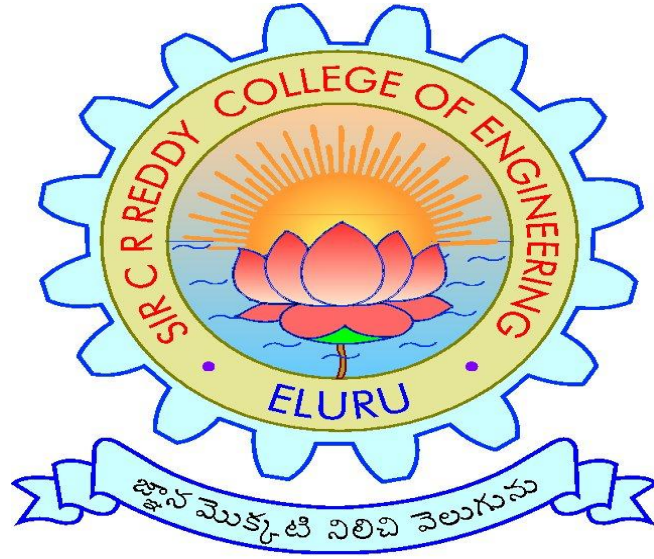


SIR C.R.REDDY COLLEGE OF ENGINEERING, ELURU

DEPARTMENT OF INFORMATION TECHNOLOGY

LESSON PLAN



SUBJECT: IT 4.1.2 NETWORK PROTOCOLS

CLASS: 4/4 B.Tech., I - SEMESTER, A.Y.2017-18

INSTRUCTOR: Sri N. Prasad

Sir C R Reddy college of Engineering

DEPT. OF INFORMATION TECHNOLOGY

PROGRAMME : B.Tech

SEMESTER : IV/IV I Semester

A.YEAR : 2017-18

Course : IT 4.1.2 Network Protocols

Instructor : Sri N. Prasad

Course Contents

Category of Course	Course Title	Course Code	Credits- 4 C	Theory Paper
Departmental IT 4.1.2	Network Protocols	IT 4.1.2	L-3 T-1	Max.Marks- 70 Duration- 3hrs.

Course objectives:

1. Know which protocols are part of the TCP/IP protocol suite
2. Understand how each protocol fits into the Internet Protocol Stack and the OSI Model
3. Understand how the protocols relate to one another
4. Be able to describe the function and operation of each protocol
5. Understand the syntax and semantics of the various PDUs for each protocol

Students who have successfully completed this course will have full understanding of the following concepts

Course Outcomes for Network Protocols:

1. Understand the fundamental principles of TCP/IP Protocol suite.
2. Apply working concepts of Connection oriented and Connection less Protocols
3. Analyze various Protocols like FTP, ARP, RARP, TELNET, RLOGIN, and BOOTP.
4. Design subnetting and Supernetting using different addresses

ONLINE REFERENCES :

1. <http://vlaurie.com/computers2/Articles/protocol.htm>
2. <https://www.techopedia.com/definition/12938/network-protocols>
3. <http://www.comptechdoc.org/independent/networking/guide/netcategories.html>

Prerequisite :

Students are expected to know and understand the fundamentals of Computer Networks as taught in an undergraduate course using a text such as William Stallings. Network Topologies, TCP/IP model, local area networking, Wide Area Networking and Internetworking. Students will gain fundamental knowledge and understanding of the basic principles and practice of computer networking, emphasizing data and computer communication within the framework of the OSI and TCP/IP protocol architectures

Internal Assessment Details:

Attendance: 5 Marks
Internal Test 1& 2: 15 Marks
Assignment-1: 5 Marks
Assignment-2: 5 Marks

Total: 30 Marks

IT4.1.2

NETWORK PROTOCOLS

Credits:4

IP ADDRESSING: Decimal Notation-Classes- special addresses - A simple Internet-Unicast and Broadcast addresses - Applying for IP addresses-Private networks.

SUBNETTING AND SUPERNETTING: Subnetting- Masking-Examples of Subnetting – Variable length Subnetting- Supernetting.

INTERNET PROTOCOL: Data gram-Fragmentation-Options- Checksum- IP design.
ARP and RARP: ARP- ARP design – RARP

INTERNET CONTROL MESSAGE PROTOCOL: Types of Messages- Message formats- Error reporting- Query- Checksum- ICMP design.

INTERNET GROUP MANAGEMENT PROTOCOLS: Multicasting- IGMP-Encapsulation- Multicast Backbone- IGMP design.

USER DATAGRAM PROTOCOL: Process to process communication-User datagram – Checksum- UDP operation- uses of UDP – UDP design.

TRANSMISSION CONTROL PROTOCOL: Process to Process communication -TCP Services – Segment - Options- Checksum-Flow control- Error Control- TCP Timers-Connection-State Transition Diagram- Congestion Control-TCP operation- TCP Design.

APPLICATION LAYER AND CLIENT-SERVER MODEL: Client-server Model-Concurrency-Processes
BOOTP and DHCP: BOOTP-DHCP

DOMAIN NAME SYSTEM: Name Space-Domain name Space-Distribution of Name space-DNS in the Internet-Resolution- DNS Messages- Types of Records-Compression-DDNS-Encapsulation.

TELNET AND RLOGIN: Concept-Network Virtual Terminal- NVT character set -Embedding-Options- Option Negotiation-Sub option Negotiation-Controlling Server-Out of Band signaling –Escape character- Mode of Operation-Examples- User Interface- Rlogin-Security Issue.

FILE TRANSFER PROTOCOL: Connections- Communication-Command Processing-File Transfer-User Interface-Anonymous FTP.

TRIVIAL FILE TRANSFER PROTOCOL: Messages- Connection- Data Transfer-UDP ports- Tftp Example- TFTP options -Security-Applications.

HYPERTEXT TRANSFER PROTOCOL: HTTP overview-Proxy-Gateway-Tunnel-Cache-Messages-General Header Fields-Cache Control-Connection-Request Methods-Request Header Fields-Response Messages- Response Header Fields-Entity Header Fields-Client/Server Authentication.

SOCKET INTERFACE: Definitions-Sockets-Byte ordering- Address Transformation-Byte manipulation Function-Information about Remote Host- Socket System Calls- Connectionless Iterative server- UDP Client/Server Programs-Connection oriented Concurrent Server - TCP Client/Server Programs.

Text Book: TCP/IP Protocol Suite. Behrouz A. Forouzan (TMH edition)
Reference Book: Internetworking with TCP/IP. D. E. Comer (PHI publications).

SIR C R REDDY COLLEGE OF ENGINEERING, ELURU
DEPARTMENT OF INFORMATION TECHNOLOGY
COURSE SCHEDULE

The schedule for the whole course/subject is:

Unit No	Description of the Chapter	Description of the Topics	Total no of periods (L+T)
1	IP Addressing	IP address: Decimal Notation, Classes, special addresses, A simple Internet, Unicast and Broadcast addresses, Applying for IP addresses, Private networks	3+1
2	Sub-Netting and Super Netting	Subnetting, Masking, Examples of Subnetting, Variable length Subnetting, Supernetting.	5
3	Internet Protocol	Data gram, Fragmentation, Options, Checksum, IP design. ARP and RARP: ARP,ARP design , RARP	9+1
4	ICMP	Types of Messages, Message formats, Error reporting, Query, Checksum, ICMP design.	4+1
5	IGMP	Multicasting, IGMP, Encapsulation, Multicast Backbone, IGMP design.	4
6.	UDP	Process to process communication, User datagram, Checksum- UDP operation, uses of UDP, UDP design.	4
7.	TCP	Process to Process communication , TCP Services, Segment, Options, Checksum-Flow control, Error Control, TCP Timers, Connection, State Transition Diagram, Congestion Control, TCP operation, TCP Design	3+1
8.	Client-Server Model	Client-server Model, Concurrency, Processes	2
9.	BOOTP and DHCP	BOOTP And DHCP: BOOTP-DHCP	2

10.	DNS	Name Space-Domain name Space, Distribution of Name space, DNS in the Internet, Resolution, DNS Messages, Types of Records, Compression, DDNS, Encapsulation	4
11.	TELNET AND RLOGIN	Concept, Network Virtual Terminal, NVT character set , Embedding-Options, Option Negotiation-Sub option Negotiation, Controlling Server, Out of Band signaling , Escape character, Mode of Operation, Examples, User Interface, Rlogin, Security Issue	3
12	FTP	Connections, Communication-Command Processing, File Transfer, User Interface, Anonymous FTP.	6+1
13.	TFTP	Messages, Connection, Data Transfer, UDP ports, Tftp Example, TFTP options , Security, Applications.	3+1
14.	HTTP	HTTP overview-Proxy, Gateway, Tunnel, Cache-Messages, General Header Fields, Cache Control, Connection, Request Methods, Request Header Fields, Response Messages, Response Header Fields-Entity Header Fields-Client/Server Authentication	3
15.	SOCKET INTER FACE	Definitions, Sockets, Byte ordering, Address Transformation, Byte manipulation Function, Information about Remote Host, Socket System Calls, Connectionless Iterative server, UDP Client/Server Programs, Connection oriented Concurrent Server TCP Client/Server Programs.	3+1

Signature of the H.O.D

Signature of the Faculty

Date:

LECTURE PLAN

DEPARTMET	INFORMATION TECHNOLOGY
NAME OF LECTURER	Sri N.Prasad

Sl.No	Topics to be covered	No. of Lecture hours	Teaching method	Reference
1	Classes of IP Address	1	BB	TB
2	Special Address, Special classes	2	BB	TB
3	Special Classes in I.P	1	BB	TB
4	Sample Internet	1	BB PPT Using LCD	TB
5	Unicast, Broadcast and Multicast Address	1	BB	TB
6	Sub netting and super netting Introduction	1	PPT Using LCD	TB/INTERNET
7	Sub Netting of IP Address	1	BB	TB
8	Masking	1	BB	TB
9	Super Netting	1	PPT Using LCD	TB
10	IP Datagram	1	BB,PPT Using LCD	TB
11	Datagram Header	1	BB,PPT Using LCD	TB

12	Identification of datagram and offset	1	BB	TB
13	Options field in IP Datagram	2	BB	TB
14	Checksum field in IP Datagram	1	BB	TB
15	Private Network and Simple Internet	1	PPT Using LCD	TB
16	IP Design	1	PPT Using LCD	TB/INTERNET
17	ARP Introduction	1	BB	TB
18	ARP Packet Format	1	PPT Using LCD	TB
19	ARP Design and RARP	1	BB	TB
20	ICMP Introduction and Message Format	2	BB	TB
21	ICMP Error message	1	BB	TB
22	ICMP Error Messages and Query Messages	1	BB	TB
23	IGMP Design	1	PPT Using LCD	TB/INTERNET
24	IGMP	1	BB	TB
25	UDP Process to Process Communication	1	BB	TB
26	TCP Timers	1	BB	TB
27	User Datagram in UDP	1	PPT Using LCD	TB
28	Check sum in UDP	1	BB	TB
29	UDP Operations	1	BB	TB

30	UDP Design	1	PPT Using LCD	TB
31	TCP Operations	1	BB	TB/INTERNET
32	TCP Format	1	BB	TB
33	TCP Options	1	BB	TB
34	Sliding window protocol in TCP	1	BB	TB
35	Error Control in TCP	2	BB	TB
36	TCP Options	1	BB	TB
37	Congestion Control in TCP Design	2	BB	TB
38	TCP Design	2	PPT Using LCD	TB
39	Client-Server model	1	PPT Using LCD	TB
40	Bootstrap Format	1	PPT Using LCD	TB
41	Boot-Strap Operations	1	BB	TB/INTERNET
42	DHCP Introduction	1	BB	TB
43	DNS Messages	1	BB	TB
44	Domain Name Space and Messages	1	PPT Using LCD	TB
45	TELNET	1	PPT Using LCD	TB
46	Rlogin Introduction	1	BB	TB
47	FTP Connection	1	BB	TB
48	FTP Control	1	BB	TB

49	TFTP messages	1	BB	TB
50	UDP Ports	1	PPT Using LCD	TB/INTERNET
51	HTTP Request Messages	1	BB	TB
52	HTTP Response Messages	1	BB	TB
53	Socket System Calles	2	BB	TB
54	Socket Interface	1	BB	TB
55	Connection less Iterative Server	1	PPT Using LCD	TB
56	Connection oriented Iterative Server	1	PPT Using LCD	TB
57	TCP Client-Server Program	1	BB	TB/INTERNET
58	UDP Client-Server Program	1	BB	TB
	Total classes	65		

Network Protocols

Unit Wise Questions

1. INTERNET PROTOCOL ADDRESS

➤ **Two mark Questions :**

1. What is an IP address? Give one example.
2. Define primary classes of IP addresses?
3. Find the net id and host id of the 192.8.56.2 and 220.34.8.9, IP addresses.
4. What is a protocol?
5. What is remote procedure call?

➤ **Essay Questions :**

1. Describe Internet Datagram? (14 M).
2. Find the class of the IP address and identify the network address and host address:
IP: 01111111 11110000 01100111 01111101.

2. SUB NETTING AND SUPER NETTING

➤ **Two mark Questions :**

1. What is subnetting?
2. What is standard subnet mask for a class-C address?

➤ **Essay Questions :**

1. Explain about Sub Netting and Super Netting.

3. INTERNET PROTOCOL

➤ **Two mark Questions :**

1. What is concurrency?
2. What is congestion?
3. What is Gateway?

➤ **Essay Questions :**

1. Distinguish between virtual network and connectionless network?
2. What is an IP address? Explain about applying for IP address.
3. Differentiate between multicast and broadcast.
4. What is the purpose of IP protocol and mention and components of Internet datagram format?

4. ICMP, IGMP, ARP and RARP

➤ **Two mark Questions :**

1. What is the significance of a check sum?
2. Differentiate between broadcasting and multicasting.
3. What is logical address and what is physical address?
4. Expand RARP and give an example where RARP is used?
5. What is ICMP? What are the different types of ICMP messages?

6. What are the different types of error reporting messages in ICMP?
7. Expand IGMP and what are the different types of IGMP messages?

➤ **Essay Questions :**

1. Differentiate between ARP and RARP?
2. Explain the design of ARP?
3. Explain IGMP design?
4. Explain ICMP design?
5. Explain the ICMP message format.

5. USER DATAGRAM PROTOCOL

➤ **Two mark Questions :**

1. What is a process?
2. List the uses of UDP?
3. List out well-known ports for UDP?
4. What is multiplexing and demultiplexing?
5. Explain about flow and error control in UDP?
6. What is an application program?
7. What is an ephemeral port number, why we are using this number?

➤ **Essay Questions :**

1. Write about UDP packet?
2. How TCP/UDP provide process-to-process communication?

6. TRANSMISSION CONTROL PROTOCOL

➤ **Two mark Questions :**

1. What is buffer in TCP? Why we are using buffers in TCP?
2. What is the use of TCP timers?
3. Write about TCP header Options.

➤ **Essay Questions :**

1. Explain flow control in TCP

2. Elaborate on TCP services?
3. Explain the TCP segment format?

7. CLIENT – SERVER MODEL

➤ **Two mark Questions :**

1. What is child process and child server explains?

➤ **Essay Questions :**

1. Describe about client-server model? Client-Server Authentication.
2. Explain about point-to point networks and Network virtual terminal?

8. BOOTP and DHCP

➤ **Two mark Questions :**

1. What is Active open and Passive open explain?
2. What is the maximum number of seconds that can be stored in the number of seconds field of BOOTP packet?
3. What is the maximum number of seconds that can be stored in the number of seconds field of BOOTP packet?

➤ **Essay Questions :**

1. Explain BOOTP protocol.
2. Explain DHCP protocol.

9. DNS, TELNET AND RLOGIN

➤ **Two mark Questions:**

1. What is resolution in DNS?
2. What is mean by fragmentation?
3. Differentiate FQDN and PQDN?
4. What are the noticeable differences between TELNET and RLOGIN?
5. What is default, character and line mode in TELNET?

➤ **Essay Questions :**

1. What is the significance of DNS? Differentiate between DNS and DDNS.
2. What is out of band signaling? How to control server out of band signaling?

10. FTP, TFTP

➤ **Two mark Questions :**

1. Define FTP.
2. Define TFTP.

➤ **Essay Questions :**

1. Write message categories of TFTP?
2. What is virtual terminal?
3. What is magic cookie? Explain?
4. Explain about Trivial File Transfer Protocol.
5. Explain File Transfer Protocol (FTP)?
6. Differentiate between FTP and TFTP?
7. What is Network virtual terminal?

11. HTTP AND SOCKET SYSTEM CALLS

➤ **Two mark Questions :**

1. What is name server, why we are using that?
2. What is out-of- band signaling?
3. Define HTTP.

➤ **Essay Questions :**

1. Explain the general header fields related to HTTP?
2. Explain about HTTP messages.
3. Explain header format of a HTTP protocol.
4. Write a note on socket system calls.

