



Science, Technology, Engineering, and Mathematics (STEM) Division  
3322 College Drive, Vineland, NJ 08360  
856-691-8600

## **MA 111 Discrete Mathematics**

Syllabus

Lecture Hours/Credits: 4/4

### **Catalog Description**

*Prerequisites: MA 110 or permission from the instructor*

Discrete Mathematics is designed to meet the needs not only of students majoring in computer science but of wider audience, especially students in mathematics and science. The course provides tools for formal reasoning as well as providing an early look at the connections between mathematics and computer science and the applications they generate. Topics include counting rules, propositional and first-order logic, set theory, functions (with an emphasis on recursive functions), basic equivalence relations, algorithms, proofs, graphs and trees. An introduction to Boolean algebra and switching circuits is included.

### **Textbook and Course Materials**

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

Click here to see current textbook prices at [ccnj.bncollege.com](http://ccnj.bncollege.com).

### **Evaluation Assessment**

#### **Online Proctoring**

All courses offered at RCSJ, whether they are web-enhanced, hybrid, or fully online, may include assessments that make use of Online Proctoring. To find out more about Online Proctoring, and to learn about the minimum technical requirements, visit [rcsj.edu/elearning/online-proctoring](http://rcsj.edu/elearning/online-proctoring).

#### **Grading Distribution**

Grading to be determined by individual instructors.

Individual instructors may include the following assessment(s):

- Class participation/Attendance
- Quizzes and lecture exams
- Final Exam
- Lab reports (incl. field trips)
- Project

## Grading

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

## Rowan College of South Jersey Core Competencies

(Based on the NJCCC General Education Foundation - August 15, 2007; Revised 2011; Adopted 2014)

This comprehensive list reflects the core competencies that are essential for all RCSJ 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.

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.

## MA 111 Core Competencies

This course focuses on three of RCSJ's Core Competencies:

- [Add Core Competencies here](#)

## Student Learning Outcomes: Discrete Mathematics

Successful completion of MA 111 will help students:	RCSJ Core Competencies	Evaluation / Assessment (Additional means of evaluation may be included by individual instructors)
Develop logic and problem solving skills through exposure to and constructing many different forms of proof and/or arguments		<ul style="list-style-type: none"> <li>• Class participation/Attendance</li> <li>• Quizzes and lecture exams</li> <li>• Final Exam</li> <li>• Lab reports (incl. field trips)</li> <li>• Project</li> </ul>
Develop an understanding of sets, relations, and functions		<ul style="list-style-type: none"> <li>• Class participation/Attendance</li> <li>• Quizzes and lecture exams</li> <li>• Final Exam</li> <li>• Lab reports (incl. field trips)</li> <li>• Project</li> </ul>
Develop, perform and/or investigate an algorithm		<ul style="list-style-type: none"> <li>• Class participation/Attendance</li> <li>• Quizzes and lecture exams</li> <li>• Final Exam</li> <li>• Lab reports (incl. field trips)</li> <li>• Project</li> </ul>
Develop strong computational skills for typical counting problems		<ul style="list-style-type: none"> <li>• Class participation/Attendance</li> <li>• Quizzes and lecture exams</li> <li>• Final Exam</li> <li>• Lab reports (incl. field trips)</li> <li>• Project</li> </ul>
Evaluate and find the closed form for simple recurrence relations		<ul style="list-style-type: none"> <li>• Class participation/Attendance</li> <li>• Quizzes and lecture exams</li> <li>• Final Exam</li> <li>• Lab reports (incl. field trips)</li> <li>• Project</li> </ul>
Develop an understanding of graph theory		<ul style="list-style-type: none"> <li>• Class participation/Attendance</li> <li>• Quizzes and lecture exams</li> <li>• Final Exam</li> <li>• Lab reports (incl. field trips)</li> </ul>

Successful completion of MA 111 will help students:	RCSJ Core Competencies	Evaluation / Assessment (Additional means of evaluation may be included by individual instructors)
		<ul style="list-style-type: none"> <li>• Project</li> </ul>
Develop an understanding of trees and their connection with search or sorting algorithms		<ul style="list-style-type: none"> <li>• Class participation/Attendance</li> <li>• Quizzes and lecture exams</li> <li>• Final Exam</li> <li>• Lab reports (incl. field trips)</li> <li>• Project</li> </ul>
Develop an understanding of Boolean Algebra and Combinatorial Circuits		<ul style="list-style-type: none"> <li>• Class participation/Attendance</li> <li>• Quizzes and lecture exams</li> <li>• Final Exam</li> <li>• Lab reports (incl. field trips)</li> <li>• Project</li> </ul>

## Topical Outline

- Propositional + Predicate Logic
- Mathematical systems, proof and induction
- Sets, Sequences, Strings, Number Systems, Relations
- Equivalence Relations, Functions, Intro to Algorithms
- Notation for Algorithms and an example (Euclidean)
- Recursive Algorithms and Intro to Complexity
- Basic Counting methods and Mult / Add principles
- Binomial Coefficients and the pigeonhole principle
- Recurrence Relations
- Solving Rec. Rel., Analy of Algor by Worse/Average Case
- Basic Graph theory, cycles and paths
- Intro to Tree terminology and spanning trees
- Binary Trees, Decision trees Boolean Algebra, Combinatorial Circuits
- Synthesis of circuits, minimization problem and apps

### **Affirmative Action Statement**

The Board of Trustees is committed to providing a work and academic environment that maintains and promotes affirmative action and equal opportunity for all employees and students without discrimination on the basis of certain enumerated and protected categories. These categories are race, creed (religion), color, national origin, nationality, ancestry, age, sex (including pregnancy and sexual harassment), marital status, domestic partnership or civil union status, affectional or sexual orientation, gender identity or expression, atypical hereditary cellular or blood trait, genetic information, liability for military service, or mental or physical disability, including AIDS and HIV related illnesses.

For questions concerning discrimination, contact Almarie J. Jones, Special Assistant to the President, Diversity and Equity/Title IX and Compliance, 856-415-2154 or [ajones@rcsj.edu](mailto:ajones@rcsj.edu) or (Cumberland) Nathaniel Alridge, Jr., JD, Director, Diversity and Equity/Title IX and Judicial Affairs, 856-691-8600, ext. 1414 or [nalridge@rcsj.edu](mailto:nalridge@rcsj.edu). For disability issues or any barriers in the learning or physical environment related to a document condition/disability please contact: Gloucester campus – Dennis M. Cook, Director, Department of Special Services, ADA/504 Officer at 856-415-2265 or [dcook@rcsj.edu](mailto:dcook@rcsj.edu); or Cumberland Campus – Meredith Vicente, Senior Director, Physical & Learning Disabilities, Center for Academic & Student Success (CASS) at 856-691-6900 ext. 1282 or [mvicent1@rcsj.edu](mailto:mvicent1@rcsj.edu)

### **Department of Special Services**

The Department of Special Services, located in the Enrollment and Student Services building, within the Testing Center, welcomes students of all abilities. The staff members in Special Services are committed to providing support services and ensuring equal access to eligible students with documented conditions/disabilities as outlined by the Americans with Disabilities Act (ADA) and the Americans with Disabilities Act with Amendments Act (ADAAA). For more information, please visit our website-[Department of Special Services](#) or call 856-691-8600 x1445 or x1487.

**Reporting Allegations of Sexual Assault Resource Referrals (8/2020)**  
**Cumberland Campus**

There are multiple safe places for students to report allegations of sexual assault, both on and off campus. Reports of sexual assault can be made to any of the following offices listed in the chart below.

All students are encouraged to report alleged crimes on campus. Employees must report crimes that pose an immediate threat to the campus to the Security Office, the local Police Department or the Sheriff's Office.

<b>Service</b>	<b>Resource</b>	<b>Phone Number/Location/Website</b>
<b>Non-Confidential Reporting</b>  Law Enforcement	Vineland Police Dept.	856-691-4111
	Millville Police Department	856-825-7010
	Cumberland Co. Sheriff's Office	856-451-4449
	Cumberland County Emergency Services	<b>9-1-1</b>
	Cumberland Campus Security 856-200-4706 (Direct)	Andres Lopez, Director Safety and Security 856-691-8600, ext. 1777
<b>Non-Confidential</b>  On-Campus Reporting Support Services	Almarie J. Jones Special Assistant to the President Diversity and Equity, Title IX and Compliance	856-415-2154 College Center, room116 <a href="mailto:ajones@rcsj.edu">ajones@rcsj.edu</a>
	Nathaniel Alridge, Jr., JD, Director Diversity and Equity, Title IX and Judicial Affairs	856-200-4712 <a href="mailto:nalridge@rcsj.edu">nalridge@rcsj.edu</a> Academic Building, 2 <sup>nd</sup> floor
	Kellie W. Slade Executive Director Student Services, Student Life	856-200-4615 <a href="mailto:kslade@rcsj.edu">kslade@rcsj.edu</a> Student Life Building (near gym)
<b>Confidential</b> On-Campus Counseling and Support Services	Heather Bense, LCSW, ACS Director	856-200-4759 <a href="mailto:hbense@rcsj.edu">hbense@rcsj.edu</a> <a href="#">Academic Building downstairs</a>
	John Wojtowicz, LSW, VACW Mental Health Counselor	856-200-4760 <a href="mailto:jwojtowicz@rcsj.edu">jwojtowicz@rcsj.edu</a>
	<b>Student Counseling and Wellness Center</b>	<b>Academic Building – 1<sup>st</sup> floor</b>
<b>Confidential</b> Off-Campus Full-Service Support	<b>Center for Family Services – Services Empowering Rights of Victims (SERV)</b>	24/7 Hotlines <b>Cumberland Co. – 1-800-225-0196</b> Camden & Glo. Co. 1-866-295-7378 <a href="http://centerffs.org/serv">centerffs.org/serv</a>
<b>Sexual Assault Nurse Examiner on Site</b>	<b>Inspira Medical Center Vineland</b>	<b>1505 W. Sherman Ave., Vineland, NJ 856-641-8000</b>