DEVOPS PROGRAM

An eleven-week program covering DevOps and continuous delivery, for IT professionals and software developers.

DePaul University's DevOps Program is designed for IT professionals and software developers who want to understand the fundamental principles of DevOps and continuous delivery and be able to apply them to their business. The program examines the DevOps movement through three lenses: business agility, supporting technologies, and software engineering disciplines. We look at the motivation for DevOps and continuous delivery and some of the considerations that are required to present a compelling business case for its adoption. The program also examines common tools that enable DevOps success including source code control, build automation, continuous integration, automated testing, cloud adoption, and containerization. Finally, the program looks at common changes that may be required in traditional software delivery and operations teams to allow DevOps to flourish. Throughout the program we look at DevOps as the logical extension of the fundamental principles of agile development and focus significant time and attention to the organizational and cultural changes that are often required for such initiatives to be successful.

Program content consists of lectures and demonstrations complemented with hands-on labs. Students will use a variety of tools and techniques such as Github, Jenkins/Travis CI, Maven, Gradle, Docker, AWS, and Chef. Reading assignments, case studies, group discussions, and projects will be assigned. Students are expected to have easy access to either a Windows or Linux desktop with a current version of Java and be able to install additional software as required.

YOU WILL BE ABLE TO:

- Understand the goals of DevOps and continuous delivery and how to continuously evaluate whether those goals have been met.
- Develop build automation using Maven and Gradle.
- Develop test automation in the style of behavior-driven development (BDD) using Spock.
- Implement continuous integration using hosted solutions such as Travis CI.
- Understand the role of virtualization and containerization as an enabler to DevOps.
- Understand the role of cloud computing as it relates to DevOps.
- Understand how DevOps and continuous delivery affect organization culture and team composition.
DEVOPS PROGRAM

CURRICULUM
Each student will have a flexible environment to access different tools along with sample code and scripts to learn best practices and real-world scenarios. Classroom lectures and demonstrations will be complemented by reading assignments, hands-on exercises, case studies, and projects. An ongoing project will be completed to gradually transform an application from classic, manual deployment into one that exhibits the principles discussed during the program.

DEVOPS OVERVIEW
The motivation for DevOps. Cautionary tales that demonstrate the need for improved practices. DevOps as an extension to agile development frameworks. Common myths of DevOps and continuous delivery. Common pitfalls of DevOps adoption and how we can tell when we’ve arrived at our goal.

THE 3-WAYS
There are many parallels between classic manufacturing firms and modern software development teams. We look at how some classic manufacturing techniques have been adapted for use in DevOps and at some of the metrics they can provide to evaluate our progress. We’ll look at the “3 Ways” defined by Gene Kim and see how they apply.

SOURCE CODE MANAGEMENT AND GIT
Successful source code management is the single-most important technique in all of DevOps. It is the foundation on which all of the other techniques and tools are based. We’ll look at why source code management is so critical and then turn our attention to Git and Github as our means of filling that need. Learn how different branching and merging strategies can significantly impact change throughput and review the practices of some modern firms such as Facebook and Amazon.

BUILD AUTOMATION
Gain hands-on experience with Maven and Gradle to standardize and automate the process of producing final build artifacts. We also consider dependency management and discuss the merits of manual and automated approaches to its implementation.

AUTOMATED TESTING
Understand the evolution of testing and automation. We discuss different forms of testing including: unit, functional, capacity, and acceptance. You’ll get hands-on experience in authoring automated tests using the Spock framework. Learn about the impacts that automated testing can have on an organization’s role, responsibilities, and separations of concerns that can impact auditing and compliance evaluations.

CONTINUOUS INTEGRATION AND DEPLOYMENT
Bring your automation alive by integrating it with one or more continuous integration software packages so that it is automatically triggered on changes made to your source code management system.

VIRTUALIZATION AND INFRASTRUCTURE AS CODE
Virtualization is the cornerstone of most scalable infrastructure including cloud computing providers such as AWS and Microsoft. Learn what virtualization is and how it can be leveraged at the data center level to allow for right-sized computing environments. Discover how virtualization can be used at a micro-level to make it simpler to define development
environments and increase team productivity. Get hands-on experience using Vagrant to build a virtual machine.

| CLOUD COMPUTING AND 12-FACTOR APPLICATIONS | Review the foundational elements of cloud computing including network, storage, and compute. Evaluate the costs of cloud migration and understand some of the best practices of incorporating cloud computing in your DevOps practices. Learn about how 12-factor applications are architected and constructed in such a way as to make their management, in or out of the cloud, simple and frictionless. |
| CONTAINERIZATION AND CONFIGURATION MANAGEMENT | Containerization using Docker is making significant contributions to the DevOps space. Learn about what Docker is and how it relates to virtualization. Get hands-on experience building Docker containers. Learn about Kubernetes and other container management tools and understand what they contribute to container infrastructure. Understand the role of configuration management tools like Chef. Learn how to write simple Chef cookbooks and recipes and how they can be incorporated into software delivery pipelines. |
| GOVERNANCE AND OPERATIONALIZATION | A common mistake is to assume that “DevOps” means that “governance is no longer required.” Nothing could be further from the truth. Learn how governance practices and principles still have a major role to play within DevOps initiatives and how the concept of a central team may need to evolve. Understand the role of operations in “DevOps” and modern trends that are gradually blurring the lines between development, QA, and operations. |

**GENERAL INFORMATION**

**ADMISSION**

The program is suitable for IT professionals and software developers who want to explore how DevOps and continuous delivery practices are shaping modern IT organizations. Applicants should have a minimum of two years of professional software development experience. Experience with Java is assumed, although this program does not require significant Java development.

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 the essential elements of our on-campus classes—the lecture itself and information displayed in class and written on the board—incorporating into a flexible interface, available online only a few hours after the class session ends.

**SCHEDULE**

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

The program is taught by Chris Jones. Mr. Jones has been an adjunct lecturer at DePaul University for almost 20 years and has more than 25 years in the IT industry encompassing many roles across different industry verticals. Mr. Jones earned his MS in Software Engineering from DePaul in 2002 and his PhD in Computer Science from DePaul in 2016. He has written academic articles on DevOps techniques and their inclusion in higher education. He has also presented at Chicagoland technical conferences including the 2017 Chicago Coder Conference ("The Myth of Technical Excellence in Continuous Delivery"), the 2018 Midwest AWS Community Day ("Easing Cloud Migrations with Software Pipelines as a Service"), and the 2018 AWS Summit Chicago ("Software Pipelines as a Service"). Mr. Jones 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. Over 3,000 students are enrolled in the college’s bachelor’s programs and about 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 close to 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.
- 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.
- Game Programming B.S.
- Graphic Design B.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.
- Applied Technology M.S.
- Business Information Technology M.S.
- Computation Finance M.S.
- Cybersecurity M.S.

**Continued from prior column**
- Data Science M.S.
- Digital Communication and Media Arts M.A.
- E-Commerce Technology M.S.
- 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
- Master’s of Fine Arts
- Animation
- Creative Producing
- Documentary
- Film and Television Directing
- Game Design
- Screenwriting
- Ph.D. in Computer and Information Sciences
- Ph.D. in Human Centered Design

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 SQL
- Big Data and NoSQL
- Big Data Using Hadoop
- Big Data Using Spark
- Cloud Computing Technologies
- Cybersecurity Risk Management
- Data Science for Business
- Data Science: Programming with Python
- DevOps
- Fundamentals of R
- Fundamentals of Software Testing
- Incident Response and Digital Forensics
- Introduction to Artificial Intelligence and Deep Learning
- Introduction to SQL
- iOS Developer
- Java™ Developer
- Modern Information Technology
- Modern .NET Web Development
- SQL Server® Business Intelligence
- SQL Server® Database Administration
- Technology and Innovation
- Web Development with JavaScript and HTML5

**APPLICATION PROCEDURE:**
Complete the enclosed application and return it with a non-refundable $40.00 application fee (check or money order made payable to DEPAUL UNIVERSITY) to:

DePaul University
Institute for Professional Development
243 S. Wabash Avenue, Room 301
Chicago, IL 60604-2300

The DevOps Program at DePaul University is an independent program of study and is not affiliated with, nor has it been authorized, sponsored, or otherwise approved by external entities.