CIT 425: Software Development and Operations (DevOps)

Gandaki University

IV Year, I Sem

Program: `Bachelor of Information Technology`
Subject: `Software Development and Operations (DevOps)` Year: IV
Course Code: CIT 425 Semester: I
Credit Hour: 2+1=3 Lab Type: Computer Lab
Contact Hours: 45 Lab Hours: 10

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1 Course Objectives

The key objectives of learning Software Development and Operations (DevOps)are:

1. Learn and understand how various technologies work together in DevOps. Get a firm understanding in DevOps Processess, Tools and Technologies.
2. Learn the basics of working in DevOps environments like Linux, AWS, Bash & Python Scripting, Jenkins, Ansible, Docker, Kubernetes and more

Course Description

This course provides an introduction to the concepts, practices, and tools used in DevOps. Students will learn about the fundamental principles of DevOps and how they can be used to improve the software development and deployment process. The course will cover a range of topics including automation, continuous integration and delivery, testing, and monitoring.

This course starts from very basics of command line, hands on demonstrations of many tools & technologies. Also most importantly it will show the readers how various technologies in DevOps work together by setting up their own projects.

2 Course Outcomes

- This course will enable the students to understand the fundamental principles and benefits of DevOps and how it can improve software development and deployment processes.

- This course will enable students to apply continuous integration and delivery practices to automate the software build, test, and deployment process.

3 Course Content

3.1 Introduction (3 Hrs)

1. Introduction to DevOps: Definition, Scope, Application.
2. Introduction to Continuous Integration(CI) and Continuous Delivery(CD).
3. Prerequisites Info and Setup: Chocolatey (Windows), Homebrew(MacOS), AWS Setup, Linux Setup. Server Management in Linux.
4. Basics of Networking

3.2 Search Engine Basics (5 Hrs)

1. Search Index, Search Algorithm(s), Aim of Search Engines, Organic and Paid results
2. Indexing of websites. URLs - Backlinks, Sitemaps and URL Submissions. Crawler - Bot.
3. Ranking of websites. Key Ranking Factors of different Search Engines.
4. Personalized search Results.

3.3 Indexing Web Content on Search Engine (6 hrs)

1. Basic webpage designing. Key differences/similarities between a human visitor and search engine visitor. Website core structure.
2. Tools for SEO Monitoring: Google Analytics, Bing Webmaster, Yandex Webmaster.
3. Different Frameworks available for SEO in popular programming languages like python, java, R etc.

3.4 Components of SEO (5 Hrs.)

1. On-page SEO: On-page on-site SEO factors, Google Search Console, Yahoo & Bing Webmaster tools.
2. Off-Page SEO: Off Page Activities, Introduction to Off-page optimization, Guest Article Posts. Off Page Tools: Business Listings.
3. Site Optimization Techniques: Title tags, Meta tags, Header tags optimization.

3.5 Digital Marketing (5 Hrs.)

1. Introduction to Marketing. Online Vs. Offline Marketing. Mediums for Digital Marketing: Voice, Visuals, Text, Animation.
2. Landscape of Digital Marketing. Target Audience. Strategies of Digital Marketing.
3. Key Metrics for Measuring Success.

3.6 Content Marketing (9 Hrs.)

1. Introduction to Ontology. Use of OWL files like schema.org for site indexing.
2. Understanding User Experience and User Interface Design.
3. Website optimization for different devices.
4. Planning for content Marketing

3.7 Social Media Marketing (4 Hrs.)

1. Introduction to Social Media. Attributes of Engaging Content. Digital Actions for Social Media Campaigns.
2. Opportunities of different social media for digital marketing: Facebook - page, group, marketplace etc. Twitter. LinkedIn.
3. SEO efficiency with social media.

3.8 Advertising (3 Hrs.)

1. Paid Advertising: Introduction and Types.
2. Campaigns for Advertisement: Creating and Managing PPC(Pay Per Click) Campaigns, Analytics and Reporting, Analyzing and Reporting on Digital Marketing Campaigns

3.9 Summing Up (5 Hrs.)

1. Ethical Considerations for Marketing: Ads Writing, WordStream, Copywriting
2. Product Management with different marketing campaigns: Paper, Online, Digital etc.
3. Emails and Newsletters in Digital Marketing.
4. Content Design using AI tools for Digital Marketing and SEO.

4 Case Study

1. Study on different search engines like Google, Bing etc and key business strategies incorporated by those engines.
2. Study of different web development frameworks for SEO.
3. A case study of SEO and digital marketing in a business(choosen by student) domain: Global and Local Perspective.

5 Textbook(s):

1. Enge, E., Stricchiola, J., Spencer, S. (2015). The Art of SEO: Mastering Search Engine Optimization. United States: O'Reilly Media.
2. Digital Marketing That Actually Works the Ultimate Guide: Discover Everything You Need to Build and Implement a Digital Marketing Strategy That Gets Results. (2019). United States: Boot Camp Digital.

6 Reference(s):

1. Digital Marketing for Dummies. Ryan Deiss, Russ HenneBerry. 2nd Edition.
2. Social Media Marketing 2023: 4 BOOKS IN 1 - Social Media for Beginners, Instagram Marketing to Become an Influencer, Facebook Advertising, Google AdWords (Analytics, SEO and ADS for Your Business). Jeremy Preace.
3. The Beginner's Guide to SEO: How to Optimize Your Website, Rank Higher on Google and Drive More Traffic (The Beginner's Guide to Marketing). Jessica AinsWorth.