DATABASE AND DATA ANALYTICS

Post-Graduate Certificate Program

UC SANTA CRUZ SILICON VALLEY CAMPUS
UCSC Silicon Valley Extension

in partnership with Higher Education

Learn the principles and practices involved in handling business data and analysis, which are suitable for anyone who designs, administers, tunes, and uses shared databases. UCSC's Database and Data Analytics certificate program offers up-to-date training for data scientists, analysts, administrators and managers who want to apply analytics to business decision-making.

Who Should Attend?

This program is geared to data professionals seeking to augment their understanding of the latest database systems and stay current with ongoing industry changes and the evolving enterprise environment. Others wishing to start a career in databases or data analytics will find a wide range of courses to establish a solid foundation in the related disciplines.

Curriculum

Certificate | 2 Quarters | 14 Units

Relational Database Design and SQL Programming | 3 Units
Cover the concepts and design for Relational Database Management Systems (RDMS)and the Structured Query Language (SQL) needed to define and manipulate data. Learn how to create conceptual, logical and physical designs ofrelational databases. The course covers methods for producing readable output, creating and manipulating tables and creating and managing constraints using SQL. Skills needed: Familiarity with general database concepts and ability to install software or databases on a personal computer.

Business Intelligence Solutions | 2 Units
This course takes a hands-on approach to the fundamentals of business intelligence, using the Microsoft BI stack as an example. You will learn the features of PivotTables, Power Pivot and Power View, including how to load data from SQL Server and create Poweriew dashboards, charts and maps. You will use Visual Studio to build an Online Analytical Processing (OLAP) cube and dimensions. Learn to use SQL Server Analysis Services (SSAS), Integration Services, and Reporting Services.

Predictive Analytics: Applications of Machine Learning | 3 Units
An introduction to machine learning methods including regression, classification, clustering and recommender systems, and their application to practical scenarios. Review the steps involved in building predictive models, including data collection, feature selection, algorithms, and evaluation. You will learn how to fine tune the performance of these predictive models, and plan for practical implementation issues. Skills needed: Some programming experience is recommended. R will be used in class examples, and Python experience can be helpful. Basic knowledge of probability and statistics is required. Prior machine learning knowledge is recommended but not required.

Introduction to Data Analysis | 3 Units
Examine different approaches to a data analysis project, with a framework for organizing an analytical effort. Popular tools for data analysis are introduced to carry out analysis. Learn how to obtain and manipulate the raw data for use. It covers the basic exploratory analysis and common data analytical techniques such as regression, simulation, estimation and forecasting, and it includes several graphing and visualization tools to understand the data and to present findings and results. Skills needed: Some programming experience is recommended. (R will be covered in class and used in examples, and Python experience can be helpful.) Basic knowledge of probability and statistics is required (at the level of most basic statistics textbooks).

Big Data: Overview, Tools and Use Cases | 3 Units
Learn data management, including how to acquire, cleanse and normalize Big Data. Explore key concepts, schema, data access and methodology of NoSQL, a database management system designed to handle Big Data. Learn the technology infrastructure, Hadoop and SMAQ (Storage, MapReduce and Query) stacks in Big Data. The course concludes with Data Visualization Tools (DVT), analytics tools, and deployment patterns in various industries. Skills needed: A fundamental understanding of databases, programming and data analytics is strongly recommended.

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Additional Curriculum

Certificate & OPT | 3 Quarters | 27 Units

Data Modeling, Introduction | 3 Units
Data modeling defines and applies structure to the information systems in an enterprise, allowing data to flow across the enterprise, departments, or business areas. This course provides in-depth knowledge and hands-on practice in data modeling and design. After introducing the concepts and principles of data modeling, the course covers data modeling techniques and practices in four modeling areas: conceptual, logical, physical, and dimensional. You will study real-world examples of data models for transactional systems, data marts and enterprise data warehouses.

Introduction to NoSQL Databases | 3 Units
This course offers a study of the features of NoSQL databases and why they are good fit for Big Data, covering the types and categories of popular NoSQL databases, including overviews and examples. The instructor will provide a data processing example in NoSQL databases using Hadoop, Apache Hive and Pig. Cover the API coding and cloudbased NoSQL. Course project involves setting up, populating, and using a NoSQL of your choice. You will understand NoSQL concepts and learn to use popular NoSQL databases. Skills needed: Experience using a programming language such as Python, Ruby, Java, etc. Ability to set up open-sourced software, databases, tools, and development environments on personal computers.

Introduction to Machine Learning & Data Mining | 3 Units
Machine learning automatically recognizes complex patterns in all types of data. This hands-on course covers the concepts and principles of a variety of data mining methods and includes machine learning examples written in the statistical language R. The course presents supervised learning concepts, which require labeled training data and include various types of linear regression, decision trees, k-nearest neighbors, Naive Bayes, Support Vector Machines and ensemble methods. Skills needed: Moderate level of computer programming ability (Python, R, C++, Java, Matlab), elementary understanding of probability and statistics.

Oracle PL/SQL, Introduction | 2 Units
This course is applicable to Oracle8i, Oracle9i, Oracle 10g, and Oracle 11g users. It introduces students to PL/SQL and explains the benefits of this powerful programming language. You'll learn to create PL/SQL blocks of application code that can be shared by multiple forms, reports, and data management applications, as well as anonymous PL/SQL blocks, stored procedures, functions, packages and database triggers. You'll also learn to manage PL/SQL program units, use dependencies, manipulate large objects, and use some of the Oracle-supplied packages. The lab uses I*SQLPLUS to develop these program units.

Dashboards and Data Visualization | 2 Units
This course introduces dashboard and data visualization technologies with a hands-on approach. Identify and design key performance indicators (KPIs), learn the principles of data visualization, and design and implement dashboards and scorecards. You will learn how to choose data sources, extract required data, perform data analysis using an example tool, and visually present results on the dashboard. Skills needed: Knowledge of database concepts and any business experience related to decision-making.

Internships (unpaid) | 3 Units
Minimum 90 Hours Per Quarter
Enrolling in a certificate program allows you to participate in multiple unpaid internships at local companies in your field of study. Internships are available across a variety of sectors, generally at mid-sized companies, such as Agylytyx, Crowdera Inc, Innowest, and YMedia Labs. Good internships are much sought after and highly competitive. To stand the best chance of securing your preferred placement, our Internship Coordinators are on hand with expert support and guidance.

Courses in the certificate programs are subject to change based on schedule availability and/or student aptitude. Equivalent course substitutions will be made to accommodate.