BIG DATA AND NO SQL PROGRAM

A ten-week in-depth program covering popular NoSQL databases and how they fit with Big Data

DePaul University's Big Data and NoSQL Program is designed for IT professionals whose companies are new to the Big Data environment. Big Data refers to the ever increasing amounts of unstructured data being generated by websites, sensors, and many other sources, along with transactional data from enterprise applications. The program has been designed to give learners a very comprehensive understanding of Big Data and NoSQL (commonly referred to as “Not Only SQL”), which is a new class of database management systems used for storing new types of data. The program will focus on the technologies and their implementation, but will also cover the business impact and guidelines for adoption. Two of the most popular NoSQL databases—MongoDB® and Apache Cassandra®—will be covered in detail.

Students will learn how to design, build, launch, deploy, and scale an application using the NoSQL approach in different platforms. Classroom lectures and demonstrations will be complemented by hands-on exercises, reading assignments, case studies, and projects. Each student will have a flexible environment (BYOD-Bring Your Own Device, Virtual, or Cloud) to access NoSQL databases, along with sample code and scripts, in order to learn real-world scenarios and best practices. In order to maximize learning, students will be required to bring their own laptop computer to every class session. While access to most cloud services explored in the program will be provided to students in class, there may be some cloud services that are only accessible via the use of a student’s own credit card. Students should expect to spend a small fee to access these services.

YOU WILL LEARN:

- Big Data characteristics and the NoSQL data model
- The differences between traditional relational databases and NoSQL databases
- The value of adopting Big Data using a NoSQL approach
- How to leverage open source, virtualization, cloud computing and social media to achieve better results
- Practical knowledge with hands-on labs on NoSQL using different platforms and tools
- Use cases and best practices to process Big Data with NoSQL
- The new generation of databases that have recently emerged in the marketplace
- The overall market shift and expansion and what the database market will look like tomorrow
- How to view database workloads and technologies and how to select database technology
BIG DATA AND NOSQL PROGRAM

The goal of the Big Data and NoSQL Program is to provide students with an objective overview of Big Data so that they can determine how best to use different NoSQL databases in their working environments. The program will cover the leading players in the world of Big Data and explain the different ways that NoSQL databases store data. It will also cover which types of applications are best suited for the NoSQL approach and when a relational database would be more appropriate. DePaul University partners with leading professionals in the Big Data and NoSQL industry and subject matter experts with real-world experience to lead students through the NoSQL principles, methods, technologies and other essential aspects of Big Data. Two of the most popular NoSQL databases—MongoDB® and Apache Cassandra®—will be covered in detail. Other NoSQL databases will also be covered.

Students will gain an understanding of what is involved in selecting NoSQL technologies from different disciplines: applications development, management, and architecture. Students will also gain knowledge of the skills needed to build and deploy applications using a variety of common services. Each student will have a flexible environment (BYOD, Virtual, or Cloud) to access NoSQL databases along with sample code and scripts to learn best practices and real-world scenarios. Classroom lectures and demonstrations are complemented by reading assignments, hands-on exercises, case studies, and projects.

CURRICULUM

BIG DATA OVERVIEW

NOSQL INTRODUCTION
A primer on NoSQL and how it compares to relational database technology. Topics to be covered include: Key-Value store database, Document oriented database, Graph database, and Columnar database. Appropriate times to use NoSQL databases and (dis)advantages of using them.

MONGODB AND CASSANDRA DATABASES

AMAZON DYNAMODB
Comparing DynamoDB to other databases. Using the AWS Console and API to read and write data, create and query secondary indexes, use partitions in large tables.

MICROSOFT COSMOSDB
Overview of CosmosDB architecture, CosmosDB features and capabilities, CosmosDB API, Azure functions and CosmosDB. Creating an application with CosmosDB.

NOSQL SCHEMA DESIGN
The challenges of designing a NoSQL database for processing
large data streams and solutions. Describe the choices of schema design and index strategies to optimize writes and efficient querying/retrieval.

**NOSQL BACKUP STRATEGIES**

An introduction to data backup strategies and steps to implementing a backup strategy.

**SCALABILITY AND AVAILABILITY**

NoSQL’s different scaling options and how to use clustering, sharding, and replica sets to scale capacity up or down automatically according to conditions you define.

**CASE STUDIES AND INDUSTRY TRENDS**

Case studies. Discussion of database industry trends and job market.

**GENERAL INFORMATION**

**ADMISSION**

Applicants should have an understanding of relational databases and some programming experience building applications with them; and, experience using Windows and Linux commands. No previous NoSQL experience is necessary. In addition, students are required to bring their own laptop computers to class.

A substantial commitment of time is required for this intensive course of study. Final admission will be determined by the admissions committee on the basis of an applicant's overall qualifications, including work history and educational background.

**FACILITIES**

To promote the learning process, the Institute maintains special-purpose laboratories as well as dedicated classrooms equipped with state-of-the-art audio/visual equipment.

In addition, the college’s unique Course OnLine (COL) technology allows students to replay classes over the Internet. COL captures and replays five components of the classroom experience—audio, video, PC screen, whiteboard, and document camera input—and incorporates them into one interface to provide an innovative rebroadcast system.

**SCHEDULE**

The Institute offers one section of the program each quarter. Classes meet one day per week. The option to take the program entirely online is also available.

**FACULTY**

The faculty consists of a team of instructors from the College of Computing and Digital Media and experts in industry. Faculty will be available throughout the program both in person and through electronic mail.
The college, through its School of Cinematic Arts, School of Computing, and its School of Design, offers a variety of programs at the undergraduate and graduate levels. Almost 4,000 students are enrolled in the college’s bachelor’s programs and more than 2,000 students are enrolled in the master’s and Ph.D. programs making the college’s graduate program one of the largest in the country. The college offers more than 400 courses each quarter, many in the evening, and primarily in the Loop and Lincoln Park Campuses. Most of the degree programs are also available exclusively online.

**Offerings at the undergraduate level include:**
- Animation B.A. / B.F.A.
- Computing B.A.
- Computer Science B.S.
- Cyber-Physical Systems Engineering B.S.
- Cybersecurity B.S.
- Data Science B.S.
- Film and Television B.A. / B.F.A.
- Game Design B.S.
- Graphic Design B.F.A.
- Industrial Design M.F.A.
- Information Systems B.S.
- Information Technology B.S.
- Math and Computer Science B.S.
- Network Engineering and Security B.S.
- User Experience Design B.S.

**Offerings at the graduate level include:**
- Animation M.A.
- Business Information Technology M.S.
- Computational Finance M.S.
- Computer Science M.S.
- Cybersecurity M.S.
- Data Science M.S.
- Digital Communication and Media Arts M.A.
- Experience Design M.A.
- Film and Television M.S.
- Game Programming M.S.
- Health Informatics M.S.
- Human-Computer Interaction M.S.
- Information Systems M.S.
- Network Engineering and Security M.S.
- Product Innovation and Computing M.S.
- Software Engineering M.S.
- J.D./M.S. in Computer Science Technology

**Ph.D. in Computer and Information Sciences**
- Animation
- Creative Producing
- Documentary
- Film and Television Directing
- Game Design
- Screenwriting

**Ph.D. in Human Centered Design**

**INSTITUTE FOR PROFESSIONAL DEVELOPMENT**

The Institute for Professional Development was formed by the college in 1984 to assist both individuals and businesses in keeping pace with the rapid development of computer technologies. The Institute currently offers a variety of intensive certificate programs in these areas:

- Advanced Data Science with Python
- Advanced Python
- Advanced SQL
- Artificial Intelligence for Enterprise
- Automated Software Testing
- Big Data and NoSQL
- Big Data Using Spark
- Cloud Computing Technologies
- Cybersecurity Risk Management
- DevOps
- Data Analytics with Excel and Tableau
- Data Science for Business
- Data Science: Programming with Python
- Fundamentals of Statistics and Machine Learning Using R
- Fundamentals of R
- Incident Response and Digital Forensics
- Introduction to SQL
- iOS Developer
- Machine Learning and Deep Learning
- Modern .NET Web Development
- Robotic Process Automation
- SQL Server® Business Intelligence
- SQL Server® Database Administration
- Web Development with JavaScript and HTML5

**APPLICATION PROCEDURE:**

You do not have to be an existing DePaul student to take this certificate program. All interested parties must apply for admission. Prospective students may complete the online application and pay the (non-refundable) $40.00 application fee online during the application process. Alternatively, prospective students may print, complete and return the printable application via mail or email (ipd@cdm.depaul.edu), and mail the (non-refundable) $40.00 application fee (check or money order made payable to DEPAUL UNIVERSITY) to:

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Institute for Professional Development
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