**Database Technologies for Web Applications**

**MASY1-GC 3540| 200 | Fall 2023 | 9/11/2023 - 12/11/2023 | 3 Credit**

**Modality:** Online (Sy)

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

**General Course Information**

**Name/Title:** Sam Sultan, Adjunct Assistant Professor

**NYU Email:** sam.sultan@nyu.edu

**Class Meeting Schedule:** **9/11/2023 - 12/11/2023 | Mondays | 07:00pm - 09:35pm**

**Class Location:** Online

Office Hours: Mondays 9:45pm-10:45pm online thru Zoom [Make an appointment first].

**Description**

This course examines the database and related applications technologies that have come to be critical in the enablement of web-based applications for e-commerce in its many variations. This lab-based course provides an in-depth study of using database technologies in the context of the Internet, including Oracle, and open-source variations such as MySQL; the role of related scripting languages such as PHP. Also covered are the theory and practice involved in dynamic, database driven web-sites that are controlled using CSS and other web-enabling artifacts. Upon completion of this course, the student will understand the features of page scripting languages; understand the database options available for the web-based applications; explain how these can be combined with each other and with additional web-based tools to create effective web-based applications.

**Prerequisites**

3500 – Database Design and Management

**Learning Outcomes**

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

* Construct HTML pages and specifically containing HTML grids and forms
* Integrate CSS with HTML to improve visual web page presentation
* Create database tables to support web interaction
* Construct an end-to-end database driven web application
* Develop PHP or Python code and integrate that with HTML and database to build web applications
* Select the appropriate features of page scripting languages and database options for web-based applications

**Communication Methods**

Be sure to turn on your [NYU Brightspace notifications](https://www.nyu.edu/servicelink/KB0018507) 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. All email inquiries will be responded to within 24 hours during Monday through Friday 5pm. Email sent on Saturday or Sunday will not be responded to until Monday. I will respond to you using NYU email.

**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](https://brightspace.nyu.edu/).

**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](https://brightspace.nyu.edu/). 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](https://www.sps.nyu.edu/homepage/student-experience/policies-and-procedures.html) for additional information about attendance.

**Textbooks and Course Materials**

PHP and MySQL Web Development (5th Edition) - Available through Amazon

**Authors** – Luke Welling & Laura Thomson

**Publisher** – Pearson Education Inc., 2017

**ISBN** – ISBN-13: 978-0321833891 or ISBN-10: 0321833899

Murach’s Python Programming

**Author** – Joel Murach, Michael Urban

**Publisher** – Murach, 2016

**ISBN** 978-1-890774-97-4

Teach Yourself SQL in One Hour a Day (5th Edition) - Available through Amazon

**Author** - Ryan Stephens, Ronald Plew & Arie Jones

**Publisher** – Pearson Education Inc., 2009

**ISBN-13:**978-0672330254 **or ISBN-10:**0672330253

HTML5 & CSS3 - Visual Quickstart Guide (7th Edition) - Available through Amazon

**Author** - Elizabeth Castro, Bruce Hyslop

**Publisher** - Peachpit Press, 2011

**ISBN-13:**978-0321719614 **or ISBN-10:**0321719611

Instructor may also provide session by session content, which will be posted online.

**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 any assignment will result in an unsatisfactory course grade. All written assignments must be typed and double-spaced. Grammar, punctuation, and spelling will be considered in grading. Please carefully proof-read your written assignments before submitting them for a grade. I will update the grades on the course site each time a grading session has been completed— typically three (3) days following the completion of an activity.

Class Participation: To receive full credit for the course, you should attend all classes since much of the learning occurs during class lecture, presentation and class discussions. Please contact the instructor if you anticipate missing any part of the class. Participation grades will be based on:

* Involvement in class discussions and activities during every session
* Student must ask at least one question per each session or respond to Professor or other student inquiry at least once per session.
* Participation which demonstrates integration of reading, class work, relevance and application.
* Quality/quantity of providing effective and balanced feedback.

Homework: Homework assignments must be submitted on time within 1 week of date assigned (unless otherwise instructed). Late submission will severely impact your homework grade, or may not be accepted altogether at instructor’s discretion. Upload assignment to Brightspace or instructor may request to print all homework pages and staple together (paper clips not accepted).

Group/Team Project: There will be a group/team class project. The project will be a culmination of written, visual and proper presentation skills. It will include the culmination of topics, concepts and competencies learned in this class. The group project grade will be based on:

* Student level of participation in the team project.
* Student will be assessed both as an individual, and as part of the overall team
* Individual contribution will be assessed by identifying the components of the project student worked on and contributed to the overall project (Example database creation, data preparation and load, etc.)
* Last page of project submission should include list of responsibilities delivered by each member.
* Group contribution will be assessed on overall project depth of content, write-up and delivery.
* For the group assessment portion, all individuals within the group will receive the same grade.
* Fulfilment of all requirements stated for the project defined under “final project” on the course web site.
* All groups have the same group assignment
* All requirements for the group project is defined on the course web site.

Midterm Exam: There will be a midterm exam. The exam will be an open book, open notes/internet style exam. The exam will test the student's acquisition of topics, concepts and competencies learned in this class up to mid-term.

Final Exam: There will be a final exam. The exam will be an open book, open notes/internet style exam. The exam will test the student's acquisition of topics, concepts and competencies learned in this class. The final exam will only cover material covered in the second half of the term.

**Please Note:** Professor will not provide a “redo” or an opportunity for grade improvement for
any assignment or exam for which a student received a low grade. It is the student’s responsibility to prepare for exams and to submit correct and most accurate assignments.

DESCRIPTION PERCENTAGE

Homework 20%

Team Project 20% (teamwork – 50%, individual contribution – 50%)

Participation 10%

Midterm Project 25%

Final Exam 25%

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TOTAL POSSIBLE 100%

See the [“Grades” section of Academic Policies](https://www.sps.nyu.edu/homepage/student-experience/policies-and-procedures.html#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:** 9/11/2023 - 12/11/2023 | Monday

**Time:** 07:00pm -- 09:35pm

**No Class Date(s):** Monday, 10/9/2023, Fall Break

**Special Notes:** Legislative Monday: Classes will meet according to a Monday schedule on Tuesday, October 10, 2023

### Course Outline:

**Readings should be completed within the week.**

**Session 1, 9/11/2023 - HTML and Web Page Content**

* HTML web page structure
* The anatomy of HTML element
* The HEAD section
* the BODY section
* HTML tags versus attributes
* Basic HTML tags
* Additional HTML tags
* Formatting text
* Adding list elements
* Creating links to other pages
* Internal anchors vs. external links
* Adding images to your web page
* Using HTML tables
* The HTML Table structure
* Using tables to display rows and columns
* Using tables to layout your page
* The <table>, <tr> and <td> tags
* Spanning multiple rows and columns
* Creating column groups
* The <thead>, <tbody> and <tfoot> tags
* Nesting tables
* Wrapping text around tables
* **Assignments (due one week from today):**
	+ **Reading:** Chapter 1-6, 18 (HTML5 & CSS3)

**Session 2, 9/18/2023 - Cascading Style Sheets**

* CSS - Cascading Style Sheets
* Structure of a CSS rule
* Advantages of using CSS
* Inline, embedded and external CSS
* Creating style sheets
* Applying styles to your HTML
* Inline vs. block-level tags
* The <div> and <span> tags
* CSS selectors
* Class and Id selectors
* Contextual selectors
* Cascading and Inheritance rule
* CSS Properties and Values
* Test related properties
* Font related properties
* The element box model
* Box related properties
* Background related properties
* Display and visibility properties
* Positioning related properties
* Relative vs. absolute vs. fixed positioning
* Positioning elements in 3D using z-index
* Specifying length units
* Other media specific styles
* Printing and controlling page-breaks
* **Assignments (due one week from today):**
* **Reading:** Chapter 7-9, 10-14 (HTML5 & CSS3)

**Session 3, 9/25/2023 - HTML Forms and Introduction to SQL**

* HTML forms
* Creating input fields
* Creating radio and checkboxes
* Creating selection and dropdown lists
* Submitting a form. Where does it go?
* About server scripts and programming
* Saving and mailing your form content
* The "Get" and the "Post" methods
* Using hidden fields
* Uploading files to a server
* SQL - Structured Query language
* DDL - Data Definition language
* DML - Data Manipulation Language
* SQL standard vs. vendor extensions
* Our first database
* The SELECT statement
* The FROM clause
* The WHERE clause
* Comparison operators
* Using SELECT DISTINCT
* **Assignments (due one week from today):**
* **Reading:** Chapter 16 (HTML5 & CSS3)
* **Reading:** Chapter 2, 3 (Teach Yourself SQL in One Hour a Day)

**Session 4, 10/2/2023 - Joining Tables**

* Selecting data from multiple tables
* The join construct
* Old vs. new join syntax
* Normal or Inner join
* Cross join - Cartesian product
* Outer join vs. Inner join
* What is a Self Join
* Performance considerations
* **Assignments (due one week from today):**
* **Reading:** Chapter 5 (Teach Yourself SQL in One Hour a Day)
* **Assignments:** Create SELECT JOIN statements that perform various table joins across your assigned database.

**Session 5, Makeup for 10/9/2023 (TBD week of 10/8/2023 – 10/14/2023) - SQL Functions**

* SQL built-in Functions
* Arithmetic functions - ABS, RAND, ROUND, TRUNCATE
* Character functions - CONCAT, LENGTH, SUBSTR, TRANSLATE
* Date functions - Current date, date manipulation, date formatting
* Aggregate functions - COUNT, SUM, AVG, MIN, MAX
* Grouping with GROUP BY clause
* The HAVING clause
* Sorting with the ORDER BY clause
* **Assignments (due one week from today):**
* **Reading:** Chapter 2, 4, 12 (Teach Yourself SQL in One Hour a Day)

**Session 6, 10/16/2023 - Introduction to PHP or Python**

* Introduction to PHP or Python
* PHP/Python variables
* Numeric and string operators
* Comparison and logical operators
* Working with Arrays
* Control Structure and Program Flow
* The if, while, for and each statements
* **Assignments (due one week from today):**
* **Reading:** Chapter 1, 2 (PHP and MySQL Web Development)

**Session 7, 10/23/2023 - Midterm Exam**

* Midterm Exam

**Session 8, 10/30/2023 - PHP/Python Functions**

* PHP/Python Functions
* Working with Strings & String functions
* Working with Numbers & Numeric functions
* Working with Dates & Date functions
* Working with Arrays & Array functions
* **Assignments (due one week from today):**
* **Reading:** Chapter 3, 4, 5 (PHP and MySQL Web Development)

**Session 9, 11/6/2023 - Database Design and Modeling**

* Database Design
* The Logical and Physical Model
* Understanding data normalization
* First normal form
* Second normal form
* Third normal form
* Pros & cons of data normalization
* De-normalizing data
* Entity relationships
* One-to-one relationship
* One-to-many relationship
* Many-to-many relationship
* **Assignments (due one week from today):**
* **Reading:** Chapter 8 (PHP and MySQL Web Development)
* **Assignments:** Create a logical database model for customers and vendors in your database

**Session 10, 11/13/2023 - Creating Database Objects and Manipulating Data**

* Creating database objects
* What is a primary key?
* What is a foreign key?
* What is an index?
* Creating tables
* SQL data types
* Adding a primary key
* Adding constraints
* Creating Indexes
* Altering table definition
* Dropping tables
* Dropping databases
* Manipulating data in tables<
* Adding data with the INSERT statement
* INSERT with a SELECT statement
* Changing data with the UPDATE statement
* UPDATE with a SELECT statement
* Removing data with the DELETE statement
* DELETE with a SELECT statement
* The TRUNCATE statement
* The REPLACE statement (MySql)
* **Assignments (due one week from today):**
* **Reading:** Chapter 9 (PHP and MySQL Web Development)
* **Reading:** Chapter 11 (Teach Yourself SQL in One Hour a Day)
* **Assignments:** Use the logical database model created in previous session to create the physical tables in your database

**Session 11, 11/20/2023 - Accessing HTML Form Data from within PHP or Python**

* Accessing HTML form data
* Reading and Writing to Files
* File Permissions
* Inserting, Updating & Deleting from databases
* Querying databases
* **Assignments (due one week from today):**
* **Reading:** Chapter 11 (PHP and MySQL Web Development)

**Session 12, 11/27/2023 - Creating Persistence on the Web**

* HTTP Protocol and Concepts
* The Client Request
* The Server Response
* The GET and POST Methods
* Accessing/Manipulating HTTP Headers
* Creating Persistence on the Web
* Repopulating From Fields
* Using Hidden Fields
* Using the End of the URL
* Using Cookies
* Creating and Using Sessions
* **Assignments:**
* **Reading:** Chapter 23 (PHP and MySQL Web Development)
* **Reading:** Online web research and reading

**Session 13, 12/4/2023 - Team Project Presentations**

* Final Exam

**Session 14, 12/11/2023 - Final Exam**

* 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*](https://www.sps.nyu.edu/homepage/about-us/idbea/about-idbea.html)).

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

1. Policies - You are responsible for reading, understanding, and complying with [University Policies and Guidelines](http://www.nyu.edu/about/policies-guidelines-compliance.html), [NYU SPS Policies and Procedures](http://sps.nyu.edu/academics/academic-policies-and-procedures.html), and [Student Affairs and Reporting](https://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/student-services.html).

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](https://www.nyu.edu/students/communities-and-groups/student-accessibility.html). If you are interested in applying for academic accommodations, contact the [Moses Center](https://www.nyu.edu/students/communities-and-groups/student-accessibility/academic.html) 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](https://www.nyu.edu/students/communities-and-groups/student-accessibility.html) as soon as possible (mosescsa@nyu.edu | 212-998-4980).

3. Health and Wellness - To access the University's extensive health and mental health resources, contact the [NYU Wellness Exchange](https://www.nyu.edu/students/health-and-wellness/wellness-exchange.html). 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](https://www.sps.nyu.edu/homepage/student-experience/resources-and-services.html).

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](https://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/university-calendar-policy-on-religious-holidays.html) 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](https://www.nyu.edu/servicelink/KB0018471), 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](https://www.sps.nyu.edu/homepage/student-experience/policies-and-procedures.html) 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.