**Advanced Database Applications**

**MASY1-GC 3525 | 101 | Fall 2024 | 09/04/2024 - 12/04/2024 | 3 Credits**

**Modality:** In-Person

**Course Site URL:** https://brightspace.nyu.edu/

**General Course Information**

**Name/Title:** Kelly Kim, Adjunct Instructor, She/Her/Hers

**NYU Email:** Kelly.Kim@nyu.edu

**Class Meeting Schedule:** 09/04/2024 - 12/04/2024 | Wednesdays | 6:20 pm - 8:55 pm

**Class Location:** TBD

**Office Hours:** by NYU Zoom or in-person, by appointment, please e-mail me to arrange

**Description**

This course focuses on database language to prepare application developers and system integrators with knowledge of basic relational concepts. The course covers the important features of advanced RDBMS with Internet-oriented, object-relational database features including PL/SQL program tracing and tuning. Students design, develop, and implement advanced relational databases and use those databases for transaction processing, report generation, and queries.

**Prerequisites**

3500 – DATABASE DESIGN & MANAGEMENT

**Learning Outcomes**

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

* Design database structures using Entity Relation (ER) diagrams
* Use PL/SQL to program database applications
* Use ETL for loading data from one source to another
* Select the appropriate ETL tools to transfer data from one source to another
* Create web-based database applications using Apex and PL/SQL
* Integrate business logic into database applications

**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.

Credit students must use their NYU email to communicate. Non-degree students do not have NYU email addresses. Brightspace course mail supports student privacy and FERPA guidelines. The instructor will use the NYU email address to communicate with students. All email inquiries will be answered within 24 hours.

**Structure | Method | Modality**

There are fourteen session topics in this course. The session topics are organized into two areas of study: 1) Learning Principles, 2) Instructional Design in Practice.

Active learning experiences, labs, assignments, and project are key components of the course. Labs, assignments, project, exams, lectures, and class discussions will be based on course materials (e.g., readings). Course sessions will be conducted in-person.

This course is in-person and will meet once a week on Wednesday, with assignments, announcements and emails being sent through Brightspace. Zoom is the remote instruction platform used at NYU. Students are expected to check email and/or Brightspace at least twice a week for announcements concerning assignments, class changes or cancellations, and other important information. The course will involve lecture/discussions/forum discussions as well as case studies. One individual project using Apex is required.

**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

Week 2 Assignment, due 9/17/2024, 11pm

Week 3 Assignment, due 9/24/2024, 11pm

Week 4 Assignment, due 10/1/2024, 11pm

Week 5 Assignment, due 10/8/2024, 11pm

Week 6 Assignment, due 10/15/2024, 11pm

Week 8 Assignment, due 10/29/2024, 11pm

Week 9 Assignment, due 11/5/2024, 11pm

Week 10 Assignment, due 11/12/2024, 11pm

Week 11 Assignment, due 11/19/2024, 11pm

Week 12 Assignment, due 11/26/2024, 11pm

Project, due 11/27/24 5pm

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. All class sessions require use of Zoom.All class sessions require use of technology (e.g., laptop, computer lab) for learning purposes.

**Generative AI Use**

**Not permitted**

You can only learn from the work you do. Unless otherwise stated, you should not use generative AI tools to create any part of an assignment in this course; every submission should be entirely your work (for example from an NYU course).

This course assumes that work submitted by students – all process work, drafts, brainstorming artifacts, final works – will be generated by the students themselves, working individually or in groups as directed by class assignment instructions. As will any other class work generated by anyone other than the students (by other students, by a company, or by using generative AI tools), use can be a violation of Academic Integrity policy.

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.

Excused absences are granted in cases of documented serious illness, family emergency, religious observance, or civic obligation. In the case of religious observance or civic obligation, this should be reported in advance. Unexcused absences from sessions may have a negative impact on a student’s final grade. Students are responsible for assignments given during any absence.

Each unexcused absence or being late may result in a student’s grade being lowered by a fraction of a grade. A student who has three unexcused absences may earn a Fail grade.

Students who join the course during add/drop are responsible for ensuring that they identify what assignments and preparatory work they have missed and complete and submit those per the syllabus.

**Textbooks and Course Materials**

Database PL/SQL Language Reference, 23

May 2024, F46753-06, Oracle Corporation, Free online

<https://docs.oracle.com/en/database/oracle/oracle-database/23/lnpls/index.html>

Oracle Apex App Builder User's Guide, Release 23.2

May 2024, F83308-04, Oracle Corporation, Free online

https://docs.oracle.com/en/database/oracle/apex/23.2/htmdb/index.html

**Grading | Assessment**

Your grade in this course is based on your performance on multiple activities and assignments. Since all graded assignments are related directly to course objectives and learning outcomes, failure to complete or timely submit any assignment will result in an unsatisfactory course grade. All coding assignments should be indented, and visual images should be eligible without the need to zoom in/expand the image. Please carefully review your assignments before submitting them for a grade. Late assignment submission will be penalized. One day late will result in -10%. Two days late will result in -20%. Three days late -30%. Four days late -40%. Five days late -50%. Six days late -60%. Seven days late -100%. I will update the grades on the course site each time a grading session has been completed— typically six (6) days following the completion of an activity.

**DESCRIPTION** **PERCENTAGE**

Assignments (total of 10) 20%

Labs 10%

Individual Project 20%

Midterm Exam 25%

Final Exam 25%

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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.

**NYU SPS Graduate Grading Scale**

|  |  |  |  |
| --- | --- | --- | --- |
| **A** | 95-100 | 4.000 | **Exceptional:** Demonstrates exceptional mastery of all learning outcomes of the course and thorough and complete understanding of all concepts. |
| **A-** | 90-94 | 3.667 | **Excellent:** Demonstrates highly competent mastery of all learning outcomes of the course and strong understanding of all concepts. |
| **B+** | 87-89 | 3.333 | **Very Good; exceeds course standards:** Demonstrates mastery of all learning outcomes of the course and understanding of core concepts. |
| **B** | 83-86 | 3.000 | **Good; meets course standards:** Demonstrates mastery of some learning outcomes; understanding of some core concepts could be improved. |
| **B-** | 80-82 | 2.667 | **Somewhat Satisfactory;** meets some course standards and requires improvement: Demonstrates basic understanding of some learning outcomes; improved understanding of all core concepts is needed. |
| **C+** | 77-79 | 2.333 | **Less than Satisfactory; requires significant improvement:** Demonstrates partial understanding of all learning outcomes and core concepts; requires significant improvement. |
| **C** | 73-76 | 2.000 | **Unsatisfactory; requires substantial improvement:** Demonstrates partial understanding of some learning outcomes and core concepts; requires substantial improvement. |
| **C-** | 70-72 | 1.667 | **Unsatisfactory; requires extensive improvement:** Demonstrates poor understanding of all learning outcomes and core concepts; requires extensive improvement. |
| **F** | Below 70 |  | **Fail:** Demonstrates minimal to no understanding of all key learning outcomes and core concepts; work is unworthy of course credit towards the degree. |
| **P** |  |  | **Passing:** If a Pass/Fail grade is allowed, the choice of pass/fail must be made prior to the completion of the fifth week of the term. |

**Course Outline**

**Start/End Dates:** 09/04/2024 - 12/04/2024 | Wednesday

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

**No Class Date(s):** N/A

**Special Notes:** N/A

**Session 1 - 09/04/24**

**Topic Description:** Overview of Class, Databases, PL/SQL, and APEX

* Syllabus
* Data Repository Types
* Normalization and E/R Modeling Concepts
* Entities, Attributes, Keys
* Relationships
* Origin of PL/SQL
* Advantage of PL/SQL
* Main Feature of PL/SQL
* Create APEX account
* APEX overview
* APEX Workspace and Navigation
* APEX tutorial
* APEX Lab 1.2

**Assignments:**

* Complete Week 1 Assignment
* Read Chapter 1 and 2 in Oracle PL/SQL
* Read Chapter 2 and 3 in APEX

**Session 2 – 09/11/24**

**Topic description** – Oracle PL/SQL Chapter 2 and APEX Chapter 3

* Character Sets
* Lexical Units
* Declaration
* Scope and Visibility of Identifiers
* Assigning Values to Variables
* Expressions
* Conditional Compilation
* APEX App Builder Concepts: Page Processing, Page Rendering, Session State
* APEX Lab 2.1 and 2.2

**Assignments:**

* Complete Week 2 Assignment and Apex 2.1 and 2.2 Due on 9/17/24 11pm
* Read Chapter 3 and 4 in Oracle PL/SQL

**Session 3 – 09/18/24**

**Topic description** – PL/SQL Data Types and Control Statements

* SQL Data Types
* Boolean Data Type
* User Defined PL/SQL Subtypes
* IF Statements
* Loop Statements
* Sequential Control Statements
* PL/SQL Session 3 Lab
* APEX LAB 3.1

**Assignments:**

* Complete Week 3 Assignment, Apex Lab 3.1, and PL/SQL Session 3 lab, Due on 9/24/24 11pm
* Read Chapter 5 in Oracle PL/SQL

**Session 4 – 09/25/24**

**Topic description –** PL/SQL Collections and Records

* Collection Types
* Associative Arrays
* Varrays
* Nested Tables
* Collection Constructors
* Assigning Values to Collection Variables
* PL/SQL Session 4 Lab

**Assignments:**

* Complete Week 4 Assignment and PL/SQL Session 4 Lab, Due on 10/1/24 11pm
* Read Chapter 5 in APEX

**Session 5 – 10/02/24**

**Topic description –** Creating APEX application

* Collection Methods
* Record Variables
* Record Comparisons
* Inserting and updating Rows
* PL/SQL Session 5 Lab
* APEX using Application Wizard
* APEX creating Application Based on a Table or Query
* APEX creating Application from a File
* APEX managing Applications
* APEX using Application and Workspace Utilities
* APEX Lab 3.2, 3.3, 3.4

**Assignments:**

* Complete Week 5 Assignment, PL/SQL Session 5 Lab, Apex Lab 3.2, 3.3, and 3.4 Due on 10/8/24 11pm
* Read Chapter 6 in Oracle PL/SQL
* Read Chapter 6 in APEX

**Session 6 – 10/09/24**

**Topic description –** PL/SQL Static SQL and APEX Pages

* PL/SQL Static SQL
* Cursors Overview
* Cursor Variables
* PL/SQL Session 6 Lab
* APEX Managing Pages: adding pages, managing Feature Pages, Dialog Pages, Page Groups
* APEX Lab 4.1

**Assignments:**

* Complete Week 6 Assignment, PL/SQL Session 6 Lab, and APEX Lab 4.1 Due on 10/15/24 11pm
* Read Chapter 7 in Oracle PL/SQL
* Read Chapter 7 in APEX

**Session 7 – 10/16/24**

**Topic description –** Midterm Exam

* Covers Session 1-6

**Session 8 – 10/23/24**

**Topic description –** PL/SQL Dynamic SQL and APEX Editing Pages in Page Designer

* When to use Dynamic SQL
* Native Dynamic SQL
* DBMS\_SQL Package
* SQL Injection
* PL/SQL Session 8 Lab
* APEX Page Designer UI Elements
* APEX Using Page Designer
* APEX Managing Page Attributes
* APEX Lab 4.2 and 4.3

**Assignments:**

* Complete Week 8 Assignment, PL/SQL Session 8 Lab, and APEX Lab 4.2 and 4.3 Due on 10/29/24 11pm
* Read Chapter 8 in Oracle PL/SQL
* Read Chapter 8 in APEX

**Session 9 – 10/30/24**

**Topic description –** PL/SQL Subprograms and APEX Reports and Managing Interactivity

* Why use Subprograms
* Nested, Package, and Standalone Subprograms
* Subprogram Invocations
* Subprogram Properties
* Subprogram Parts
* Subprogram Parameters
* PL/SQL Session 9 Lab
* APEX Create Report using Application Wizard
* APEX Create Report using Page Wizard
* APEX Managing Cards
* APEX Managing Faceted Search
* APEX Managing Interactive Grids
* APEX Managing Interactive Reports
* APEX Managing Class Reports
* APEX Lab 5.1

**Assignments:**

* Complete Week 9 Assignment, PL/SQL Session 9 Lab, and APEX Lab 5.1 Due on 11/5/24 11pm
* Read Chapter 9 in Oracle PL/SQL
* Read Chapter 9 in APEX

**Session 10 – 11/06/24**

**Topic description –** PL/SQL Triggers and APEX Forms

* Overview of Triggers
* DML Triggers
* System Triggers
* Exception Handling in Triggers
* Views for Information about Triggers
* PL/SQL Session 10 Lab
* APEX Creating a Form
* APEX Creating Master Detail Forms
* APEX Validating User Input in Forms
* APEX Lab 5.2, 5.3.1, and 5.3.2

**Assignments:**

* Complete Week 10 Assignment, PL/SQL Session 10 Lab, and APEX Lab 5.2, 5.3.1,and 5.3.2 Due on 11/12/24 11pm
* Read Chapter 10 in Oracle PL/SQL
* Read Chapter 11 and 13 in APEX

**Session 11 – 11/13/24**

Topic description – PL/SQL Packages and APEX Themes and Managing Controls

* Reasons for using Packages
* Package Specification
* Package Body
* Package Instantiation and Initialization
* PL/SQL Session 11 Lab
* APEX Managing Themes
* APEX Managing Page Items
* APEX Managing Buttons

**Assignments:**

* Complete Week 11 Assignment and PL/SQL Session 11 Lab Due on 11/19/24 11pm
* Read Chapter 11 in Oracle PL/SQL
* Read Chapter 14 and 15 in APEX

**Session 12 – 11/20/24**

**Topic description –** PL/SQL Exception Handling and APEX Navigation and Computations

* Compile Time Warnings
* Overview of Exception Handling
* Internally Defined Exceptions
* User-defined Exceptions
* Raising Exceptions
* PL/SQL Session 12 Lab
* APEX Create Breadcrumbs
* APEX Managing Tabs
* APEX Page Computations
* APEX Understanding Validations
* APEX Understanding Page Processes

**Assignments:**

* Complete Week 12 Assignment and PL/SQL Session 12 Lab, due on 11/26/24 11pm
* Complete Project Due on 11/27/24 5pm

**Session 13 – 11/27/24**

**Topic description –** Student Project Presentations

* Student Project Presentations
* Review of Final Exam Topics

**Assignments:**

* Study for Final Exam

**Session 14 – 12/04/24**

**Topic description –** Final Exam

Final Exam covers sessions 8-12

**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.