Course Title: ITAP 3471: Web Server Management

Semester Credit Hours: 4 (3,1)

I. Course Overview

The primary objective of this course is to give students a comprehensive overview of the tools and techniques needed to successfully administer Web servers. The course is designed so as to cover topics that are relevant to the role of a Web server administrator. Topics include installation, configuration, and administration of Web servers on common hardware/software platforms.

II. PMU Competencies and Learning Outcomes

This course helps students develop proficiency in the installation, configuration, and administration of commonly used Web server. Students develop both the conceptual basis and the practical skills in the design and implementation of Web server software to support the core and mission-critical Internet-based business processes of an organization. The course covers the material necessary to prepare students for the CIW (Certified Internet Webmaster) Associate professional certification. Additionally, this course makes extensive use of the PMU technology infrastructure to provide communication between faculty and students. The course includes a structured laboratory component to ensure that students gain the necessary experience and skill in handling Web server environment. The course includes individual as well as group projects and provides opportunities for the presentation and defense of their designed architectural solution.

III. Detailed Course Description

The course begins with an introduction to the role of server and Web server in Web environment. It then proceeds with a review of major tasks performed by Web administrators. This sets the stage for discussing in detail the process of installing, configuring, deploying, testing and monitoring a Web server. In learning the installation task, students acquire proficiency in installing various component software (server operating system, Web server, Domain Name Server), setting up IP addressing schemes, and configuring TCP/IP. In configuring Web server, students are exposed to the process for authenticating users, establishing network policies, setting file permissions, and sharing network resources within the Web server environment. The task of securing Web server permits students to understand the role of security and provides hands-on practice in installing and configuring security-related software (firewall, proxy server and intrusion detection). Finally, students have an opportunity to deploy, test and monitor the Web server. This step familiarizes students with installing and supporting various components of an Internet-based information system. Students are exposed to these tasks for the most commonly used Web server software in industry. Both Microsoft and non-Microsoft platforms are covered so that students get a vendor-neutral perspective of this job role.

IV. Requirements Fulfilled

This course is required for all students majoring in Information Technology in the College of Information Technology. It is also recommended as an elective for students majoring in computer science and management information systems. It should be taken no earlier than the first semester of the junior year.

V. Required Prerequisites

GEIT 1411: Computer Science I
GEIT 1412: Computer Science II
ITAP 2431: Network Management.

VI. Learning Outcomes

In this course, students learn:

- To become familiar with the role of Web servers in mission-critical, Internet-based information systems.
- To become proficient in tasks performed by Web server administrator.
- To acquire an appreciation for issues relevant to Web server administration in a global business environment.
- To acquire the communication, leadership and teamwork skills necessary to work in teams, or in charge of teams, that are responsible for operating Web server environments.

VII. Assessment Strategy

The student's performance in this course may be assessed on the basis of:

- Three examinations, including two term and one comprehensive final examination.
- Laboratory exercises completed during scheduled lab sessions.
- One comprehensive final project completed outside of class.
- Class participation.

Relative weights assigned to these items in determining student's final grade are suggested as follows:

- The two term examinations each account for 20% of the grade. The final examination accounts for 20% of the grade. Combined, the three examinations account for 60% of the grade.
- Laboratory exercises account for 20% of the grade.
- Final team project accounts for 15% of the grade.
- Class participation accounts for 5% of the final grade.

The examinations are designed to assess the mastery of concepts, methodology, and tools discussed in class and assigned laboratory exercises. Assigned laboratory exercises are designed to provide students an opportunity to implement material covered in lectures. The final team project is designed to permit students to apply concepts, methods, and

tools learned in class to support a real system. The project requires students, working in teams, to install, configure and manage a Web server to support a specified Internet-based information system. Each team designs and develops a solution to support a different system. The grade on the final project depends on the quality of completed project, written technical documentation, and an oral presentation of implemented architecture. The final project is thus designed to assess competency in performing various tasks related to managing a Web server in a real-world situation. These assessments are complemented by class discussions on recent articles and case studies taken from various industry sources.

VIII. Course Format

This course utilizes a mix of in-class lectures, discussions, and hands-on demonstrations designed to help students learn the various tasks involved in designing, installing, configuring, securing, and monitoring Web server environment. While class meetings are utilized to emphasize conceptual foundation in topics related to these tasks, laboratory sessions are used to provide students with hands-on training in performing these tasks. At least one class meeting during the week should be devoted to discussing an article or case study that focuses on relevant issues or illustrate best practices in Web server administration. Students are expected to attend three hours of lecture/discussion per week and three hours of laboratory per week.

In addition, the instructor should consider creating a Web site for this course using Web technologies such as WebCT or BLACKBOARD. At minimum, the site should include:

- Course syllabus.
- Lecture material (for example PowerPoint slides, lecture notes, etc.). These should be placed on the site ahead of class meeting so that students may use the material to prepare for the lecture.
- Laboratory assignments and other projects.
- Keys to exams (after students have completed them).
- Solution to Laboratory Exercises (after graded assignments have been returned).
- Course calendar.
- Mechanism to communicate electronically (for example e-mail)
- Discussion groups.
- Students course performance measures.

Classroom Hours (6 hours per week) **Class: 3**
Lab: 3

IX. Topics to be Covered

A. The basics of server and Web server administration
   1. Basics of server and Web server administration
   2. Common tasks performed by administrators
   3. Compare Web server platforms

B. Preparing for server installation and configuration
   1. Identify server categories and evaluate server components
   2. Planning for system disasters and recovery
   3. Understand the installation process
   4. Install Windows Server 2003 and Red Hat Linux
   5. Set up IP addressing and configure TCP/IP
   6. Install and configure domain name server (DNS)
   7. Install and configure IIS and Apache Web servers

C. Managing a Web server
   1. User authentication
   2. Manage users, groups, and file system permissions
   3. Share resources in a network
   4. Enforce network policies

D. Securing a Web server
   1. Identify threats and vulnerabilities
   2. Secure data transmission, OS, and server applications
   3. Authenticate Web users
   4. Install firewall, proxy server, and intrusion detection software

E. Performance tuning
   1. Monitor Web servers and Web applications
   2. Analysis tools for Web servers

F. Deploy, test and extend Web server
   1. Understand the Web-based programming environment
   2. Provide E-mail, FTP, and remote access, streaming media services
   3. Programming languages, DBMS, Web services

X. Laboratory Exercises

Each week, students attend three one-hour scheduled laboratory sessions. During these sessions, students learn the several steps involved in the design, installation, configuration, and administration of a Web server environment. The following administration tasks should be covered in these labs. Because of extensive nature of certain tasks, some of these topics may have to be spread over multiple lab sessions.

- Install server operating system
- Set up IP addressing and Configure TCP/IP
- Install and configure DNS
- Install and configure Web server software
- Implement user authentication, user groups, and file permissions
- Set up and implement network policies
- Install and configure firewall, proxy server, and intrusion detection.
- Deploy, test, and monitor Internet-based applications such as e-mail, FTP, database, Web services, and e-business applications.

XI. Technology Component

A. In class, the instructor makes use of state-of-the art multimedia projection equipment and software. These are used to project slides and Web-based content relevant to Web server administration.

B. Outside class, the instructor uses Web-based course management software (for example WebCT, BLACKBOARD) to interact with students as described under course format section.

C. Outside class, in the laboratory setting, the instructor makes use of commercial Web server software (Microsoft and Non-Microsoft) to demonstrate various tasks involved in successfully installing, configuring, and managing a Web server.

XII. Special Projects/Activities

A team project is described in Section VII. Assessment Strategy

XIII. Textbooks and Teaching Aids

A. Required Textbook

Steve Silva, *Web Server Administration*, Course Technology, 2003, ISBN: 0-619-06439-0.

B. Alternative Textbooks

Byron Wright, *Hands-on Microsoft Windows Server 2003 Networking*, Course Technology, 2003,
ISBN: 0-619-18609-7.

C. Supplemental Print Materials

As available from publisher.

D. Supplemental Online Materials

As available from publisher.

Recent articles and case studies taken from online industry sources such as Microsoft.com and IBM.com. The instructor provides the links to these articles and case studies, which are freely available.