knowledge and Reasoning	- Assignments and Exams
2. Use the set of integers to define the concepts of modulo and remainders.	- Quantitative Knowledge and Skills - Scientific Knowledge and Reasoning	- Assignments and Exams
3. Understand and apply concepts of functions and counting.	- Quantitative Knowledge and Skills - Scientific Knowledge and Reasoning	- Assignments and Exams
4. Understand and apply graph theory.	- Quantitative Knowledge and Skills - Scientific Knowledge and Reasoning	- Assignments and Exams
5. Recognize and apply proof techniques and the concepts of logic.	- Quantitative Knowledge and Skills - Scientific Knowledge and Reasoning	- Assignments and Exams
6. Describe and apply Boolean Algebras and Boolean Functions.	- Quantitative Knowledge and Skills - Scientific Knowledge and Reasoning	- Assignments and Exams
7. Discuss combinatorics and probabilities.	- Quantitative Knowledge and Skills - Scientific Knowledge and Reasoning	- Assignments and Exams

MAT 201 TOPICAL OUTLINE

Speaking Mathematically
- Variables
- The Language of Sets
- The Language of Relations and Functions

The Logic of Compound Statements
- Logical Form and the Logical Equivalence
- Conditional Statements

The Logic of Quantified Statements
- Predicates and Quantified Statements I
- Predicates and Quantified Statements II
- Statements with Multiple Quantifiers

Elementary Number Theory and methods of Proof
- Direct Proof and counterexample I: Introduction
- Direct Proof and Counterexample II: Rational Numbers

Sequences, Mathematical Induction, and Recursion
- Sequences
- Mathematical Induction I
- Defining Sequences Recursively

Set Theory
- Set Theory: Definitions and the Element Method of Proof
- Properties of Sets

Functions
- Functions Defined on General Sets
- One-to-One and Onto, Inverse Functions

Relations
- Relations on Sets
- Reflexivity, Symmetry and Transitivity
- Modular Arithmetic and Z_n

Counting and Probability
- Introduction
- Possibility Trees and the Multiplication Rule
- Counting Elements of Disjoint Sets: The Addition Rule
- The Pigeonhole Principle
- Pascal's Formula and the Binomial Theorem

Graphs and Trees
- Graphs: Definitions and Basic Properties