**Database Applications**

**MASY1-GC 3520 | Section 101| Fall 2024 | 9/4-12/4/2024 | 3 Credit**

**Modality:** In-person

**Course Site UR****L:** [https://brightspace.nyu.edu/](about:blank)

**General Course Information** MASY1-GC3520 Section 101 Database Applications

**Name/Title: Dr. Tom Schmidt**

**NYU Email:** tms493@nyu.edu

**Class Meeting Schedule:** Wednesday, 06:20pm - 08:55pm

**Class Location: TBD**

**Office Hours: 5:20-6:20 Wednesday**

**Description**

This course introduces a variety of databases and database technologies. It covers the theory, techniques, and technologies that facilitate utilizing these technologies to enable complex data-driven applications. The course includes the basic concepts and skill sets of Sybase, SQL server, DB2, and Oracle, and compares and contrasts the facilities, options, and syntaxes available in each platform. Students learn how to make appropriate business decisions when considering choices among multiple database and database technology options in order to satisfy real-word business and technology considerations and how to create database applications to fulfill business requirements.

**Prerequisites**

MASY1-GC3500 - Database Design & Management

**Learning Outcomes**

At the conclusion of this course, students will be able to:

* Select the appropriate relational database management systems from the leading choices
* Evaluate the key features of Oracle, SQL Server, and DB2 databases
* Analyze business information requirements to compare and contrast these databases
* Evaluate the appropriate databases to support specific enterprise applications
* Design a database application to fulfill a business requirement

**Communication Methods**

Be sure to turn on your [NYU Brightspace notifications](about:blank) and frequently check the “Announcements” section of the course site. This will be the primary method I use to communicate information critical to your success in the course. To contact me, send me an email. I will respond within 24 hours.

**Structure | Method | Modality**

There are 14 session topics in this course. The session topics are organized into three (3) areas of study: 1) History, 2) Learning Principles, and 3) Instructional Design in Practice.

Active learning experiences and small group projects are key components of the course. Assignments, papers, and exams will be based on course materials (e.g., readings, videos), lectures, and class discussions. Course sessions will be conducted synchronously on NYU Zoom, which you can access from the course site in [NYU Brightspace](about:blank).

**Expectations**

Learning Environment

You play an important role in creating and sustaining an intellectually rigorous and inclusive classroom culture. Respectful engagement, diverse thinking, and our lived experiences are central to this course, and enrich our learning community.

Participation

You are integral to the learning experience in this class. Be prepared to actively contribute to class activities, group discussions, and work outside of class.

Assignments and Deadlines

Please submit all assignments to the appropriate section of the course site in [NYU Brightspace](about:blank). If you require assistance, please contact me BEFORE the due date.

Course Technology Use

We will utilize multiple technologies to achieve the course goals. I expect you to use technology in ways that enhance the learning environment for all students.

Feedback and Viewing Grades

I will provide timely meaningful feedback on all your work via our course site in NYU Brightspace. You can access your grades on the course site Gradebook.

Attendance

I expect you to attend all class sessions. Attendance will be taken into consideration when determining your final grade.

Refer to the [SPS Policies and Procedures page](about:blank) for additional information about attendance.

**Textbooks And Course Materials**

**ORACLE 19C DATABASE CONCEPTS**

[https://docs.oracle.com/en/database/oracle/oracle-database/19/cncpt/database-concepts.pdf](about:blank)

**MICROSOFT SQL SERVER 2019: A Beginner's Guide, 7th Edition**

Dusan Petkovic, 2019

ISBN:  978-1260458879, McGraw Hill

**DB2**

[https://www.ibm.com/docs/en/db2/11.5](about:blank)

**Sybase ASE 16.0**

http://infocenter.sybase.com/help/index.jsp

**Grading | Assessment**

Each lab should take about 1-2 hours to complete. Each assignment should take about 1-2 hours to complete. Students will apply and demonstrate what they have learned using Oracle, SQL Server, DB2, and Sybase. The Midterm and Final are open book exams and will each take about 2 hours to complete. Each short research paper will take about 3-5 hours to complete. All assignments must be type written when possible and the answers must not be reordered. Grade is determined by the correctness and completion of answers to problems and review of scripted results.

DESCRIPTION PERCENTAGE

Assigned Activities (total of 9) 20%

Research Paper (total of 2) 20%

Midterm 30%

Final Exam 30%

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TOTAL POSSIBLE 100%

*See the* [*“Grades” section of Academic Policies*](about:blank#Graduate1) *for the complete grading policy, including the letter grade conversion, and the criteria for a grade of incomplete, taking a course on a pass/fail basis, and withdrawing from a course.*

**Course Outline**

**Start/End Dates:** 09/04/2024 – 12/04/2024

**Time:** 6:20-8:55PM

**No Class Date(s):** None

**Special Notes: We are likely to do Zoom on 11/27, Thanksgiving Eve**

**Session 1, 09/04/24**

Syllabus Review

Oracle Chapter 1:

DBMS

Relational Model

RDBMS

History of Oracle Database

Schema Objects

Database Access

Transaction Management

Oracle Database Architecture

Logical Storage

Physical Storage

Instance Structure

Documentation Roadmap

Oracle Chapter 2:

Schema Objects

Virtual and Invisible Columns

Rows

Data Types

Integrity Constraints

Table Organization

Table Compression

Table Clusters

Attribute Clustered Tables

Temporary Tables

External Tables

For next session

Assignment 1, due 9/10/24 11pm

Read Chapter 3-1 to 3-9, 3-21, 3-27 to 3-30, 4, 5-1 to 5-12, 6-1 to 6-4

**Session 2, 09/11/24**

Review Assignment 1

Oracle Chapter 3:

Indexes

B-tree Indexes

Bitmap Indexes

Function Based Indexes

Index Organized Tables

Oracle Chapter 4:

Partitions Characteristics

Partitioned Tables

Partitioned Indexes

Shared Tables

Views

Materialized Views

Sequence

Dimensions

Synonyms

Oracle Chapter 5:

Types of Data Constraints

Oracle Chapter 6:

Overview of Data Dictionary

For next session

Assignment 2, due 9/17/24 11pm

Read 12-1 to 12-8, 12-22 to 12-45 ,13, 14-1 to 14-28

**Session 3, 09/18/24**

Review Assignment 2

Oracle Chapter 12

Data Blocks

Extents

Segments (User, Temporary, Undo)

Tablespaces

Oracle Chapter 13

Oracle Database Instance

Instance Startup and Shutdown

Checkpoints

Instance Recovery

Parameter Files

Diagnostic Files

Oracle Chapter 14

Oracle Database Memory Structures

User Global Area

PGA

SGA (Database buffer cache, Redo log buffer, Shared Pool)

For next session

Assignment 3, due 9/24/24 11pm

Read Chapter 15, 16-1 to 16-15, 17-1 to 17-6, 17-8, 17-13 to 17-20, 18-3 to 18-19, 18-27 to 18-34

**Session 4, 09/25/24**

Review Assignment 3

Oracle Chapter 15

Client Processes

Server Processes

Background Processes

Oracle Chapter 16

Overview of Oracle Application Architecture

Overview of Oracle Net Services Architecture

Oracle Chapter 17

Database Security

Encryption

Data Access Monitoring

High Availability

Oracle Chapter 18

SQL\*Plus

SQL Loader

Backup and Recovery

Resource Management and Task Scheduling

Performance Tuning

For next session

Assignment 4, due 10/1/24 11pm

Read Chapter 1-4

**Session 5, 10/02/24**

Review Assignment 4

Microsoft SQL Server:

Chapter 1 RDBMS

Chapter 2 Planning Installation

Chapter 3 SQL Server Management Studio

Chapter 4 SQL Components

For next session

Assignment 5, due 10/8/24 11pm

Read Chapters 5-7

**Session 6, 10/09/24**

Review Assignment 5

Microsoft SQL Server:

Chapter 5 Data Definition Language

Chapter 6 Queries

Chapter 7 Modification of a Table's Contents

Introduce Research Paper 1, due 11/5/24 11pm

For next session

Assignment 6, due 10/15/24 11pm

Read SQL Server Chapters 8-11

**Session 7, 10/16/24**

Open Book Midterm covers session 1 to 6

**Session 8, 10/23/24**

Midterm Review

Review Assignment 6

Microsoft SQL Server:

Chapter 8 Stored Procedures and Functions

Chapter 9 System Catalog

Chapter 10 Indices

Chapter 11 Views

For next session

Assignment 7 due 10/29/24 11pm

Read SQL Server Chapters 12-15

**Session 9, 10/30/24**

Review Assignment 7

Microsoft SQL Server:

Chapter 12 Security System

Chapter 13 Concurrency Control

Chapter 14 Triggers

Chapter 15 System Environment

Introduce Research Paper 2, due 11/26/24, 11pm

For next session

Research Paper 1, due 11/5/24 11pm

Assignment 8, due 11/5/24 11pm

Read SQL Server Chapter 16, 18, 22, 23, 24

**Session 10, 11/06/24**

Review Research Paper 1

**Session 11, 11/13/24**

Review Assignment 8

Microsoft SQL Server:

Chapter 16 Backup and Recover

Chapter 18 Data Replication

Chapter 22 Business Intelligence

Chapter 23 SQL Server Analysis Services

Chapter 24 Business Intelligence and Transact SQL

For next session

Assignment 9, due 11/19/24 11pm

Documentation for Db2

[http://infocenter.sybase.com/help/index.jsp](about:blank)

Download Db2 Community Edition

[https://www.ibm.com/cloud/blog/announcements/ibm-db2-developer-community-edition](about:blank)

Read Db2 11.5

Database administration > Instances

Database administration > Databases

Database administration > Database Objects > Concepts common to most database objects

Database administration > Data Movement Utilities and Reference > Data Movement Options

Database administration > High Availability > Outages

Database administration > High Availability > High Availability Strategies

Database administration > Data Recovery > Developing a backup and recovery strategy

**Session 12, 11/20/24**

Review Assignment 9

Db2 Topics

Db2 Features and Product Editions

Db2 Connect

Instances

Databases

Database partitions

Buffer pools

Table spaces

Constraints

Data Movement Utilities

High Availability

For next session

Research Paper 2, due 11/26/24 11pm

**Session 13, 11/27/24**

Review Research Paper 2

**Session 14, 12/04/24**

Open Book Final Exam

**NOTES:**

The syllabus may be modified to better meet the needs of students and to achieve the learning outcomes.

The School of Professional Studies (SPS) and its faculty celebrate and are committed to inclusion, diversity, belonging, equity, and accessibility (IDBEA), and seek to embody the IDBEA values. The School of Professional Studies (SPS), its faculty, staff, and students are committed to creating a mutually respectful and safe environment (*from the* [*SPS IDBEA Committee*](about:blank)).

**New York University School of Professional Studies Policies**

1. Policies - You are responsible for reading, understanding, and complying with [University Policies and Guidelines](about:blank), [NYU SPS Policies and Procedures](about:blank), and [Student Affairs and Reporting](about:blank).

2. Learning/Academic Accommodations - New York University is committed to providing equal educational opportunity and participation for students who disclose their dis/ability to the [Moses Center for Student Accessibility](about:blank). If you are interested in applying for academic accommodations, contact the [Moses Center](about:blank) as early as possible in the semester. If you already receive accommodations through the Moses Center, request your accommodation letters through the [Moses Center Portal](about:blank) as soon as possible ([mosescsa@nyu.edu](about:blank) | 212-998-4980).

3. Health and Wellness - To access the University's extensive health and mental health resources, contact the [NYU Wellness Exchange](about:blank). You can call its private hotline (212-443-9999), available 24 hours a day, seven days a week, to reach out to a professional who can help to address day-to-day challenges as well as other health-related concerns.

4. Student Support Resources - There are a range of resources at SPS and NYU to support your learning and professional growth. For a complete list of resources and services available to SPS students, visit the [NYU SPS Office of Student Affairs site](about:blank).

5. Religious Observance - As a nonsectarian, inclusive institution, NYU policy permits members of any religious group to absent themselves from classes without penalty when required for compliance with their religious obligations. Refer to the [University Calendar Policy on Religious Holidays](about:blank) for the complete policy.

6. Academic Integrity and Plagiarism - You are expected to be honest and ethical in all academic work. Moreover, you are expected to demonstrate how what you have learned incorporates an understanding of the research and expertise of scholars and other appropriate experts; and thus recognizing others' published work or teachings—whether that of authors, lecturers, or one's peers—is a required practice in all academic projects.

Plagiarism involves borrowing or using information from other sources without proper and full credit. You are subject to disciplinary actions for the following offenses which include but are not limited to cheating, plagiarism, forgery or unauthorized use of documents, and false form of identification

[Turnitin](about:blank), an originality detection service in NYU Brightspace, may be used in this course to check your work for plagiarism.

Read more about academic integrity policies at the NYU School of Professional Studies on the [Academic Policies for NYU SPS Students](about:blank) page.

7. Use of Third-Party Tools - During this class, you may be required to use non-NYU apps/platforms/software as a part of course studies, and thus, will be required to agree to the “Terms of Use” (TOU) associated with such apps/platforms/software.

These services may require you to create an account but you can use a pseudonym (which may not identify you to the public community, but which may still identify you by IP address to the company and companies with whom it shares data).

You should carefully read those terms of use regarding the impact on your privacy rights and intellectual property rights. If you have any questions regarding those terms of use or the impact on the class, you are encouraged to ask the instructor prior to the add/drop deadline.