MAKERERE UNIVERSITY BUSINESS SCHOOL

FACULTY OF COMPUTING AND INFORMATICS

Department of Computer Science and Engineering

Academic Year 2024/2025 - Semester II

Course Outline

Program:	**Bachelor of Business Computing**
Course Name:	**Web server Administration**
Course Code:	**BUC3219**
Course Level:	**3**
Credit Units:	**4**
Credit Hours:	**60**
Facilitators:	**Ms. Hajara Namuwaya, Mr. Samuel Ssendi**

Course Description

This course provides students with a comprehensive understanding of web server administration, focusing on the deployment, configuration, management, and optimization of web servers in both on-premise and cloud environments. Students will gain hands-on experience with popular web server technologies such as Apache, Nginx, and Microsoft IIS, as well as cloud-based solutions like VPS, AWS EC2, Azure, Contabo, and Google Cloud Compute. The course also covers security practices, performance tuning, load balancing, and automation using scripting and configuration management tools.

Course Objectives

- Understand the fundamental concepts of web server architecture, protocols, and technologies.
- Configure and deploy web servers in various environments, including on-premise and cloud platforms.
- Diagnose and troubleshoot common web server issues, including performance bottlenecks and security vulnerabilities.
- Design and implement scalable, secure, and high-performance web server solutions for real-world applications.

Learning outcomes

By the end of this course, students should be able to:

- Explain the architecture and functionality of web servers and their role in web applications.
- Configure and manage web servers in different environments.
- Analyze and resolve performance and security issues in web server deployments.
- Design and implement a scalable and secure web server infrastructure for business applications.

Course contents:

Week	Description	Lesson Details	Hours
1	Introduction to Web Servers & Hosting	• Computer Servers • Server Components • Types of Servers • Overview of web servers • Web Servers Softwares (Apache, Nginx, Ms IIS, LiteSpeed) • Features of Web Servers • HTTP/HTTPS, SSH protocols • Hosting fundamentals	4
2	Web Server Architecture	• Physical and logical architecture • Single-Tier (Single Server) Architecture • Multi-Tier (Load-Balanced) Architecture • Managing web infrastructure • Client-server model, request-response cycle, and server-side scripting	4
3-4	Linux Fundamentals	• Virtual Machines setup (CentOs/AlmaLinux/Ubuntu) • Linux Basics • CLI commands, file systems	8
5-6	Apache Web Server	• Installation, configuration, virtual hosts, and modules (mod_ssl, mod_rewrite), .htaccess, FTP services	8
7	Nginx Web Server	• Installation, configuration, reverse proxy, and load balancing • Performance optimization vs. Apache	8
8-9	Microsoft IIS & Windows Server	• Installation, configuration, and management tools • Configuration via GUI/PowerShell, application pools, FTP services	4
10	Web Hosting Management Systems, Hostname, NS, DNS, FTP & SMTP Email Server Configuration & Performance Tuning	• Control panels (cPanel vs. CWP vs. Plesk vs WebAdmin) • Installation & configuration of CPs • User/Domain/DNS setup, database integration • SMTP relay setup (IIS, Postfix), SPF, DKIM, DMARC for email security • Blocking spam and phishing attacks • Backups/updates automation	8

		• Caching, compression, and optimizing server performance	
11	Web Server Security	• SSL/TLS (Let's Encrypt) • Firewalls (UFW, firewalld) • Authentication and access control • OWASP Top 10, MOD Security • Blocking spam and phishing attacks	4
13	Automation and Scripting, Monitoring and Logging	• Bash scripting, PowerShell, and configuration management tools • Tools for monitoring server performance and analyzing logs • Load balancing, clustering, and failover strategies	4
14	Semester Project	• Deploy a VPS with WHM (cPanel/CWP) • Host at least three websites/accounts for group members • Configure SSH/FTP/SMTP • Secure the web servers • Simulate and resolve outages	8
	Total Hours		**60**

Mode of Delivery

- Lectures (In-House Face to Face and Online)
- Group and class discussions
- Practical Exercises and Assignments Sessions
- Tutorials

Mode of Assessment

- Course work 30%
- End of semester examination 70%

Assessment Methods

- **Course Works** 30%
  - *a) At least 1 Coursework Test (Online)*
  - *b) At least 1 Individual Project (Takehome)*
  - *c) Semester Project Part I*

- **Final Exam** *(Theory Examination and Semester Project Part II)* 70%
- **Total Marks** *(Coursework and Final exam)* **100%**

Reading list:

- Bowen, R., & Coar, K. (2003). Apache Cookbook: Solutions and Examples for Apache Administrators. O'Reilly Media.
- Garrison, J., & Nova, K. (2017). Cloud Native Infrastructure. O'Reilly Media.
- Kholodkov, V. (2015). Nginx Essentials. Packt Publishing.
- Pedersen, A. (2019). cPanel User Guide and Tutorial. Independently published.
- Piper, B. (2020). AWS Certified Solutions Administrator Study Guide (4th ed.). Sybex.
- Silva, S. (2018). Web Server Administration: From Beginner to Pro. Apress.
- Smith, R. W. (2016). Web Server Administration: A Beginner's Guide (2nd ed.). McGraw-Hill Education.
- Web Server Administration (Web Warrior)by Steve Silva (2008)
- Microsoft. (n.d.). IIS Documentation. https://docs.microsoft.com/en-us/iis/
- Nginx. (n.d.). Nginx Documentation. https://nginx.org/en/docs/

Note: All class materials and examples will be delivered via Makerere University Business School eLearning Platform (**Mubsep**) accessible at ***https://mubsep.mubs.ac.ug***