

Addis Ababa University
College of Natural and Computational Sciences
School of Information Science

Course Title	Systems and Network Administration			
Module Title	Computer Networks, Administration and Security			
Module Code	INSY-M3071	Course Code: INSY3072		
CP/ECTS	5			
Study Hours	Lecture: 32	Laboratory: 32	Tutorial: 0	Home Study: 71
Instructor's Information	Name: <i>Tsegaye Berhanu</i>			
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	Office Location: Eshetu Chole Building, 3 rd Floor, Room #319			
	Consultation Hours: Anytime			
Course Information	Academic Year: 2019/2020			
	Semester: II			
	Course Schedule:			
	Class Room: Lecture:			
	Prerequisite(s): INSY3071: Data Communication and Computer Networks			
Course Description	Mode of Delivery: Parallel			
	<p>The course addresses current systems and network administration issues in organizations. Content includes: Overview on IS management: Organizational context of information systems, management of information systems from the perspective of systems and network administration. IS/IT architecture and infrastructure: Centralized, decentralized, and distributed computing, overview of computer networking including wireless networks based on TCP/IP, WAN technologies, the various network operating systems, application servers. Network design issues: design principles, requirements, topology option, network design and implementation project management. Administration issues: user administration, connectivity administration, operating systems administration, application server's administration, backup administration. Security related issues: basic notions, threats and security mechanisms, firewall, intrusion detection and response, security strategy and risk management, legal and social issues. Special topics: documentation of designs, installation and configuration of systems, usage policy related issues.</p>			
Learning Outcomes	<p>On successful completion of the course, students will be able to:</p> <ul style="list-style-type: none"> • Demonstrate their knowledge of the theories and models related to computer networking • Make system study, design and implement computer networks • Describe and justify the tasks and roles of systems and network administrators in organizations thereby be able to participate in organizing and implementing IS unit in organizations • Feel confidence in enabling efficient and effective administration of systems and services in networked environments • Participate in creating awareness related to security issues in information systems • prepare documentations for network design, installation and configuration of networks, and network and system usage policy matters 			

Course Content		
Topic	Duration (Week)	Reading list
Chapter 1: Systems Concepts 1.1. Systems theory and Organizational Concepts 1.2. Information Systems 1.3. Information Management (Information Systems Management)	1	Lecture Slides & Reference Book
Chapter 2: Fundamental Concepts 2.1. Protocols and protocol layering (TCP/ IP) 2.2. Frame, IP Packet, TCP and UDP segment 2.3. Network devices 2.4. IP addressing (Subnetting and Supernetting) 2.5. Address resolution protocol (ARP) 2.6. ICMP 2.7. VLAN 2.8. Routing 2.9. Routing protocols	2-3	Lecture Slides & Reference Book
Chapter 3: Wireless Networks and WAN Technologies 3.1. WLAN(Wi-Fi) (ad-hoc and infrastructure WLAN) 3.2. Point-to-point 3.3. ISDN 3.4. Frame Relay 3.5. ATM 3.6. DSL and others	4	Lecture Slides & Reference Book
Chapter 4: Network Design and Implementation 4.1 Design principles 4.2. Requirements 4.3. Topology option 4.4. Documentation: (requirements, design, installation, configuration of systems, etc.) 4.5. Network design and implementation project management	5-6	Lecture Slides & Reference Book
Chapter 5: Network Items Specification 5.1. Network gadgets 5.2. Host specifications (Hardware Servers) 5.3. Network operating Systems (System platforms) <ul style="list-style-type: none"> 5.3.1. Fundamentals 5.3.2. UNIX 5.3.3. Windows 5.3.4. Novell Netware 5.4. Application Servers: (Web, FTP, Mail, Proxy, Directory, Multimedia, DNS/DHCP)	7-8	Lecture Slides & Reference Book

<p>Chapter 6: Systems and Network Administration Issues</p> <p>6.1. Tasks of systems and network administrators 6.2. Basic configuration and administration tools 6.3. Network administration 6.4. Configuring switches, routers 6.5. Directory service (user administration) 6.6. Mail administration 6.7. Web/ftp administration 6.8. Database systems administration 6.9. Remote access administration 6.10. Backup administration 6.11. DNS/DHCP administration 6.12. Proxy server administration</p>	<p>9-12</p>	<p>Lecture Slides & Reference Book</p>
<p>Chapter 7: Network Security</p> <p>7.1. Backup/recovery/ Disaster Recovery 7.2. OS security features 7.3. Antivirus 7.4. Firewall 7.5. Intrusion Detection Systems 7.6. Security tools 7.7. Troubleshooting (Hardware, Software, Network)</p>	<p>13-14</p>	<p>Lecture Slides & Reference Book</p>
<p>Chapter 8: Specials</p> <p>8.1. IS/IT management structure 8.2. Troubleshooting (Hardware, Software, Network) 8.3. Documentation: (Requirements, design, installation, configuration of systems) 8.4. Policy related issues</p>	<p>15-16</p>	<p>Lecture Slides & Reference Book</p>
<p>Teaching Strategy</p>	<p>The course will be delivered in the form of</p> <ul style="list-style-type: none"> • Lectures • Demonstration • Student presentations • Group discussions • Individual and Group project works. 	
<p>Assessment Criteria</p>	<p>The evaluation shall be based on both formative and summative assessment which include:</p>	
	<p>Assessment Forms (100%)</p>	<p>% of credit allotted</p>
	<p>Test I Test II Quiz Individual Assignment Group Project Final Examination</p>	<p>15% 15% 5% 10% 15% 40%</p>

Role of Instructor(s)	<ul style="list-style-type: none"> • Delivers lectures, • Prepares reading assignments and topics for group discussion, • Prepares projects by discussion with student, • Gives consultation and advises students on project works and assignments, • Prepares and evaluates quiz, assignment, tests and final examination.
Role of Students	<ul style="list-style-type: none"> • Attend lectures, Lab sessions and Presentations • Work in team on group work • Participate in group discussion • Discusses with the instructor on topics of interest for project work • Delivers and presents project work • Attend quiz, tests and final examination
Required Software and/or Hardware	<ul style="list-style-type: none"> • Any distribution of Linux, Windows Server 2003/2008/2012 • Squid Proxy • Protocol Analysis tools (Wireshark) • Switch and Router configuration simulation tools like (Packet Tracer) • Fedora Core – Linux • Security Tools (Snort – IDS, for intrusion detection) • Network Management Tools (NAGIOS) • Network Monitoring Tools, etc.
References	<ol style="list-style-type: none"> 1. T. Limoncelli et.al. The Practice of System and Network Administration, 2. B. A. Forouzan: Data Communications and Networking (3rd ed), 2003. 3. Recommended texts: M. Burgess, Principles of Network and System Administration 4. E. Frisch, Essential System Administration, 3rd Edition 5. S. Tannenbaum: Computer Networks (4th ed), Prentice Hall, 2003. 6. W. Stallings: Data and Computer Communications (7th ed), Prentice Hall, 2004. 7. D. E. Comer and R. E. Droms: Computer Networks and Internets, with Internet Applications (4th Ed), Prentice Hall, 2003. 8. J. F. Kurose and K. W. Ross: Computer Networking: A Top-Down Approach to the Internet (3rd ed), Pearson Education, Inc., 2005