

**SARDAR PATEL INSTITUTE OF TECHNOLOGY,  
MUMBAI**

**A Two-Week Graded ISTE-STTP Course**

**On**

**“Computer Communication Networks with Lab Exercises”**

**(21<sup>st</sup> November-2<sup>nd</sup> December, 2011)**

Convener: Dr. Prachi Gharpure, Principal  
Dr. Y.S. Rao, Vice-Principal

Coordinator: Prof. Dayanand Ambawade  
Co-coordinator: Prof. Manish Parmar

Instructors:

Prof. Dayanand Ambawade    Dr. Deven Shah (Terna COE, Navi Mumbai)  
Prof. Radha Shankarmani  
Prof. Manish Parmar

**Course Objectives:**

1. **Hands-on Networking:** The learn-by-doing approach is absolutely essential in data communications and networking. “Do Networking” at the hardware, software, simulation, configuration levels.
2. **Experimental Method:** Interconnecting hardware, configuring network systems, measuring performance, observing protocols in action, and creating client-server programs that communicate over a network all help sharpen one’s understanding and appreciation.
3. **Tools:** How to correctly use a variety of abstract tools (measurement, simulation, animation, experiment) for design and analysis of computer/network systems. The specific tools/platforms useful for networking research and advanced development.

**Course Benefits:**

Today's professionals must possess a solid foundation in networking concepts and practices to streamline enterprise operations and maintain a competitive edge. This course provides you with a working knowledge of IP addressing, TCP/IP operation, LAN solutions, wireless network options, security elements, enterprise internetworking and modern hardware.

Extensive hands-on exercises provide the practical experience you need to configure a host, employ TCP/IP tools, use application services and access TCP/IP-based internetworks.

Providing participants with constant access to critical data is essential for the success of today's rapidly evolving networks. In this course, you gain the skills necessary to

configure networks and resolve problems related to cables, wireless connections, protocols and applications. You learn to configure, maintain and troubleshoot networks using a comprehensive set of tools and techniques.

### **Hands-On Lab:**

Exercises throughout this course provide practical experience with TCP/IP internet-working issues and services, including:

- Deploying protocol analysis techniques for Internet protocols: IP, ARP, TCP, UDP and HTTP
- Troubleshooting IP configuration problems
- Troubleshooting TCP/IP networks with ICMP and ping
- Exploiting FTP and TELNET
- Performing protocol analysis of FTP sessions
- Examining SMTP headers
- Decoding HTTP traffic
- Dissecting packet structure with Wireshark
- Utilizing, monitoring and securing Ethernet and Wi-Fi LANs
- Configuring TCP/IP on hosts and routers

You gain hands-on experience configuring and troubleshooting a network. Exercises include:

- Testing cables and connections using a cable scanner
- Diagnosing cable and connection configuration to ensure operation
- Analyzing traffic with Wireshark
- Upgrading to a switched network
- Setting up a wireless network
- Allocating an IP address with DHCP
- Interpreting a routing table
- Troubleshooting name resolution

### **Course Description:**

- 1. Lectures**
- 2. Quizzes**
- 3. Homework**
- 4. Lab Exercises**
- 5. Exam Paper**

### **Evaluation Methods:**

1. Quizzes (4) 20 pts
2. Lab Exam (3) 30 pts
3. Question Paper (1) 30 pts
4. Project (1) 10 pts
5. Homework (2) 10 pts

<b>Day-1 (9.00 a.m. to 5.00 p.m.) 21<sup>st</sup> Nov,2011</b>		
<b>Registration:9.00 a.m. to 9.30 a.m.</b>		
<b>Sr. No.1</b>	<b>Topic</b>	<b>Course Content</b>
(9.30 am to 10.30 am)	Inauguration Program	Dr. Prachi Gharpure Principal, S.P.I.T.
<b>Tea Break</b>		
Session-I (10.45 am 11.00 pm)	Course Overview	Course Structure : Objectives, Evaluation Methods
Session-II (11.00 pm to 1.00 pm)	Introduction to Computer Networking	Basics of Networking Network Models, Categories of Networks, OSI-RM and Network Applications
<b>Sr. No.2</b>	<b>Topic</b>	<b>Course Content</b>
<b>Lunch Break</b>		
Session-III 2.00 pm to 4.30 pm)	Concept of NOS	Installation of Linux Server OS.
Quiz-1 4.30 pm to 5.00 pm)	Networking Overview	Basics of Networking

<b>Day-2 (9.30 a.m. to 5.00 p.m.) 22<sup>nd</sup> Nov,2011</b>		
<b>Sr. No.1</b>	<b>Topic</b>	<b>Course Content</b>
Session-I (9.30 am to 11.30 am)	TCP/IP Overview	Application Layer Protocols Transport Protocols Network Protocols
<b>Tea Break</b>		
Session-II (11.45 am 1.00 pm)	Introduction to LAN	LAN Concept, Ethernet Protocol
<b>Sr. No.2</b>	<b>Topic</b>	<b>Course Content</b>
<b>Lunch Break</b>		
Session-III (2.00 pm to 4.00 pm)	LAN Cabling	LAN Wiring, Connectors and Crimping Demo
Quiz-2 (4.30 pm to 5.00 pm)	LAN Basics	LAN Protocols, Connector, Cables and Standards

<b>Day-3 (9.30 a.m. to 5.00 p.m.) 23<sup>rd</sup> Nov,2011</b>		
<b>Sr. No.1</b>	<b>Topic</b>	<b>Course Content</b>
Session-I (9.30 am to 11.30 am)	Enterprise Networks	Enterprise Wide Networks Structured Networking Concepts
<b>Tea Break</b>		
Session-II (11.45 am 1.00 pm)	Network Design	Network Design Concept
<b>Lunch Break</b>		
<b>Sr. No.2</b>	<b>Topic</b>	<b>Course Content</b>
Session-III (2.00 pm to 4.30 pm)	Network Administration	LAN Setup, Network Configuration, Network commands, Utilities & tools
Quiz-3 (4.30 pm to 5.00 pm)	Network Administration	Enterprise Networks, Network configuration and commands and tools.

<b>Day-4 (9.30 am to 5.00 pm) 24<sup>th</sup> Nov,2011</b>		
<b>Sr. No.1</b>	<b>Topic</b>	<b>Course Content</b>
Session-I (9.30 am to 11.30 am)	Application Layer Protocols	WWW, Remote Login, FTP, EMAIL etc
<b>Tea Break</b>		
Session-II (11.45 am 1.00 pm)	Network Administration LAN Devices	LAN Switch Configuration
<b>Sr. No.2</b>	<b>Topic</b>	<b>Course Content</b>
<b>Lunch Break</b>		
Session-III (2.00 pm to 4.00 pm)	Server Administration – I	Telnet/SSH Server/Client Configuration.
Lab Exam1 (4.00 pm to 5.00 pm)	Network and Server Administration	Network and Server services and protocols

<b>Day-5 (9.30 a.m. to 5.00 p.m.) 25<sup>th</sup> Nov,2011</b>		
<b>Sr. No.1</b>	<b>Topic</b>	<b>Course Content</b>
Session-I (9.30 am to 11.30 am)	Server Administration (Part-II)	Server/Client Configuration: APACHE
<b>Tea Break</b>		
Session-II (11.45 am 1.00 pm)	Server Administration (Part-III) Domain Name System	DNS Concept, Primary DNS, Caching DNS
<b>Sr. No.2</b>	<b>Topic</b>	<b>Course Content</b>
<b>Lunch Break</b>		
Session-III (2.00 pm to 4.00 pm)	Server Administration Part (IV) File Transfer/Name Server/	Server/Client Configuration: FTP DHCP DNS
Lab Exam2 (4.00 pm to 5.00 pm)	Server Configurations	APACHE/DNS/FTP/DHCP TELNET/SSH

<b>Day-6 (9.30 a.m. to 5.00 p.m.) 28<sup>th</sup> Nov,2011</b>		
<b>Sr. No.1</b>	<b>Topic</b>	<b>Course Content</b>
Session-I (9.30 am to 11.30 am)	Internet Protocol	IP Addressing Schemes IP fragmentation TCP and IP Headers
<b>Tea Break</b>		
Session-II (11.45 am 1.00 pm)	Network Protocol Analyser	TCPDUMP/ETHERREAL
<b>Sr. No.2</b>	<b>Topic</b>	<b>Course Content</b>
<b>Lunch Break</b>		
Session-III (2.00 pm to 4.30 pm)	IP Traffic	Frame Concept IP fragmentation Link Management
Quiz-4 (4.30 pm to 5.00 pm)	Internet Protocols	Data Encapsulation IP fragmentation MTU Transfer modes

<b>Day-7 (9.30 a.m. to 5.00 p.m.) 29<sup>th</sup> Nov,2011</b>		
<b>Sr. No.1</b>	<b>Topic</b>	<b>Course Content</b>
Session-I (9.30 am to 11.30 am)	Network Security	Firewall Concepts
<b>Tea Break</b>		
Session-II (11.45 am 1.00 pm)	Firewall Configuration	Basic rules writing for Firewall
<b>Sr. No.2</b>	<b>Topic</b>	<b>Course Content</b>
<b>Lunch Break</b>		
Session-III (2.00 pm to 4.00 pm)	NAT	NAT Concepts Advanced Firewall Configuration
Lab Exam-3 (4.00 pm to 5.00 pm)	Internet Firewall	Access Control Listing

<b>Day-8 (9.30 a.m. to 5.00 p.m.) 30<sup>th</sup> Nov,2011</b>		
<b>Sr. No.1</b>	<b>Topic</b>	<b>Course Content</b>
Session-I (9.30 am to 11.30 am)	Routing in Packet Switching Networks	SPF Algorithms Bellman-Ford and Dijkstra Algorithms
<b>Tea Break</b>		
Session-II (11.45 am 1.00 pm)	Internet Routing Protocols	RIP OSPF BGP
<b>Sr. No.2</b>	<b>Topic</b>	<b>Course Content</b>
<b>Lunch Break</b>		
Session-III (2.00 pm to 4.00 pm)	Network Programming	SPF Algorithms
Question Paper-1 (4.00 pm to 5.00 pm)	Routing Concepts	Routing Table Synthesis

<b>Day-9 (9.30 a.m. to 5.00 p.m.) 1<sup>st</sup> Dec,2011</b>		
<b>Sr. No.1</b>	<b>Topic</b>	<b>Course Content</b>
Session-I (9.30 am to 11.30 am)	Simulation and Modeling	Simulation and Modeling Concept
<b>Tea Break</b>		
Session-II (11.45 am 1.00 pm)	Network Simulation NS-2	Introduction to NS-2 Generic Script Structure
<b>Sr. No.2</b>	<b>Topic</b>	<b>Course Content</b>
<b>Lunch Break</b>		
Session-III (2.00 pm to 4.00 pm)	Installation of NS-2	Installing of NS-2 Path Setup TCL Scripts
Projects (4.00 pm to 5.00 pm)	Project Discussion	Project Ideas

<b>Day-10 (9.30 a.m. to 5.00 p.m.) 2<sup>nd</sup> Dec,2011</b>		
<b>Sr. No.1</b>	<b>Topic</b>	<b>Course Content</b>
Session-I (9.30 am to 11.30 am)	Mobile and Wireless Environment in NS-2	Simulating Wireless Environments in NS-2 RTS/CTS
<b>Tea Break</b>		
Session-II (11.45 am 1.00 pm)	Setting up a Wireless LAN	WLAN Setup, Configuration and Security
<b>Sr. No.2</b>	<b>Topic</b>	<b>Course Content</b>
<b>Lunch Break</b>		
Session-III (2.00 pm to 3.30 pm)	Project Submission	Project Demos
(3.30 pm to 5.00 pm)	Valedictory Function	Certificate Distribution

**Contact for registration:**

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