Database Applications
MASY1-GC 3520 | 100 | Spring 2024 | 1/22/2024 - 5/6/2024 | 3 Credit
Modality: In-person
Course Site URL: https://brightspace.nyu.edu/

General Course Information
Name/Title: Kelly Kim
NYU Email: Kelly.kim@nyu.edu
Class Meeting Schedule: 1/22/2024 - 5/6/2024 / Mondays | 06:20pm -- 08:55pm
Class Location: TBD
Office Hours: can be scheduled via email for Zoom meeting or live meeting

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 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.

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. 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 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

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

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%
_____	_____
TOTAL POSSIBLE	100%

See the "Grades" section of Academic Policies 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: 1/22/2024 - 5/6/2024 / Mondays
Time: 06:20pm -- 08:55pm
No Class Date(s): 02/19/2024 & 03/18/2024
Special Notes: President's Day - Monday, February 19, 2024, & Spring Break 03/18/24 - 03/24/24

Session 1, 01/22/24
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 1/28/24 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, 01/29/24
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 2/04/24 11pm
      Read 12-1 to 12-8, 12-22 to 12-45 ,13, 14-1 to 14-28

Session 3, 02/05/24
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 2/11/24 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, 02/12/24
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 2/25/24 11pm
Read Chapter 1-4

Session 5, 02/26/24
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 3/05/23 11pm
        Read Chapters 5-7

Session 6, 03/04/24
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 4/07/24 11pm

For next session
        Assignment 6, due 3/24/24 11pm
        Read SQL Server Chapters 8-11

Session 7, 03/11/24
Open Book Midterm covers session 1 to 6

Session 8, 03/25/24
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 3/31/24 11pm
        Read SQL Server Chapters 12-15

Session 9, 04/01/24
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 04/29/24, 11pm

For next session
Research Paper 1, due 4/07/24 11pm
Assignment 8, due 4/16/23 11pm
Read SQL Server Chapter 16, 18, 22, 23, 24

Session 10, 04/08/24
Review Research Paper 1

Session 11, 04/15/24
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 4/21/24 11pm
Documentation for Db2
http://infocenter.sybase.com/help/index.jsp

Download Db2 Community Edition
https://www.ibm.com/cloud/blog/announcements/ibm-db2-developer-community-edition
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, 04/22/24
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 4/29/24 11pm

Session 13, 04/29/24
Review Research Paper 2

Session 14, 05/06/24
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*).

New York University School of Professional Studies Policies

1. <u>Policies</u> - You are responsible for reading, understanding, and complying with University Policies and Guidelines, NYU SPS Policies and Procedures, and Student Affairs and Reporting.

2. <u>Learning/Academic Accommodations</u> - 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. If you are interested in applying for academic accommodations, contact the Moses Center 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 as soon as possible (mosescsa@nyu.edu | 212-998-4980).

3. <u>Health and Wellness</u> - To access the University's extensive health and mental health resources, contact the NYU Wellness Exchange. 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. <u>Student Support Resources</u> - 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.

5. <u>Religious Observance</u> - 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 for the complete policy.

6. <u>Academic Integrity and Plagiarism</u> - 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, 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 page.

7. <u>Use of Third-Party Tools</u> - 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.