College of Information Technology and Computing
Department of Information Technology

SYLLABUS
Course Title: **System Administration & Maintenance**
Course Code: **IT412**
Credits: 3 units (2 hours Lecture, 3 hrs. Laboratory)

USTP Vision

A nationally-recognized Science and Technology (S&T) university providing the vital link between education and the economy

USTP Mission

Bring the world of work (industry) into the actual higher education and training of the students;

- Offer entrepreneurs of the opportunity maximize their business potentials through a gamut of services from product conceptualization to commercialization;
- Contribute significantly to the national development goals of food security and energy sufficiency through technology solutions.

Semester/Year: **1st Semester SY2025-2026**
Class Schedule: Bldg./Rm. No.ICT Building 9
IT4R1 (Lec Tue-10:00-12:00am/Lab Fri:10:00-1:00pm)
IT4R2 (Lec Thu-10:00-12:00am/Lab Mond:7:00-10:00am)
IT4R3(Lec Tue 1:00-03:00pm/Lab Wed:7:00-10:00am)
IT4R4(Lec Mon 10:00-12:00pm/Lab Fri:7:00-10:00am)
IT4R5(Lec Wed 6:00-8:00pm/Lab Sat:7:00-10:00am)
IT4R6(Lec -3:00-05:00pm/Lab Wed:10:00-1:00pm)
IT4R7 (Lec Tue-8:00-10:00am/Lab Fri:7:00-10:00am)
IT4R8 (Lec Thu-6:00-8:00pm/Lab Sat:10:00-1:0pm)
IT4R9 (Lec Thu-1:00-3:00pm/Lab Fri:10:00-1:00pm)
IT4R10 (Lec Thu-2:00-4:00pm/Lab Fri:04:00-7:00pm)
IT4R11 (Lec Thu-4:00-6:00pm/Lab Sat:1:00-4:00pm)
IT4R12 (Lec T-6:00-8:00pm/Lab Sat:04:00-7:00pm)

Prerequisite(s): **IT312 – Networking 2, IT322-Integrative Programming Technologies**

Co-requisite(s):

Instructor: **ARLENE A. BALDELOVAR**
Email: arlene.baldelovar@ustp.edu.ph Mobile No:09128377007

Instructor:Paul Joseph Estrera Mobile No.:09158120273
Email:paul.estrera@ustp.edu.ph

Instructor:Washington Aguilar Mobile No.:09360619575
Email:washinton.aguilr@ustp.edu.ph

Consultation Schedule: M 1:00-3:00pm
Bldg./Rm. No.: Bldg. 09
Office Phone No./Local: (088) 856 1739 local 1153

I. Course Description:

This course provides students with a robust foundation in the essential skills and knowledge required to manage and maintain IT systems effectively. Beginning with an overview of system administration roles and system architecture, the course progresses through critical topics such as operating system fundamentals, networking basics, and user and group management. Students will learn about file systems, storage management, system monitoring, and performance tuning, as well as backup and recovery strategies. The curriculum also covers security fundamentals, software installation, scripting and automation, virtualization concepts, and cloud computing basics. Additionally, students will explore troubleshooting techniques, system documentation, and change management processes. The course culminates in advanced topics, including networking fundamentals and Linux administration, equipping participants with the practical skills needed to excel in the field of system administration.

II. Course Outcomes:

Course Outcomes (CO)	Program Outcomes (PO)														
	a	b	c	d	e	f	g	h	i	k	l	m	n	o	
CO1: Justify how resources will be allocated for the various administrative domains.	E	E	E	E			E	E	E	E					
CO2: Formulate policies governing the use of IT Systems within the organization															
	E	E	E		E		E	E	E	E					
CO3: Recommend measures on how to administer and maintain systems effectively.	**E**	**E**		**E**		**E**	**E**	**E**	**E**	**E**	**E**	**E**	**E**		
CO4: Modify configuration of an operating system to implement policy.	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**		

Program Educational Objectives:

PEO1: Graduates are proficient in the IT field and able to engage constantly in technological and professional advancement by pursuing a higher academic level and practicing quality improvement in their career and personal lives.

PEO2: Graduates are competent in

III. Course Outline:

Allotted Time	Course Outcomes (CO)	Intended Learning Outcomes (ILO)	Topic/s	Suggested Readings	Teaching-Learning Activities	Assessment Tasks/Tools	Grading Criteria	Remark

generating new ideas and innovations in Information Technology with more emphasis on technopreneur ship, management, IT solutions and the likes through research collaborations. **PEO3:** Graduates are practicing professionals in the field of Information Technology who can contribute significantly to human development, socio-economic transformation, and patriotic initiatives.	Week 1 2 hrs.			Course Orientation (Class Policies & requirements) Orientation on the USTeP portal Creation of online student account.	Student Handbook Course Syllabus	1. Orientation Walk-through on the Information Assurance and Security Curriculum 2. PowerPoint Slides	1. Online Registration Online student enrolment to USTeP portal Social media group page.		

Program Outcomes: a: Apply knowledge of computing, science, and mathematics in solving computing/IT-related problems through critical and creative thinking. b: Use current best practices and standards in solving complex computing/IT-related problems and requirements; c: Analyze complex computing/IT-related problems by applying analytical and quantitative reasoning; and define the computing requirements appropriate to its solution; d: Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer based-systems; e: Design creatively, implement and evaluate different computer-based systems, processes, components, or programs to meet desired needs and requirements under various constraints; f: Integrate effectively the IT-based solutions into the user environment with appropriate consideration for public health and safety, cultural, societal, and environmental concerns; g: Select, adapt and apply appropriate techniques, resources, skills, and modern computing tools to complex computing activities, with an understanding of the limitations;		Lec 2 Lab 3 Week 1 & Week 2 5hrs. Aug 11-15 Lec 2 Lab 3 Week 3 5 hrs. Aug 18-22 Lec 2 Lab 3 Week 4 5 hrs Aug 25-29	CO1 CO1 CO1	1. Describe the roles and responsibilities of system administrators and demonstrate an understanding of system architecture, including the components and interactions within computer systems. 2. Identify and differentiate between various types of servers, such as web servers, database servers, and file servers, along with understanding their specific roles within an IT infrastructure. 3. Recognize and distinguish among various types of servers, including web servers, database servers, and file servers, while comprehending their specific functions and roles within an IT infrastructure.	**Introduction to System Administration** • Overview of system administration roles and responsibilities • Understanding system architecture **Server Fundamentals** • Types of servers and their roles • Installation and configuration basics of server operating systems **Active Directory Administration** • Overview of Active Directory and its component • Managing users, groups, and organizational units in Active Directory • Implementing Group Policy for system management	The Practice of System and Network Administra-. tion Second Edition Thomas A. Limoncelli Christina J. Hogan Strata R. Chalup The Practice of System and Network Administra-tion Second Edition -Windows Server 2008 Active Directory Resource Kit -Active Directory: Designing, Deploying, and Running Active Directory.	- Lecture/seminar - Videos - Interactive Activities - PowerPoint Slide - Lecture Demo - Videos - Interactive Activities - Installation of servers : open-source cross-platform web server solution stack package - PowerPoint Slide - Lecture Demo - Videos - Group Policy Implementation Exercise - PowerPoint Slide	-Quizzes - Assignment -Practical Activity - Assignment -Quizzes -Reflective Journal -Quizzes Practical Activity		

h: Function effectively as individual, or work collaboratively and respectfully as a member or leader in diverse development teams and in multidisciplinary and/or multicultural settings;. i: Assist in the creation of an effective IT project plan; j: Communicate effectively in both oral and in written form by being able to deliver and comprehend instructions clearly; and present persuasively to diverse audience the complex computing / IT-related ideas and perspectives; k: Assess local and global impact of computing information technology on individuals, organizations, and society; l: Act in recognition of professional, ethical, legal, security and social responsibilities in the utilization of information technology; m: Recognize the need to engage in independent learning and be at pace with the latest developments in a specialized field in IT, with emphasis on Database Management and Information System; Network Design and Administration; and Computer Vision and Image processing for continual development as a computing professional; n: Participate in generation of new knowledge; or in research and development projects aligned to local and national development agenda or goals with the end view			Lec 2 Lab 3 Week 5 5 hrs Sept 1-5 Lec 2 Lab 3 Week 6 5 hrs. Sept 8-12	**CO1** **CO1 & CO2**	4. Create and manage user accounts, ensuring proper user provisioning and deprovisioning in an IT environment. 5. To understand and explain the fundamental concepts of file systems, including their structure, types, and functionalities.	**User and Group Management** • Creating and managing user accounts • Understanding permissions and access control **File Systems and Storage Management** • Overview of file systems • Disk partitioning and management	The Practice of System and Network Administration Second Edition https://www.examcollection.com/certification-training/a-plus-how-to-install-configure-windows-operating-systems.html - Lecture Slides Thomas A. Limoncelli Christina J. Hogan Strata R. Chalup Computer and network organization : an introduction https://www.javatpoint.com/fundamentals-of-computer-networking	- Lecture/Demo - Videos - Interactive Activities - PowerPoint slides - PowerPoint Slide - Lecture Demo - PowerPoint Slide - Interactive Activities -Draw a physical-network map for your organization	-Quizzes -Reflective Journal Practical Activity - Group Activity - Module Quizzes		

of contributing to the local and national economy; and o: Preserve and Promote "Filipino historical and cultural heritage". **USTP Core Values** A. Unselfish Dedication – Selfless commitment and complete fidelity towards a course of action or goal B. Social Responsiveness- Ethical / moral responsibility leading to corrective action on social issues and contribution for the betterment of the environment and the community's equality of life C. Transformational Leadership – leading through inspiration and by example to foster positive change with the end goal of developing followers into leaders D. Prudence – self-governance leading to circumspection and good judgment in the management of affairs and use of resources.			Lec 2 Lab 3 Week 7 5 hrs Sept 15-19 Lec 2 Lab 3 Week 8 5hrs Sept 22-26	CO2,CO3	6. Identify and utilize various tools for monitoring system performance, enabling them to assess the health and efficiency of computing environments. 7. Articulate the importance of data backup in safeguarding information and ensuring business continuity	**System Monitoring and Performance Tuning** • Tools for monitoring system performance • Techniques for optimizing system performance **Backup and Recovery Strategies** • Importance of data backup • Implementing backup solutions	The Practice of System and Network Administration Second Edition The Practice of System and Network Administration Second Edition https://www.cr-t.com/blog/why-you-need-a-backup-and-disaster-recovery-solution/p	- Lecture Demo - Interactive Activities - - group activities - Lecture Demo - Interactive Activities - group activities	hands-on/ practical assessment 1 hands-on/ practical assessment 2 - online chapter quiz -hands-on/ practical assessment3 -hands-on/ practical assessment4 - hands-on/ practical assessment5		

		Lec 2 Lab 3 Week 9 5 hrs Sept 29 -Oct 03	CO3,CO4	8. Define and explain the key concepts of system security, including the principles of confidentiality, integrity, and availability	**Security Fundamentals** • Introduction to system security • Best practices for securing systems	The Practice of System and Network Administration Second Edition Thomas A. Limoncelli Christina J. Hogan Strata R. Chalup	- Lecture Demo - Interactive Activities - group activities	-hands-on/ practical assessment3 -hands-on/ practical assessment4		
		Week 10 2hrs Oct 06-10	**MIDTERM EXAMINATION**							

		Lec 2 Lab 3 Week 11 5 hrs Oct 13-17	CO3,CO4	9. Demonstrate proficiency in managing software installations across various operating systems.	**Software Installation and Package Management** • Managing software • Packages using package managers	The Practice of System and Network Administration Second Edition - Lecture Slides https://www.baeldung.com/cs/virtualization-vs-containerization	Lecture/ seminar Interactive Activities Interactive Activities	- online self-assessment questionnaire - online chapter Quiz - hands-on/ practical assessment		
		Lec 2 Lab 3 Week 12 5 hrs Oct 20-24	CO4	10. Explain the fundamental principles and benefits of virtualization technologies, including types of virtualization such as hardware, software, and network virtualization.	**Virtualization Concepts** • Overview of virtualization technologies • Setting up virtual machines	- Lecture Slides https://www.baeldung.com/cs/virtualization-vs-containerization	Module quizzes Case study	Case study report/analysis		
		Lec 2 Lab 3 Week 13 5hrs Oct 27-31		11. Define and describe the fundamental concepts of cloud computing, including the various types of cloud services available.	**Cloud Computing Basics** • Introduction to cloud services • Understanding IaaS, PaaS, and SaaS	Vine, Michelle (editor). (2016). Networking, models and methods of cloud	Module quizzes	Case study report/analysis		

		Lec 2 Lab 3 Week 14 5 hrs Nov 03-07	CO3,CO4	12. Identify and apply common troubleshooting methodologies to systematically diagnose and resolve technical issues.	**Troubleshooting Techniques** • Common troubleshooting methodologies • Tools for diagnosing issues	https://edu.gcfglobal.org/en/computerbasics/basic-troubleshooting-techniques/1/	Module quizzes Case study	Case study report/analysis		
		Lec 2 Lab 3 Week 15 5hrs Nov 10-14		13. Articulate the importance of comprehensive documentation in IT systems, including its role in facilitating communication, ensuring compliance, and supporting system maintenance.	**System Documentation and Change Management** • Importance of documentation • Change management processes	IT Change Management: A Practical Guide by David A. Chappell (Published in 2020)	module quizzes Case study	Case study report/analysis		
		2 hrs		Semi-Finals				Test Questionnaire		
		Lec 2 Lab 3 Week16 6hrs Nov 17-21	CO3, Co4	14 Describe the key features and benefits of Linux operating systems, including their architecture and common distributions	**Introduction to Linux Administration** • Overview of Linux operating systems • Basic Linux commands and file system structure	References - Web -Linux Administration: A Beginner's Guide, Eighth Edition Lecture Slides	Lecture/ seminar Interactive Activities module quizzes	-online self-Assessment - Practical Activity		

		Lec 2 Lab 3 Week 17 5 hrs Nov 24-28	CO3,CO4	15. Effectively manage users and groups in a Linux environment, including creating, modifying, and deleting user accounts, as well as setting appropriate permissions and access controls.	**Advanced Linux Administration** • User and group management in Linux • System services and process management	- UNIX and Linux System Administration Handbook, Fifth Edition - Lecture Slides	module quizzes	-Case study - Practical Activity		
		Week 18 3 hrs	**FINAL EXAMINATION**							

.	**1. Course Requirements:** • Class standing (attendance, participation, etc.) policy: • Expected classroom behavior (may want to develop this with the students, e.g., What guidelines m are appropriate for behavior and participation in a large class • Students must come to class on time. • Strict observance of deadlines. • Class participation is encouraged. • Observe proper courtesy.

(b) Ground Rules for participation in discussions or activities.

- Only one student may talk at a time.
- Must follow instructions for every activity given.
- For group activity, each member must participate accordingly.

- Course Readings/Materials:

Titles, authors, and editions of textbooks and other materials, required and recommended

1. The Practice of System and Network Administration
Second Edition
Thomas A. Limoncelli Christina J. Hogan Strata R. Chalup

2. Cyber security and supply chain management : Risks, challenges, and solutions. Singapore: : World scientific, 2021.

3. UNIX and Linux System Administration Handbook, Fifth Edition" by Evi Nemeth, Garth Snyder, Trent R. Hein, and Ben Whaley (2020).

4. The Practice of System and Network Administration, Third Edition" by Thomas Limoncelli, Christina J. Hogan, and Strata R. Chalup (2020).

5. Linux Administration: A Beginner's Guide, Eighth Edition by Wale Soyinka (2020).

6. Windows Server Administration Fundamentals by Craig Zacker (2019).

7. Mastering Windows Server 2019 by Brian Svidergol, John Savill, and Mark Minasi (2020).

8. IT Change Management: A Practical Guide by David A. Chappell (Published in 2020)

9. Vine, Michelle (editor). (2016). Networking, models and methods of cloud computing. New York : Willford Press.

10. Supplies needed (software, workbooks, disks, CDs, lab supplies, etc.)

- Student Handbook
- Power ISO
- Rufus USB tools
- Google Drive, iCloud, OneDrive, and Dropbox
- Virtual Machines like VMware Workstation
- Back-up and restore software
- Computer Driver software
- Computer Repair Simulator
- Operating System(Windows 2008 server, Linux, etc)
- Packet Tracer Network Simulator

Code	Descriptor
I	Introductory Course
E	Enabling Course
D	Demonstrative Course

(b) URLs for online resources

- https://www.sciencedirect.com/topics/computer-science/system-administration
- https://www.scribd.com/document/479863646/Chapte-2-ITSA01-1-pdf

Code	Definition
I	An introductory course to an outcome
E	A course that strengthens the outcome
D	A course demonstrating an outcome

- https://teachcomputerscience.com/computer-ethics/
- https://edu.gcfglobal.org/en/computerbasics/basic-troubleshooting-techniques/1/ https://www.slideshare.net/asertseminar/cloud-computing-31961574
- https://www.baeldung.com/cs/virtualization-vs-containerization
- https://www.cr-t.com/blog/why-you-need-a-backup-and-disaster-recovery-solution/
- https://www.javatpoint.com/fundamentals-of-computer-networking
- https://www.examcollection.com/certification-training/a-plus-how-to-install-configure-windows-operating-systems.html
- https://prezi.com/q4_hg3kqjnm0/legal-and-ethical-issues-related-to-the-use-of-computers/
- https://www.booksfree.org/principle-of-information-security-fourth-edition-by-michael-e-whitman-pdf/
- https://www.springboard.com/blog/cryptography-basics-the-ins-and-outs-of-encryption/
- https://quizlet.com/388219675/all-topics-system-admin-and-maintenance-flash-cards/

3. Assignments, Assessment, and Evaluation

(a) Policy concerning homework (grading, posting, late policy, etc.)
Students may share ideas as they work on their assignments but the submitted assignments must be their own work.

(b) Policy concerning make-up exams
No special examination is given unless a student has valid reasons stipulated in the Student Handbook Article 3: Excused Absences.

(c) Policy concerning late assignments/requirements

- Assignments: no assignment for a particular date, will have a grade of zero (0).
- Projects: late submission of projects will have a corresponding consequence. There will be a deduction of points for every day that the project submission will be late.

4. Preliminary information on term papers or projects, with due dates

(a) Projects for midterm and finals are given ahead of time along with its corresponding due dates, rubrics, and other requirements for the completion of the projects.

(b) Non-submission of projects does not mean you

5. List of assignments that will impact the final grade and % weight given each

(a) Portfolio: grade will be part of the PIT.

6. Description in detail of grading processes and criteria (how many quizzes, tests, papers; weighting of each; amountof homework, etc.) or the GRADING POLICY

Grading System

Lecture Grade (67%)	
Performance Item/Criteria	***%***
Class Performance Item	10%
Quizzes (All quizzes, prelim and pre-final exams)	40%
Major Exams (i.e, Midterm and Final Exams)	30%
Performance Innovative Task / Project	20%
TOTAL	**100%**
Laboratory Grade (33%)	
Performance Item/Criteria	***%***
Laboratory Exercises/Reports	30%

Laboratory Major Exam	40%
Hands on Exercises	30%
TOTAL	**100%**
Term/Periodic Grade = 67% Lecture Grade + 33% Laboratory Grade	
Options: **FINAL GRADE (FG) = 1/3 Midterm Grade (MTG)+ 2/3 Final Term Grade (FTG) FINAL GRADE** **(FG) = 1/2 Midterm Grade (MTG)+ 1/2 Final Term Grade (FTG)**	
(Passing Percentage is 70%) Ex. In a 10-item quiz, obtaining 7 points would be equivalent to a passing score.	

Disclaimer:
Every attempt is made to provide a complete syllabus that provides an accurate overview of the subject. However, circumstances and events make it necessary for the instructor to modify the syllabus during the semester. This may depend, in part, on the progress, needs, and experiences of the student.

Prepared by:

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