

**STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK**



MASTER SYLLABUS

CYBR 216 - Database Fundamentals

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A. **TITLE:** Database Fundamentals

B. **COURSE NUMBER:** CYBR 216

C. **CREDIT HOURS:** 3

D. **WRITING INTENSIVE COURSE:** n/a

E. **GER CATEGORY:** n/a

F. **SEMESTER(S) OFFERED:** Fall and Spring

G. **COURSE DESCRIPTION:** The course "CYBR 216 - Database Fundamentals" at SUNY Canton covers database management systems with a focus on SQL-based products. Topics include logical vs. physical organization, various database models (relational, network, hierarchical), normalization, and creating web-based interfaces for database manipulation. It includes a term project and emphasizes installation and administration of a database server. The course is designed to provide practical and theoretical knowledge in database systems, suitable for students interested in database management and data science.

H. **PRE-REQUISITES/CO-REQUISITES:**

a. Pre-requisite(s): None.

I. **STUDENT LEARNING OUTCOMES:**

<u>Course Student Learning Outcome [SLO]</u>	<u>PSLO (2698)</u>	<u>GER</u>	<u>ISLO</u>
Understand basic of Databases	Understanding of basic database concepts		5. Industry, Professional, Discipline-Specific Knowledge and Skills
Explain Fundamentals of SQL	Skill in SQL and basic database operations		5. Industry, Professional, Discipline-Specific Knowledge and Skills
List Database Design Principles	Ability to design effective databases		5. Industry, Professional, Discipline-Specific Knowledge and Skills
Describe Normalization and Data Integrity	Knowledge of data integrity		5. Industry, Professional, Discipline-Specific Knowledge and Skills
Describe Basic Database Security	Understanding of database security principles		5. Industry, Professional, Discipline-Specific Knowledge and Skills
Explain Database Management and Administration	Competence in database administration		5. Industry, Professional, Discipline-Specific Knowledge and Skills
Explain Transaction Processing	Understanding of transactions in databases		5. Industry, Professional, Discipline-Specific Knowledge and Skills
Explain Data Warehousing and Reporting	Basics of data warehousing and reporting		5. Industry, Professional, Discipline-Specific Knowledge and Skills

Describe NoSQL Databases	Knowledge of NoSQL database systems		5. Industry, Professional, Discipline-Specific Knowledge and Skills
Apply learnings in a Capstone Project	Application of learned skills in a project		5. Industry, Professional, Discipline-Specific Knowledge and Skills

KEY	<u>Institutional Student Learning Outcomes</u> <u>[ISLO 1 – 5]</u>
ISLO #	ISLO & Subsets
1	Communication Skills Oral [O], Written [W]
2	Critical Thinking <i>Critical Analysis [CA], Inquiry & Analysis [IA], Problem Solving [PS]</i>
3	Foundational Skills <i>Information Management [IM], Quantitative Lit./Reasoning [QTR]</i>
4	Social Responsibility <i>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</i>
5	Industry, Professional, Discipline Specific Knowledge and Skills

J. APPLIED LEARNING COMPONENT: Yes _____ No **X _____**

If Yes, select one or more of the following categories:

Classroom/Lab _____

Civic Engagement _____

Internship _____

Creative Works/Senior Project _____

Clinical Practicum _____

Research _____

Practicum _____

Entrepreneurship _____

Service Learning _____

(program, class, project)

Community Service _____

K. Suggested TEXTS:

1. "Database System Concepts" by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan. This textbook provides comprehensive coverage of fundamental database concepts, SQL, database design, transaction management, and more. It's suitable for beginners and aligns well with the course's learning outcomes.

L. REFERENCES: n/a

M. EQUIPMENT: n/a

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

- Participation Assignments
- Challenge Assignments
- Quizzes
- Exams

P. DETAILED COURSE OUTLINE:

Week 1: Introduction to Databases

- Overview of database systems
- Importance in modern computing

Week 2-3: Fundamentals of SQL

- Basic SQL queries
- Data manipulation

Week 4-5: Database Design Principles

- Entity-relationship models
- Database schemas

Week 6-7: Normalization and Data Integrity

- Normal forms
- Data integrity techniques

Week 8: Midterm Project Overview

Week 9: Basic Database Security

- Security fundamentals
- Protecting against common threats

Week 10-11: Database Management and Administration

- Basic administration tasks
- Database backup and recovery

Week 12: Introduction to Transaction Processing

- Transaction concepts
- ACID properties

Week 13: Data Warehousing and Reporting

- Basics of data warehousing
- Creating reports

Week 14: Introduction to NoSQL Databases

- NoSQL vs. SQL
- Use cases for NoSQL

Week 15: Capstone Project Presentations

- Final project presentations
- Course review and wrap-up

Q. LABORATORY OUTLINE:

n/a