****Republic of the Philippines

**POLYTECHNIC UNIVERSITY OF THE PHILIPPINES**

**College of Computer and Information Sciences**

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| **Course Title** | **:** | **LAN Switching and Wireless** |
| **Course Code** | **:** | **COMP 4193**  **ELECTIVE** |
| **Credit** | **:** | **3 units / 5hrours** |
| **Pre-requisites** | **:** | **COMP 3023** |
| **Description** |  | The primary focus of this course is on LAN switching and wireless LANs. The goal is to develop an understanding of how a switch communicates with other switches and routers in a small- or medium-sized business network to implement VLAN segmentation. Topics and discussions includes Layer 2 switching protocols and concepts used to improve redundancy, propagate VLAN information, and secure the portion of the network where most users access network services. The better the underlying concepts are understood, the easier it is to implement, verify, and troubleshoot the switching technologies. |

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| **Institutional Learning Outcomes** | **PROGRAM INTENDED LEARNING OUTCOMES**  **Bachelor of Science in Information Technology** | | **Course Objectives** | |
| Creative and Critical Thinking | IT01 | Apply knowledge of computing, science, and mathematics appropriate to the discipline. | LO1. | Explain how standardization supports interoperable end-to end communications |
|  | IT03 | Analyze complex problems, and identify and define the computing requirements appropriate to its solution. |
|  | IT04 | Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer based systems. | LO2.  . | Explain the process by which devices access local and remote network resources. |
|  | IT05 | Design, implement, and evaluate computer based systems, processes, components, or programs to meet desired needs and requirements under various constraints | LO3. | Implement basic network connectivity between devices |
|  | IT06 | Integrate IT-based solutions into the user environment effectively | LO4. | Design an IP addressing scheme to provide network connectivity for a small to medium-sized business network. |
|  | IT09 | Assist in the creation of an effective IT project plan. | LO5. | Describe routing hardware that facilitates network access for a small to medium-sized business network. |
| Adeptness in the Responsible Use of Technology | IT07 | Apply knowledge through the use of current techniques, skills, tools and practices necessary for the IT profession | LO6. | Explain the operation of switching in a small to medium-sized business network. |
| High Level of Leadership and Organizational Skills | IT08 | Function effectively as a member or leader of a development team recognizing the different roles within a team to accomplish a common goal. | LO7. | Configure monitoring tools available for small to medium sized business networks |
| Strong Service Orientation |  |  |
| Community Engagement | IT02 | Understand best practices and standards and their applications. |  |  |
| Effective Communication | IT10 | Communicate effectively with the computing community and with society at large about complex computing activities through logical writing, presentations, and clear instructions. |  |  |
| Sense of Personal and Professional Ethics | IT11 | Analyze the local and global impact of computing information technology on individuals, organizations, and society. |  |  |
| Sense of Nationalism and Global Responsiveness | IT12 | Understand professional, ethical, legal, security and social issues and responsibilities in the utilization of information technology. |  |  |
| Passion to Life-Long Learning | IT13 | Recognize the need for and engage in planning self-learning and improving performance as a foundation for continuing professional development. |  |  |

**COURSE PLAN**

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| **Week** | **Topic** | **Learning Outcomes** | **Methodology** | **Resources** | **Assessment** |
| Week 1 | 1. Introduction to the Course    1. Vision Mission Goals and Objective of the University, and the College.    2. Self-Introduction    3. Course Overview    4. Grading System    5. Classroom Management | 1. Demonstrate a sense of readiness for the upcoming semester. 2. Identify their learning outcomes and expectations for the course. 3. Recognize their capacity to create new understandings from reflecting on the course | Orientation  Self-Introduction  Group Discussions | University Student Handbook  College Manual  Course Syllabus | N/A |
| Week 1 - 3 | 1. LAN Design | 1. Describe how a hierarchical network supports the voice, video, and data needs of a small- or medium-sized business. 2. Describe the functions of each of the three levels of the hierarchical network design model, the principles of hierarchical network design (aggregate connectivity, network diameter, and redundancy), and the concept of a converged network. 3. Provide examples of how voice and video over IP affect network design. 4. Select appropriate devices to operate at each level of the hierarchy, including voice and video components. 5. Match the appropriate switching technologies to each layer in the hierarchical network design model. | Lectures/Discussions | Chapter 1 - PowerPoint Presentation  CCNA Exploration LAN Switching and Wireless | Quiz |
| Week 3-5 | 1. Basic Switch Concepts and Configurations | 1. Summarize the operation of Ethernet as defined for 100/1000 Mbps LANs in the IEEE 802.3 standard. 2. Explain the functions that enable a switch to forward Ethernet frames in a LAN. 3. Configure a switch for operation in a network designed to support voice, video, and data transmissions. 4. Configure basic security on a switch that will operate in a network designed to support voice, video, and data transmissions. | Lectures/Discussions  Demonstrations and Simulation | Chapter 2 - PowerPoint Presentation  CCNA Exploration LAN Switching and Wireless | Homework  LAB Hands-on  Quiz |
| Week 5-7 | 1. VLANs | 1. Explain the role of VLANs in a network. 2. Explain the role of trunking VLANs in a network. 3. Configure VLANs on the switches in a network topology. 4. Troubleshoot the common software or hardware configuration problems associated with VLANs on switches in a network topology. | Lectures/Discussions  Demonstrations and Simulation | Chapter 3 - PowerPoint Presentation  CCNA Exploration LAN Switching and Wireless | Homework  LAB Hands-on  Quiz |
| **Week** | **Topic** | **Learning Outcomes** | **Methodology** | **Resources** | **Assessment** |
| Week 7-8 | 1. VLAN Trunking Protocol (VTP) | 1. Explain the role of VTP in a converged switched network. 2. Describe the operation of VTP including domains, modes, advertisements, and pruning. 3. Configure VTP on the switches in a converged network. | Lectures/Discussions  Demonstrations and Simulation | Chapter 4 - PowerPoint Presentation  CCNA Exploration LAN Switching and Wireless | Homework  LAB Hands-on  Quiz |
| Week 9 | MIDTERM EXAM |  |  |  |  |
| Week 10-12 | 1. Spanning-Tree Protocol (STP) | 1. Explain the role of redundancy in a converged network. 2. Summarize how STP works to eliminate Layer 2 loops in a converged network. 3. Explain how the STP algorithm uses three steps to converge on a loop-free topology. 4. Implement rapid PVST+ in a LAN to prevent loops between redundant switches. | Lectures/Discussions  Demonstrations and Simulation | Chapter 5 - PowerPoint Presentation  CCNA Exploration LAN Switching and Wireless | Homework  LAB Hands-on  Quiz |
| Week 13-14 | 1. Inter-VLAN routing | 1. Explain how network traffic is routed between VLANs in a converged network. 2. Configure inter-VLAN routing on a router to enable communication between end-user devices on separate VLANs. 3. Troubleshoot common inter-VLAN connectivity issues | Lectures/Discussions  Demonstrations and Simulation | Chapter 6 - PowerPoint Presentation  CCNA Exploration LAN Switching and Wireless | Homework  LAB Hands-on  Quiz |
| Week 15-17 | 1. Basic Wireless Concepts and Configuration | 1. Describe the components and basic operation of wireless LANs. 2. Describe the components and operations of basic WLAN security. 3. Configure and verify basic wireless LAN access. 4. Troubleshoot wireless client access. | Lectures/Discussions  Demonstrations and Simulation | Chapter 7 - PowerPoint Presentation  CCNA Exploration LAN Switching and Wireless | Homework  LAB Hands-on  Quiz |
| Week 18 | FINAL EXAM / PROJECT PRESENTATION  Culminating Activities |  |  |  |  |

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| **BOOK/ COURSE REFERENCE:**  REQUIRED READING:   1. Wayne Lewis, LAN Switching and Wireless: CCNA Exploration Companion Guide, Copyright© 2012 Cisco Systems, Inc. Cisco Press   REFERENCES By   1. Todd Lammle, CCNA: Cisco Certified Network Associate Study Guide: Exam 640-802, Copyright © April 2011, Publisher: Sybex 2. Scott Empson, CCNA Portable Command Guide Second Edition, Copyright © 2007 , Cisco Press   Note: Extended Readings may be assigned by the professor. |
| **INSTRUCTIONAL MEDIA:**  PowerPoint presentation  CCNA Exploration LAN Switching and Wireless Course  Packet Tracers Activities |
| **COURSE ASSESSMENT& EVALUATION CRITERIA** (GRADING & REQUIREMENTS)  ASSIGNMENTS / QUIZZES / HANDS-ON ACTIVITIES  MAJOR REQUIREMENTS   * MIDTERM AND/OR FINAL EXAM * COMPUTER NETWORK PLAN FOR SMALL/MEDIUM BUSINESS |
| **GRADING SYSTEM:**  FIRST GRADING = Class Standing (70%): Quizzes, Long Test, Recitation, Research Work, Assignment, Exercises, Projects, Recitation; Midterm Examination (30%)  SECOND GRADING = Class Standing (70%): Quizzes, Long Test, Recitation, Research Work, Assignment, Exercises, Projects, Recitation; Final Examination (30%)  FINAL GRADE = (FIRST GRADING + SECOND GRADING) / 2 |

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| **House Rules:**  Aside from what is prescribed in the student handbook, the following are the professor’s additional house rules:   1. The course is expected to have a minimum of four (4) quizzes. **No make up tests will be given**. 2. Assignments and research projects/report works will be given throughout the semester. Such requirements shall be due as announced in class. Late submission shall be penalized with grade deductions (5% per day) or shall no longer be accepted, depending on the subject facilitator’s discretion. Assignments and exercises are designed to assist you in understanding the materials presented in class, and to prepare you for the exams. 3. Students are required to attend classes regularly, including possible make-up classes. The student will be held liable for all topics covered and assignments made during his/her absence. The university guidelines on attendance and tardiness will be implemented. 4. Any evidence of copying or cheating during any examinations may result in a failing grade from the examination for all parties involved. Note that other university guidelines shall be used in dealing with this matter. 5. Students are advised to keep graded work until the semester has ended. 6. Contents of the syllabus are subject to modification with notification. 7. Cell phones, radios or other listening devices are not allowed to be used inside lecture and laboratory rooms to prevent any distractive interruption of the class activity. 8. No foods, drinks, cigarettes nor children are allowed inside the lecture and laboratory rooms. 9. Withdrawal and dropping from the subject should be done in accordance with existing university policies and guidelines regarding the matter. | | | | | |
| Prepared by:  **CARLO G. INOVERO**  *Course Specialist* | Date:  June , 2016 | Reviewed by:  **RACHEL A. NAYRE, MSIT**  *Department Chair, IT* | Date:  June , 2016 | Approved by:  **GISELA MAY A. ALBANO, MIT**  *CCIS Dean* | Date:  June , 2016 |