



STEM Studies Division  
3322 College Drive, Vineland, New Jersey 08360  
856-691-8600

## **CS 337 - Applied Database Technologies**

Syllabus

Lecture Hours/Credits: 3/3

### **Catalog Description**

Catalog Description Prerequisite: AS Cybersecurity

This course covers the practical aspects of relational database systems, including database modeling using ER and EER diagrams, physical database design, the relational database query language SQL, normal forms, database integrity and transaction management. Includes a project involving an RDBMS.

### **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 [RCSJ.bncollege.com](http://RCSJ.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. Students will be provided with hands-on projects to design, integrate, and demonstrate their learning experience that complements the textbook material. Individual instructors may include the following assessment(s):

- Assignments/Projects
- Exams
- Quizzes
- Papers

## **Grading**

The grading scale for each course and section will be determined by the instructor and distributed on 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.

## **CS 337 Core Competencies**

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

- Technological Competency
- Information Literacy
- Written and Oral Communication

**Student Learning Outcomes: Applied Database Technologies**

| <p><b>Successful completion of CS 337 will help students:</b></p>  | <p><b>RCSJ Core Competencies</b></p>  | <p><b>Evaluation / Assessment</b><br/>(Additional means of evaluation may be included by individual instructors)</p> |
|--|---|--|
| <p>Identify and describe the three main hardware components of a client/server system.<br/>Describe the way a client accesses the database on a server using these terms: application software, data access API, database management system, SQL query, and query results.<br/>Describe the way a relational database is organized using these terms: tables, columns, rows, cells, primary keys, unique keys, and foreign keys.</p> | <p>Technological Competency<br/>Information Literacy<br/>Written and Oral Communication</p> | <p>Assignments/Projects<br/>Exams<br/>Quizzes<br/>Papers</p>   |
| <p>Explain the function of each of these client tools: the MySQL Command Line Client, MySQL Workbench, and the MySQL Reference Manual. Explain Code SELECT statements that require any of the MySQL language elements. Identify, and analyze the Code summary queries that use aggregate functions, including queries that use the WITH ROLLUP operator and the GROUPING and IF functions.</p>                                       | <p>Technological Competency<br/>Information Literacy<br/>Written and Oral Communication</p> | <p>Assignments/Projects<br/>Exams<br/>Quizzes<br/>Papers</p>   |
| <p>Identify and explain script that creates and calls a stored procedure that can be used to test MySQL's language features. Differentiate the use of MySQL to write procedural code that uses IF statements, CASE statements, loops, cursors, and condition handlers.</p>   | <p>Technological Competency<br/>Information Literacy<br/>Written and Oral Communication</p> | <p>Assignments/Projects<br/>Exams<br/>Quizzes<br/>Papers</p>   |
| <p>Describe the responsibilities of a database administrator. Distinguish between administrative privileges and object privileges. Describe what a user can do when given any of these privileges for a MySQL object: SELECT, UPDATE, INSERT, DELETE, and EXECUTE. Distinguish between the four privilege levels. Distinguish between a full backup and an incremental backup.</p>   | <p>Technological Competency<br/>Information Literacy<br/>Written and Oral Communication</p> | <p>Assignments/Projects<br/>Exams<br/>Quizzes<br/>Papers</p>   |

## **Topical Outline**

### ***Specific Goals for Course***

1. Students can distinguish poorly designed database (that may appear to work) from well- designed databases
2. Students have implemented a project in a relational database for a specified operating system.
3. Students will be able to assess the accuracy of relational queries expressed in SQL.
4. Students will have developed database triggers or other applications.
5. Students have considered the data requirements of a particular domain and have produced and justified a particular database model to support the information needs.
6. Students will have produced correct ER / EER diagrams that are routinely manifested in database design specifications.
7. Understand security issues associated with database development
8. Define the terminology, features, classifications, and characteristics embodied in database systems.

### ***Required list of topics to be covered:***

1. Overview of database types with advantages and disadvantages
2. Characteristics of the Database approach
3. Advantages of using the DBMS approach
4. Database concepts (indexing, inference, aggregation, polyinstantiation)
5. Data Models, Schemas, and Instances
6. Conceptual data modeling and database design (ER / EER)
7. Relational model concepts
8. Relational model constraints and relational database schemas
9. Update operations, transactions, and dealing with constraint violations
10. SQL data definition and data types
11. Specifying constraints in SQL
12. Basic retrieval queries in SQL
13. INSERT, DELETE, and UPDATE Statements in SQL
14. More complex SQL retrieval queries (joins, aggregations, subqueries)
15. Views
16. Schema change statements in SQL
17. Database normalization
18. Database administration (user creation/deletion, permissions and database access controls such as DAC, MAC, RBAC, Clark-Wilson)
19. Database security
  - a. How to protect data (confidentiality, integrity and availability in a DBMS context)
  - b. Vulnerabilities (e.g., SQL injection)
  - c. Inference
  - d. Aggregation
  - e. Hashing and encryption
  - f. Data corruption
  - g. Unauthorized acces

***Optional list of topics to be covered:***

1. Database Programming (functions, triggers, procedures)
2. Query Optimization
3. Transaction Processing
4. Concurrency Control
5. NoSQL Databases

**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 – Carol Weinhardt, Director, Department of Special Services, ADA/504 Officer at 856-415-2247 or [cweinhar@rcsj.edu](mailto:cweinhar@rcsj.edu); or Cumberland Campus – Meredith Vicente, Senior Director, Department of Special Services/Project Assist at 856-200-4688 or [mvicent1@rcsj.edu](mailto:mvicent1@rcsj.edu)

**Department of Special Services**

The Department of Special Services is 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).

**(Gloucester Campus Location and Contact)**

Location: Instructional Center, room 425A.

Primary Contact: Director, Carol Weinhardt, (email) [cweinhar@rcsj.edu](mailto:cweinhar@rcsj.edu); or (phone) 856-415-2247.

**(Cumberland Campus Location and Contact)**

Location: Center for Academic & Student Success (CASS)

Primary Contact: Senior Director, Meredith Vicente, (email) [mvicent1@rcsj.edu](mailto:mvicent1@rcsj.edu); or (phone) 856-200-4688.

**Reporting Allegations of Sexual Assault Resource Referrals (8/2021)  
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 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><br><br>Law Enforcement            | Vineland Police Dept.<br><br>Millville Police Department<br><br>Cumberland Co. Sheriff's Office<br><br>Cumberland County Emergency Services<br><br>Cumberland Campus Security<br>856-200-4706 (Direct)  | 856-691-4111<br><br>856-825-7010<br><br>856-451-4449<br><br><b>9-1-1</b><br><br>Andres Lopez, Director<br>Safety and Security<br>856-200-4706   |
| <b>Non-Confidential</b><br><br>On-Campus Reporting Support Services | Almarie J. Jones<br>Special Assistant to the President<br>Diversity and Equity, Title IX and Compliance<br><br>Nathaniel Alridge, Jr., JD, Director<br>Diversity and Equity, Title IX and Judicial Affairs<br><br>Kellie W. Slade<br>Executive Director<br>Student Services, Student Life | 856-415-2154<br>Gloucester Campus<br>College Center, Room 116<br><a href="mailto:ajones@rcsj.edu">ajones@rcsj.edu</a><br><br>856-498-9948<br>Catherine J. Arpino Education and Humanities Center,<br><a href="mailto:nalridge@rcsj.edu">nalridge@rcsj.edu</a><br><br>856-200-4615<br>Student & Enrollment Services Center<br><a href="mailto:kslade@rcsj.edu">kslade@rcsj.edu</a> |
| <b>Confidential</b><br>On-Campus Counseling and Support Services    | Student Counseling and Wellness Center<br>John Wojtowicz, LCSW  | Academic Building – 1 <sup>st</sup> floor<br>856-200-4760<br><a href="mailto:jwojtowi@rcsj.edu">jwojtowi@rcsj.edu</a>   |
| <b>Confidential</b><br>Off-Campus Full-Service Support              | Center for Family Services – Services Empowering Rights of Victims (SERV)   | 24/7 Hotlines<br>Cumberland Co. – 1-800-225-0196<br><a href="http://www.centerffs.org/serv">www.centerffs.org/serv</a>  |
| <b>Hospital</b><br>Sexual Assault Nurse Examiner on Site            | Inspira Medical Center<br>Vineland  | 1505 W. Sherman Ave., Vineland, NJ<br>856-641-8000  |