**San Diego University for Integrative Studies**  
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**Phone:** 619.297.1999 **Fax:** 619.542.1999  
[www.sduis.edu](http://www.sduis.edu)

**Course Syllabus**

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| **Course Name** | ITS 180 DL Database Management Systems |
| **Course Length** | 6 weeks |
| **Credits** | 5 quarter credits |
| **Workload Expectations** | This course meets for 50 hours. Additionally, students can expect to be assigned approximately 100 hours of homework for this course. |
| **Course Dates** | May 16 to June 26, 2022 |
| **Instructor** | Robert Spellman |
| **Email** | [rspellman@faculty.sduis.edu](mailto:rspellman@faculty.sduis.edu) |
| **Zoom Meetings** | Courses taught online via NEO will include a 1-hour **mandatory** meeting via Zoom each week. The day and time is will be scheduled by the instructor and requires **mandatory** attendance. SDUIS administration will monitor attendance at the Zoom meetings via Zoom reports. |
| **Midterm & Final Exams** | All midterm and final exams will be proctored. The instructor will use Zoom to watch students taking the test to ensure student identity. |

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| **Course Description** | This course will cover the use of Database Management Systems (DBMS) to solve a wide range of information storage, management and retrieval problems, in organizations ranging from large corporations to personal applications, such as research data management. This course combines the practical aspects of DBMS use with more theoretical discussions of database design methodologies and the “internals” of database systems. In the theoretical portion of the course, we will examine the major types or data models of DBMS (hierarchical, network, relational, and object-oriented). The course will cover the principles and problems of database design, operation, and maintenance for each data model. |

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| **Course Objectives and Goals** | By the end of this course, students will be able to:  ●     Demonstrate familiarity with modern database systems and how to use them effectively.  ●     Obtain, install, start and use PostgreSQL.  ●     Discuss and use the query language SQL.  ●     Outline and employ many aspects of database programming, from simple data insertions and updates to extending the database server functionality.  ●     Describe how to take advantage of PostgreSQL in various programs. |

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| **Instructional Methods** | Lectures, presentations, case studies, reading assignments, student presentations, quizzes, midterm and final exams, and writing assignments. |

**Course Requirements and Grading**

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| **Prerequisites** | Approval of the Program Director. |
| **Technology Requirements** | All SDUIS courses require online access to the university’s Learning Management System, known as NEO. The NEO system is designed to be useable from any mobile device. Of course, the device must also have access to the internet. Some courses are offered completely online via NEO, while other courses are hybrid, conducted in residence with an online component needing to be accessed while in the classroom.  Therefore, every student is required to have a laptop computer or equivalent device which is able to access the NEO system effectively, along with a cell phone or other “hot spot” device for internet access in the event there should be an interruption in the university’s WiFi service at a given moment. For hybrid classes, students are required to bring the laptop or equivalent device and the “hot spot” access with them to every class meeting. |
| **Attendance and Participation** | Distance learning students are required to log on and participate in the course discussion, complete a quiz/test, and/or submit an assignment a minimum of five (5) times per week for every 6 week session. Students who fail to participate the required number of times a week will receive a “Drop Warning.” In this case, students will be given a deadline to submit any late or missed work or contact the instructor and DL coordinator for any extenuating circumstances.  If a student fails to submit the missed assignments and/or contact the appropriate administrator/faculty, a “Drop Notice” will be emailed. That student will be taken off the class list and will no longer have access to the course. A refund, if due, would be prorated based upon the date of the last time the student logged on to the course. |
| **Grading Scale** | |  |  |  |  | | --- | --- | --- | --- | | ***Letter Grade*** | ***% From*** | ***%***  ***To*** | ***Grade Point Value*** | | ***A+*** | ***98*** | ***100*** | ***4.0*** | | ***A*** | ***94*** | ***97*** | ***4.0*** | | ***A-*** | ***90*** | ***93*** | ***3.7*** | | ***B+*** | ***87*** | ***89*** | ***3.3*** | | ***B*** | ***84*** | ***86*** | ***3*** | | ***B-*** | ***80*** | ***83*** | ***2.7*** | | ***C+*** | ***77*** | ***79*** | ***2.3*** | | ***C*** | ***74*** | ***76*** | ***2*** | | ***C-*** | ***70*** | ***73*** | ***1.7*** | | ***D+*** | ***67*** | ***69*** | ***1.3*** | | ***D*** | ***64*** | ***66*** | ***1*** | | ***D-*** | ***60*** | ***63*** | ***0.7*** | | ***F*** | ***0*** | ***59*** | ***0*** | |
| **Assessment Items** | 10% Participation  20% Homework and Classroom Assignments  30% Midterm  40% Final Exam |
| **Participation** | Class participation will be a part of students’ final grades. Full participation consists of demonstrating that students are prepared for class, asking thoughtful questions, responding respectfully to peers, and engaging productively in class exercises. |
| **Midterm Exam** | At the end of the third week, students will take a midterm exam to demonstrate comprehension of course topics. |
| **Final Exam** | At the end of the course, students will take a final exam to demonstrate comprehension of course topics. |

**Course Texts**

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| **Required Textbooks** | Every member of the class is expected to complete all assigned readings for the assigned day from the following textbook:  ●     Matthew, N., & Stones, R. (2005). *Beginning Databases With Postgresql: from Novice to Professional.*New York, NY: Springer-Verlag. |
| **Recommended Reading** | ●     American Psychological Association (2019).*Publication Manual of the American Psychological Association* (7th ed.). Washington, DC: Author. |
| **Library Access** | Students are strongly urged to make use of SDUIS’s online library to assist with completing course requirements. There is no extra charge for the use of this extensive library collection – it is included in the cost of your tuition. To access the online library (known as LIRN: Library and Information Resources Network) go to <https://proxy.lirn.net/SDUnivForIntegrativeStudies> (copy & paste the link to into your browser). Multiple library collections may be accessed here. Click on the box on the lower right that says, “LIRN – Library and Information Resources Network - Databases.” When prompted to enter the LIRN ID, enter 72684; password: muddymist40. Please do not share this access information. It is intended only for SDUIS students, faculty, and staff. |

**Classroom Policies**

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| **Make-Up Work and Incompletes** | Only a documented (written) medical excuse and approval from the Registrar’s Office and the instructor may allow a student to make up any scheduled quiz, midterm, presentation, or final exam.    Students who, for extenuating circumstances, need to receive an incomplete in any of their courses, must submit a “Petition for Incomplete” (obtained by the Registrar or SDUIS website, approved and signed by the instructor) and pay a $50 processing fee. |
| **Add and Drop Policy** | **Adding Classes:**  To add courses after the registration deadline, complete and submit an Add/Drop form to the Registrar’s Office and pay the required fees.    It is the student’s responsibility to participate fully in classes once registration is complete. However, should it become necessary to withdraw from a class, it is the student’s responsibility to submit an Add/Drop form to the Registrar’s Office and pay the required fees. Classes may also be dropped online on the SDUIS website.    **Dropping Classes:** Classes **may not**be dropped by phone. SDUIS may administratively drop a student who fails to attend 80% of a class. The student must officially withdraw from class to avoid a failing grade. A student who is administratively dropped from class due to failure to meet the attendance requirement will receive **WF-Withdrawal Failure** on their transcript.    If you are adding or dropping a course, please see an admissions advisor, especially if your international student status may be adversely affected by class changes. |
| **Academic Honesty** | Plagiarism occurs whenever a person presents the words, ideas, or views of someone else as if they were his or her own. The use of another’s published or unpublished ideas, words, or views on a paper, report, or oral presentation must be accompanied by specific citations and references. The consequence of plagiarism and other forms of academic dishonesty may include non-acceptance of the work submitted by the student or dismissal from the University. The Chief Academic Officer handles all matters involving academic dishonesty. |
| **Ethical Conduct** | San Diego University for Integrative Studies embraces a high standard of performance for students, administrators, faculty, and staff members. All members of the campus community have the responsibility to foster a standard of conduct which reflects credit on themselves and on the University, while preserving a climate that respects the dignity and integrity of each individual.    San Diego University for Integrative Studies expects and requires that all students maintain the ethical standards of the professions and careers for which they are training. Plagiarism, or presenting the ideas, words, or views of another, as if they were one's own, is considered unethical conduct by the University. Failure in maintaining such standards or engaging in actions that are deleterious to San Diego University for Integrative Studies may result in disciplinary action, which is determined on a case-by-case basis. |
| **Student Identity Policy** | Upon acceptance into the University, each student is asked to verify the email address they wish to use for university business. They may choose to use an email address that they already have, or they may request a university email account be assigned to them, which is then issued.   This email address becomes the authorized channel for their interaction with the university via email.  Each quarter the Registrar’s Office sends to the Distance Learning Coordinator a list of all students registered for each class. The Distance Learning Coordinator then enters those names into the authorized class roster on NEO, our learning management system. Only students registered into a specific course may access course materials via NEO. The first time a student is entered into a NEO roster, the Distance Learning Coordinator issues the student a username and a password, which is unique to that individual. **It is essential that this NEO access information not be shared with anyone else. To share NEO access information with anyone else is a serious violation of academic integrity, and will be met with severe penalties, up to and including dismissal from the university.** |

**Course Outline**

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| **Week** | **Class Session** | **Topic** | **Readings and Assignments** | **Learning Objectives\*** |
| **1** | **Lesson 1** | ●      Introduction to PostgreSQL  ●      Relational Database Principles | ●      Chapter 1  ●      Chapter 2    Preview before our next class:  Chapter 3    Additional assignments per instructor | Students will be able to:  ●      Define a database management system.  ●      Outline and describe different types of databases.  ●      Describe database management system responsibilities.  ●      Explain what PostgreSQL is and its function.  ●      Define the term *open source* in terms of software.  ●      Discuss why databases are useful.  ●      Discuss the problems and limitations of spreadsheets.  ●      Explain how databases store data and how to access data in a database.  ●      Describe basic database design, with multiple tables.  ●      Describe relationships between tables.  ●      Define some basic data types.  ●      Explain the NULL token and its function. |
| **Lesson 2** | ●      Getting Started with PostgreSQL | ●      Chapter 3    Preview before our next class:  Chapters 4 & 5    Additional assignments per instructor | Students will be able to:  ●      Install PostgreSQL from Linux binaries.  ●      Install PostgreSQL from the source code.  ●      Set up PostgreSQL on Linux and UNIX systems.  ●      Install and set up PostgreSQL on Windows.  ●      Create a database with tables and add data. |
| **2** | **Lesson 3** | ●      Accessing Your Data  ●      PostgreSQL Command-Line and Graphical Tools | ●      Chapter 4  ●      Chapter 5  Preview before our next class:  Chapter 6    Additional assignments per instructor | Students will be able to:  ●      Discuss the SELECT statement, including how to choose columns and rows, how to order the output, and how to suppress duplicate information.  ●      Configure PostgreSQL’s behavior in interpreting and displaying dates.  ●      Describe how to use dates in condition statements.  ●      Perform mathematical calculations while retrieving data.  ●      Create alias table names for convenience.  ●      Use pattern matching to specify what data to retrieve.  ●      Make comparisons using various data types.  ●      Describe psql and its function.  ●      Describe how to set up an ODBC data source to use a PostgreSQL database.  ●      Outline and describe some of the graphical tools available for working with PostgreSQL databases. |
| **Lesson 4** | ●      Data Interfacing | ●      Chapter 6  Preview before our next class:  Chapters 7 & 8    Additional assignments per instructor | Students will be able to:  ●      Add data to the database with INSERT.  ●      Insert data into serial columns.  ●      Insert NULL values.  ●      Load data from text files using the \copy command.  ●      Load data directly from another application.  ●      Update and delete data in the database using the UPDATE and DELETE commands. |
| **3** | **Lesson 5** | ●      Advanced Data Selection  ●      Data Definition and Manipulation | ●      Chapter 7  ●      Chapter 8  Preview before our next class:  Chapter 9    Additional assignments per instructor | Students will be able to:  ●      Use and describe various aggregate functions.  ●      Identify advanced joins that provide more control over query results.  ●      Define *subqueries* and describe their functions.  ●      Discuss the *outer join*.  ●      Describe different data types and how to manipulate them.  ●      Create and manage tables.  ●      Explain the concept of view and how to use a view to create the “illusion” of a table.  ●      Explore foreign key constraints and use them in the creation of a sample database. |
| **Lesson 6** | ●      Transactions and Locking  ●      Midterm | ●      Chapter 9  Preview before our next class:  Chapters 10 & 11    Additional assignments per instructor | Students will be able to:  ●      Explain what constitutes a transaction.  ●      Discuss benefits of transactions in a single-user database.  ●      Discuss what is meant by *undesirable phenomena*.  ●      Describe row and table locking and how they work.  ●      Demonstrate comprehension on the midterm exam. |
| **4** | **Lesson 7** | ●      Functions, Stored Procedures, and Triggers  ●      PostgreSQL Administration | ●      Chapter 10  ●      Chapter 11  Preview before our next class:  Chapter 12    Additional assignments per instructor | Students will be able to:  ●      Describe PostgreSQL operators and built-in functions.  ●      Explain how operators are implemented as functions in PostgreSQL.  ●      Outline and describe procedural languages, specifically PL/pgSQL.  ●      Explain how stored procedures can be executed.  ●      Describe trigger procedures, how to create them, and their function in databases.  ●      Describe the layout of a PostgreSQL installation, particularly its configuration files.  ●      Discuss how to manage the internals of a PostgreSQL server.  ●      Backup and restore data.  ●      Outline measures to take to maintain or improve database performance. |
| **Lesson 8** | ●      Database Design | ●      Chapter 12  Preview before our next class:  Chapters 13 & 14    Additional assignments per instructor | Students will be able to:  ●      Outline guidelines for how to design a database.  ●      Describe stages of database design.  ●      Convert a logical model of data to a physical representation.  ●      Discuss how to enforce data integrity using constraints.  ●      Select candidate keys, primary keys, and foreign keys.  ●      Choose data types for columns.  ●      Discuss the importance of consistency in database design.  ●      Describe three common problem patterns that appear in database design and how they are typically solved. |
| **5** | **Lesson 9** | ●      Accessing PostgreSQL from C Using libpq  ●      Accessing PostgreSQL from C Using Embedded SQL | ●      Chapter 13  ●      Chapter 14  Preview before our next class:  Chapter 15    Additional assignments per instructor | Students will be able to:  ●      Create PostgreSQL applications in C.  ●      Discuss database connection and connection management.  ●      Describe how the *libpq* library allows for the connection of a database on a local machine or on a server across the network.  ●      Consider problems of handling large volumes of data.  ●      Explain how to use cursors to marshal query results into manageable units.  ●      Explain the problem of blocking.  ●      Consider ways of creating applications that continue to service the user while accessing a database server.  ●      Explain how to use SQL in C programs by embedding SQL statements directly in the source code.  ●      Describe how to connect to a database and deal with errors that may occur. |
| **Lesson 10** | ●      Accessing PostgreSQL from PHP | ●      Chapter 15  Preview before our next class:  Chapters 16 & 17    Additional assignments per instructor | Students will be able to:  ●      Describe characteristics and functions of PHP.  ●      Explore various methods for accessing PostgreSQL from PHP.  ●      Outline various aspects of database connections, query building and execution, result set manipulation, and error handling.  ●      Describe the PEAR database abstraction interface. |
| **6** | **Lesson 11** | ●      Accessing PostgreSQL from Perl  ●      Accessing PostgreSQL from Java | ●      Chapter 16  ●      Chapter 17  Preview before our next class:  Chapter 18    Additional assignments per instructor | Students will be able to:  ●      Outline three different ways to access PostgreSQL from Perl.  ●      Install Perl modules.  ●      Explain and use the database-independent layer (DBI).  ●      Access a PostgreSQL database from Java.  ●      Describe the evolution of the JDBC API. |
| **Lesson 12** | ●      Accessing PostgreSQL from C#  ●      Final Exam  ●      Class Evaluations | ●      Chapter 18 | Students will be able to:  ●      Outline and explain three ways to access a PostgreSQL database from C#.  ●      Demonstrate comprehension of topics learned and discussed throughout the course on the final exam. |