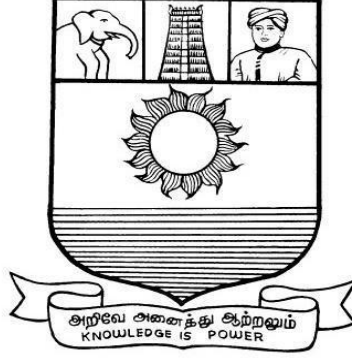


மனோன்மணியம் சுந்தரனார் பல்கலைக்கழகம்  
திருநெல்வேலி – 627 012

**Manonmaniam Sundaranar University  
Thirunelveli – 627 012.**



கல்விசார் நிலைக்குழக் கூட்டம்

**MEETING OF THE STANDING COMMITTEE ON  
ACADEMIC AFFAIRS HELD ON FRIDAY  
THE 27<sup>th</sup> OCTOBER 2017.**

**Syllabus for Diploma in IT Infrastructure Administration Course offered  
through Directorate of Vocational Education  
(Community Colleges and Extension Learning Programme)  
from 2017 – 2018**

**DIPLOMA IN IT INFRASTRUCTURE ADMINISTRATION**  
**SCHEME OF EXAMINATIONS**

<b>Subject code</b>	<b>Title of the Paper</b>	<b>Credit</b>	<b>Hours</b>	<b>Passing Minimum</b>
<b>Semester I</b>				
C17IA11/E17IA01	Computer fundamentals	6	90	40/100
C17IA12/E17IA02	IT Infrastructure Management	6	90	40/100
C17IA13/E17IA03	Remote Infrastructure Management	6	90	40/100
C17CE10/E17CE10	Communication English	6	90	40/100
C17IAP1/E17IAP1	Remote Infrastructure - Lab	4	60	40/100
<b>Semester II</b>				
C17IA21/E17IA04	Network Infrastructure Management	6	90	40/100
C17IA22/E17IA05	Data Communication and Networking	6	90	40/100
C17LS23/E17LS05	Life Skill	6	90	40/100
C17IAP2/E17IAP2	Network-Lab	4	60	40/100
C17IAPw/E17IAPw	Internship/ Project	10	150	40/100

**Eligibility for admission:** Pass in 12<sup>th</sup> std examination conducted by the Govt. of Tamil Nadu Board of Secondary Education, Government of Tamil Nadu or any other equivalent examination.

**Examination:** Passing Minimum for each paper is 40%. Classification will be done on the basis percentage marks of the total marks obtained in all the papers and as given below:

40 % but less than 50 %	- Third class
50 % but less than 60 %	- Second class
60 % and above	- First class

**SYLLABUS**

**First Semester:**

Paper I	: Computer fundamentals
Paper II	: IT Infrastructure Management
Paper III	: Remote Infrastructure Management
Paper IV	: Communicative English
Paper V	: Remote Infrastructure - Lab

**Second Semester:**

Paper VI	: Network Infrastructure Management
Paper VII	: Data Communication and Networking
Paper VIII	: Life Skills
Paper IX	: Network-Lab
Paper X	: Internship/ Project

**\*(Semester Pattern for Community College Only)**

## **(C17IA11/E17IA01)Paper I Computer Fundamentals**

### **UNIT-I COMPUTER FUNDAMENTALS:**

Block structure of a computer, characteristics, problem solving, generations of computers, Classification of computers - capacity, purpose, and generation. Main frame Systems, Desktop Systems – Multiprocessor Systems – Distributed Systems – Real Time systems – Clustered Systems – Keyboard, Mouse, Monitor (CRT and LCD).

### **UNIT-II OUTPUT DEVICES:**

Light pen, joystick, Mouse, Touch screen OCR, OMR, MICR- Printers- Impact, non-impact, working mechanism of Dot Matrix printer, Inkjet printer and Laser printer. Memory Types: Magnetic core, RAM, ROM, Secondary, Cache, Bubble Memory, Floppy disk, hard disk, compact disk, flash memory, USB, Drives NAND and NOR - tapes.

### **UNIT-III COMPUTER LANGUAGES:**

Number System: binary, decimal, hexadecimal, and octal systems, conversion from one system to the other, representation of characters, integers and fractions. Binary Arithmetic: Addition, subtraction and multiplication. Computer languages: Machine language, assembly language, higher level language, 4GL. Introduction to Compiler, Interpreter, Assembler, System Software - Application Software – scripting - Shell script – variables – constructs – example shell scripts.

### **UNIT-IV COMPUTER NETWORK :**

Network, Topology, LAN, MAN, WAN, OSI Model, TCP/IP Model, What is RFC, Unicast, multicast, broadcast, NIC, Ports, types, RPC, NTP, Netbios, TCP protocol, Header structure, UDP protocol, Header structure, IP protocol, header structure, IPV4, addressing, CIDR, IP V6, ARP, RARP, ICMP, DHCP, NAT WLAN, Bluetooth, WiFi, WiMesh, WiMaX, (Outline Only)

### **UNIT-V INTERNET PROTOCOLS & TELECOM NETWORK:**

Application layer protocols, SMTP, POP, IMAP, MIME, HTTP, HTTPS, RTP, Telnet, FTP, SNMP (Outline Only) DNS, BIND, SLIP, PPP, PPTP, VLAN, VPN, SSL (Outline Only) GSM architecture, GPRS architecture, 3GPP, Mobile TCP, Mobile IP, Handoff, SIP, VOIP

### **Reference:**

1. Computers, Larry long & Nancy long, 12th edition Prentice Hall 2005
2. Fred Halsall, Computer networking and the internet, Addison Wesley
3. Larry L. Peterson, Bruce S.Dave, Computer networks, a systems approach, Ed 3, Morgan Kaufmann. 2003
4. Fundamentals of Computers -2014  
by Rajaraman V (Author), Adabala N (Author)

## **(C17IA12/E17IA02)Paper II IT INFRASTRUCTURE MANAGEMENT**

### **UNIT-I INFRASTRUCTURE MANAGEMENT OVERVIEW:**

What is Infrastructure management – associated activities - Evolutions of Systems - Mainframes-to-Midrange-to-PCs-to-Client-server computing-to-New age systems - ARPANET - Internet - Growth of internet - current business demands - IT systems – return on investments, complexity of today’s computing environment, Total cost of complexity issues, Systems management for business.

### **UNIT-II PREPARING FOR INFRASTRUCTURE MANAGEMENT:**

Factors - IT infrastructure design, Customer’s Requirements, Identifying System Components, Existing Processes, Data, applications, Tools - integration, Patterns of IT systems management, Introduction to the design process for information systems, Models, Fundamentals of ITIL-Service delivery process, service support process

### **UNIT-III BUSINESS CONTINUITY:**

Principles of Business continuity - Business Interruption Events – Business impact assessment – fire exposure analysis – functional analysis –compliance issues – Pre-Planning - Initial Response - Recovery - Identification of Recovery environment - Identification of Recovery Point - site and structures – Equipment and technology – documents and records electronic equipment and process equipment - Business continuity plans – crisis management plans –function restoration plans – disaster recovery plans – Incident Response Plan

### **UNIT-IV VIRTUALIZATION:**

Server virtualization concepts- types of server virtualization technologies – physical partitioning – logical partitioning – host machines – virtual machines – guest operating systems, platforms – Hypervisor –ESX platform –VM kernel – COS – VMFS- ESX architecture

### **UNIT-V STORAGE AND SECURITY MANAGEMENT:**

Access Management, Intrusion detection, define, methods of intrusion – SNORT tool - firewall, Information security management system- Introduction to tape Storage, Backup & Restore, Archive & Retrieve, tape library, Disaster Recovery, Database & Application protection, Bare machine recovery, Data retention

### **Reference Books:**

1. Foundations of IT Service Management: based on ITIL, by Jan Van Bon,
2. It Infrastructure & Its Management  
By Gupta

## **(C17IA13/E17IA03)Paper III REMOTE INFRASTRUCTURE MANAGEMENT**

### **UNIT -I INSTALLATION:**

Installation - Capacity Planning Redundancy and Backup Installing the Nagios Software Nagios Server Nagios Plug-ins Configuring Web Server for Nagios - Configuring Your Web Server with an RPM Installation.

### **UNIT-II NAGIOUS ROLES:**

How Does Nagios Work? - How Is Nagios Configured- Getting Started - Configuration - Specifying Configuration Files - Nagios objects - Defining Nagios Configuration Objects - defining host –Services – templates – contact objects – group objects – time periods – commands

### **UNIT-III SECURITY AND ADMINISTRATION:**

General security guidelines – Web console security –Nagious administration – using the web console - Monotiring hosts and services – tactical monitoring – reporting – Remote monitoring – NRPE – SSH.

### **UNIT-IV :**

Advanced commands Macros – event handlers – notifications – External commands – host and services dependencies – Notification escalations – Distributed monitoring, redundancy and failover – Integrating nagious - SNORt MRTG Cacti and other tools

### **UNIT-V SNMP AND NETWORK MANAGEMENT TOOLS**

Simple Network Management Protocol, Management Information Base, types, structure - RMON, - SNMP walk - tools – OpenNMS - Installation, configuration, types of files, Add, modify, delete, nodes, report generations – Dashboards.

### **Reference Books:**

1. James turnbull Pro Nagious 2, Apress, 2006
2. Williams Stallings, SNMP, SNMPv2, SNMPv3, and RMON 1 and 2, Addison Wesley,
3. Remote Infrastructure Management Lambert M Surhone, Mariam T Tennoe, Susan F Henssonow VDM Publishing,

## **(C17CE10/E17CE10)Paper IV COMMUNIVATIVE ENGLISH**

### **Unit I: Learning context**

Concept of learning – Learning style –Grammatical framework – sentence framing – paragraph and texts

### **Unit II: Reading**

Basic concept – Purposes of reading-Decoding-Reading materials – Barriers of reading

### **Unit III: Writing**

Basic concept-Writing style-Terminology-stages-English spelling and punctuation – Written texts

### **Unit IV: Speaking**

Language functions-Conversation- Features of spoken English – Types of English course: functional English, English literature, advance English – Phonetic

### **Unit V: Developing Communication Skills**

Meaning –Classroom presence- Features of developing learning process- Practical skills and Listening- uses of communicative English

### **Reference Books:**

- 1.Raman,m.&S.Sharma (2011) communication skills,OUP,New Delhi: India
- 2.Lata,P.&S.Kumar(2011) communication skills,OUP,New Delhi: India,
- 3.Leech,G&J.Svartvik(2002) A communicative grammar of English,Pearson,India,
4. Sethi,J. and P.V. Dharmija (2007) A course in Phonetics and spoken English.Second edition, Prentice hall: New Delhi
- 5.Communication Skills for Technical Students by Farhatulla (Author)

## **(C17IAP1/E17IAP1)Paper V REMOTE INFRASTRUCTURE LAB**

Based on the below guidelines, the lab incharge is expected to design his lab experiments

1. Install Nagios
2. List out the various configuration file locations
3. Configure Nagios
4. Configure SNMP for network elements and capture them in Nagios
5. Create users and groups
6. Create objects
7. Create network views
8. Create reports
9. Create automated reports
10. Install Open nms
11. List out the various configuration locations
12. Configure Open NMS

## SEMESTER II

### **(C17IA21/E17IA04)Paper VI NETWORK INFRASTRUCTURE MANAGEMENT**

#### **UNIT-I INFRASTRUCTURE MANAGEMENT OVERVIEW:**

Definitions, Infrastructure management activities, Evolutions of Systems since 1960s and their management, growth of internet, current business demands and IT systems issues, complexity of today's computing environment, Total cost of complexity issues, and Value of Systems management for business.

#### **UNIT-II LINUX ADMINISTRATION:**

Overview Foss- Definition of FOSS, Advantages of Foss, trends and potential— GNU/Linux OS installation-detect hardware, configure disk partitions & file systems - install a GNU/Linux distribution; command line, Basic shell commands - logging in, listing files, editing files, copying/moving files, viewing file contents, changing file modes and permissions, -file ownerships and permissions, process management; Administrating users and groups-install and configure local components and services Establishing network and securing network services, Deploying file-sharing services. GUI-based tools and key command-line concepts. Basic security skill, Basic Server Admin-Managing physical storage

#### **UNIT-III STORAGE MANAGEMENT:**

Introduction to Storage, types of storage – file storage vs block storage – RAID and types - Storage virtualization using RAID and different RAID levels - disk error management- raid error management - Backup & Restore, storage synchronization and tools – HA solution – Rack Space – Management - open source tools - introduction to distributed storage - large storage systems – Amazon cloud

#### **UNIT-IV SECURITY MANAGEMENT:**

Introduction Security, CIA triad – digital Identity management, Access Management, concepts of Single sign-on, LDAP fundamentals – configuring LDAP - Kerberos fundamentals – LDAP Vs Kerberos

#### **UNIT-V WINDOWS:**

Windows platform administration - Windows server - Active directory – domain services – management console – trees – forest – trust domains - administration tools – OU, user object, group object, computer object, DSquery, DNS

### **(C17IA22/E17IA05)Paper VII Data Communication and Networking**

#### **UNIT I: INTRODUCTION:**

Network Hardware, Topology, Network Software, Reference Models, Example Networks, Uses of Computer Networks, ARPANET, Connection Oriented Networks, X.25, Frame Relay, ATM

#### **UNIT II: PHYSICAL LAYER:**

The Theoretical Basis for Data Communication, The Public Switched Telephone Network, The Mobile Telephone System

#### **UNIT III: DATA LINK LAYER:**

Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols, Example Data Link Protocols

#### **UNIT IV:MEDIUM ACCESS CONTROL SUB LAYER:**

The Channel Allocation Problem, Multiple Access Protocols, Ethernet, Wireless LANs, Broadband Wireless, Bluetooth, RFID, Data Link Layer Switching

Reference:

1. Data Communications & Networking (sic)

By A. Behrouz Forouzan

#### **(C17LS23/E17LS05)Paper VIII Life Skill**

##### **UNIT-I ATTITUDE :**

Positive thinking – Goal setting – Problem Solving and Decision making – Leadership and Team Work.

##### **UNIT-II COMMUNICATION SKILLS:**

Oral communication: Concept of English language – Fluency – Verbal communication in official and public situations.

##### **UNIT-III COMMUNICATION SKILLS:**

Written Communication: Comprehension – Writing a formal letter like application for Job, enquiry, reply, complaint and such others – preparation of Resume, Curriculum Vitae.

##### **UNIT-IV COMPUTING SKILLS – 1:**

Introduction to Computers, its various components and their respective functions – Memory storage devices – Microsoft (MS) Office – MS Word.

##### **UNIT-V COMPUTING SKILLS – 2**

Internet Basics – Origin of Internet – MODEM – ISP – Upload – Download – e-mail – Origin of worldwide web (www) Browsers – Search engines.

##### **Reference books:**

1. Life skill, Manonmaniam Sundaranar University Publications Division (2011).

2. Developing Entrepreneurial Life Skills: Creating and Strengthening ...

By Shipra Vaidya

#### **(C17IAP2/E17IAP2)Paper IX NETWORK LABORATORY**

Network The following exercises should be done preferably on ‘UNIX’/linux platform

1. (a) Configure the IP addressing and subnetting on a LAN using ‘ifconfig’
- (b) Check the basic IP connectivity using ‘ping’ command.
- (c) Inspect the Routing table and ARPcache of a LAN server.
- (d) Use ‘traceroute’ to watch the route your IP packet takes for reaching destination.
- (e) Use ‘tcpdump’ to monitor ‘ping’ and ‘traceroute’ from your machine.



2. (a) Create a user group and permit it to access 'Telnet' service over a LAN.
- (b) Restrict the 'Telnet' service to maximum five users at a time.
- (c) Configure the 'Cron' daemon to stop 'Telnet' service and reboot the system after five minutes of usage by at least three users.

3. (a) Create a text file containing records of employees in text form line wise.
- (b) Save this file and edit its copy for some changes and save it.
- (c) Use 'diff' command to generate a patch for the original file.
- (d) Use the 'patch' command to patch the original file to make it similar to the edited copy.

4. (a) Create a text file containing records of employees in text form line wise.
- (b) Save this file and edit its two copies independent of each other.
- (c) Save both new versions as two new files.
- (d) Now use 'diff3' command to compare and create a third file containing merged output.
- (e) Again create the merged file using '-m' option of the 'diff3' command.

5. (a) Create a text file containing records of employees in text form line wise and save it.
- (b) Establish the 'CVS' repository over a network and store the original file in it.
- (c) Now edit the file and save its edited version in the repository.
- (d) Store at least five continuously edited versions of the file in the 'CVS' repository.
- (e) Now retrieve version 1.0 and 3.0 from the repository.

6. (a) Use 'tar' to create multi-file non-zipped and zipped archives (using gzip and bzip2).
- (b) Update the non-zipped tarball by adding three new files to it and list its final contents.
- (c) Now extract the contents of both the tarballs to two different directories.
- (d) Inspect the retention of user permissions on the files before the archiving & after the extraction.

7. (a) Use LDAP to access 'Telnet' service on a LAN server.
- (b) Use /etc/hosts.allow and /etc/hosts.deny to allow & deny access to web service to two hosts on the LAN.
- (c) Use 'iptables' or similar utility to block TCP SYN segments from a particular IP address for port 25 using firewall rules.

(d) Use an IDS tool(e.g. tripwire, snort, other firewall) to track changes in /var/log/messages after every 5 minutes and to monitor the ICMP requests coming to the host.

8. (a) Use the Netstat command and collect the traffic statistics.

(b) Identify the various live connections present in the network

9. Configure SNMP and SNMP agents for the system and other elements with admin rights.

10. Write a shell script that takes a valid directory name as an argument and recursively descend all the sub-directories, finds the maximum length of any file in that hierarchy and writes this maximum value to the standard output. Write a shell script that accepts a path name and creates all the components in that path name as directories. For example, if the script is named mpc, then the command mpc a/b/c/d should create directories a, a/b, a/b/c, a/b/c/d.

**(C17IAPW/E17IAPW)Paper X INTERNSHIP/PROJECT**

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