

INTERNET TECHNOLOGIES

(457CSS-3)



Course Description

Study the history and fundamentals of the internet, Common web applications, types of web pages, web publishing and to learn about Internet protocols (HTTP, TCP/IP and FTP), Client/Server Architecture and the MVC approach in Website design. Programming with HTML, XHTML, cascading style sheets (CSS), and JavaScript, client and server-side scripting, develop dynamic web application with PHP or ASP and MySQL. Finally, evaluating web sites and applications and learning about web privacy and various security issues.

Course Learning Outcomes

CLO#1	Understand fundamentals of internet, common web applications, their types, web security and privacy issues and social and commercial issues of web apps.
CLO#2	Recognize browsing tools, web development tools and web publishing.
CLO#3	Explain Internet protocols (HTTP, TCP/IP and FTP) and File/server, database server and 3-tier Client/Server Architecture.
CLO#4	Design a web page using MVC and other design approaches.
CLO#5	Develop dynamic web application with PHP or ASP and MySQL and programming with HTML, XHTML, cascading style sheets (CSS), and JavaScript, client and server-side Scripting language.
CLO#6	Evaluate a web site.

Learning Resources

Textbook	Douglas E.Comer, Computer Networks and Internets with Internet Applications, Publisher: Prentice Hall, 5th Edition.
	Deitel & Deitel, Internet & World Wide Web: How to Program, Prentice Hall, 5th Edition.
	Robert W. Sebesta, Programming the World Wide Web, Addison-Wesley, Latest Edition.
Other References	Hugh E. Williams and David Lane, Web Database Applications with PHP, and MySQL, O'Reilly & Associates
	David Powers, PHP Solutions: Dynamic Web Design Made Easy
	<u>http://www.w3schools.com/</u>

Assessment Plan

Assessment Methods (the name of each assessment method)	Weight (The weight of each assessment method out of the total grade 100)
Quiz	5%
Participation	5%
Presentation	5%
Midterm Exam	30%
Final Lab Exam	15%
Final Exam	40 %
Total	100 %



LECTURE 1: FUNDAMENTALS OF THE INTERNET TECHNOLOGIES AND WEB APPLICATIONS

Objectives:

By the end of this unit, you should be able to:



Define the Internet



Network Protocols



Differentiate between
the Internet and the
World Wide Web



Describe the History
of the Internet



List World Wide Web
browser software
available in this
course material

CLO_1: Understand fundamentals of internet, common web applications, their types, web security and privacy issues and social and commercial issues of web apps.

Computer Network

Computer network is a collection of computers and other hardware components interconnected by communication channels that allow sharing of resources and information.



Internet

- It formed by interconnecting multiple networks.
- The Internet is what we call a meta network, that is, a network of networks that spans the globe.
- It's impossible to give an exact count of the number of networks or users that comprise the Internet, but it is easily in the thousands and millions respectively.

Internet (Cont.)

- The Internet is a network of Networks, that uses the standard Internet Protocol Suite (TCP/IP).
- The Internet carries a vast range of information resources and services, such as the inter-linked hypertext documents of the World Wide Web (WWW) and the infrastructure to support electronic mail.
- The Internet employs a set of standardized protocols which allow for the sharing of resources among different kinds of computers that communicate with each other on the network.

Internet (Cont.)

- The Internet and the World Wide Web (WWW) are not one and the same.
- The Internet is a global data communications system. It is a hardware and software infrastructure services that provide connectivity between computers.
- In contrast, the Web is one of communication via the Internet. It is a collection of interconnected documents and other resources, linked by hyperlinks and Uniform Resource Identifiers (URLs).
- Web design is the process of planning and creating a website.

Need for Internet:

- Early computer networks were designed when computers were large and expensive.
- The main motivation was resource sharing.
- For example, networks were devised to connect multiple users, each with a screen and keyboard, to a large centralized computer.
- Later networks allowed multiple users to share peripheral devices such as printers.

Internet (Cont.)

- An IP address is a number that uniquely identifies each computer or device connected to the Internet
- A domain name is the text version of an IP address
 - Top-level domain (TLD)

IP address → 72.14.207.99

Domain name → www.google.com

top-level domain → .com

Examples of Generic Top-Level Domains

Generic TLD	Intended Purpose	Generic TLD	Intended Purpose
aero	Aviation community members	mil	Military organizations
biz	Businesses of all sizes	mobi	Delivery and management of mobile Internet services
cat	Catalan cultural community	museum	Accredited museums
com	Commercial organizations, businesses, and companies	name	Individuals or families
coop	Business cooperatives such as credit unions and rural electric co-ops	net	Network providers or commercial companies
edu	Educational institutions	org	Nonprofit organizations
gov	Government agencies	pro	Certified professionals such as doctors, lawyers, and accountants
info	Business organizations or individuals providing general information	tel	Internet communications
jobs	Employment or human resource businesses	travel	Travel industry

History of the Internet & World Wide Web:

ARPANET – origin of the Internet

- It was implemented in late 1960's by ARPA (Advanced Research Projects Agency of Department of Defense, US)**
- It is a networked computer systems of a dozen universities and institutions (funded by ARPA) with 56KB communications lines**
- It intended to allow computers to be shared but later became clear that the key benefit was allowing fast communication between researchers – electronic-mail (email)**

Goals of ARPANET:

- To allow multiple users to send and receive information simultaneously over the same communications paths (e.g., phone lines).
- Operated with a technique called packet switching, in which digital data was sent in small bundles called packets.
- The packets contained address, error-control and sequencing information.
- The address information allowed packets to be routed to their destinations.
- The sequencing information helped in reassembling the packets into their original order for presentation to the recipient.
- Technique greatly reduced transmission costs, as compared with the cost of dedicated communications lines.

Growth of Internet

1969
ARPANET
becomes
functional

1986 NSF
connects
NSFnet to
ARPANET
and becomes
known as the
Internet

1996
Internet2 is
founded

1984
ARPANET
has more
than 1,000
individual
computers
linked as
hosts

1995 NSFNet
terminates its
network on
the Internet
and resumes
status as
research
network

Today More
than 550
million hosts
connect to
the Internet

Common Communication in Internet



Electronic mail, or email, is an important communications service available on the Internet. The concept of sending electronic text messages between parties.



Internet telephony is another common communications service made possible by the creation of the Internet. It is named as VoIP stands for Voice-over-Internet Protocol.

The Internet

An **access provider** is a business that provides individuals and organizations access to the Internet free or for a fee.

Data transfer in Internet

- File sharing is an example of transferring large amounts of data across the Internet.
- A computer file can be emailed to customers, colleagues and friends as an attachment.
- It can be uploaded to a website for easy download by others. It can be put into a "shared location" or onto a file server for instant use by colleagues.
- In any of these cases, access to the file may be controlled by user authentication, the transit of the file over the Internet may be obscured by encryption, and money may change hands for access to the file.

Data transfer in Internet (Cont.)

ISP (Internet service provider)

Regional ISPs provide Internet access to a specific geographical area

National ISPs provide Internet access in cities and towns nationwide

Online service provider (OSP)

Has many members-only features

Popular OSPs include AOL (America Online) and MSN (Microsoft Network)

Wireless Internet service provider (WISP)

Provides wireless Internet access to computers and mobile devices

May require a wireless modem

Data transfer in Internet (Cont.)

How a Home User's Data and Information Might Travel the Internet Using a Cable Modem Connection

Step 1

You initiate an action to request data or information from the Internet. For example, you request to display a Web page on your computer screen.



Step 2

A cable modem transfers the computer's digital signals to the cable television line in your house.



Step 3

Your request (digital signals) travels through cable television lines to a central cable system, which is shared by up to 500 homes in a neighborhood.



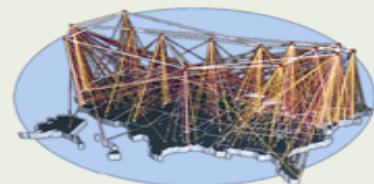
Step 4

The server retrieves the requested Web page and sends it back through the Internet backbone to your computer.



Step 5

The ISP routes your request through the Internet backbone to the destination server (in this example, the server that contains the requested Web site).



Data transfer in Internet (Cont.)

Protocols used in the network:

- TCP
- IP

TCP – Transmission Control Protocol

- *Based on the Arpanet concept*
- *Specifies that information should be broken down into data packets of 1500 characters*
- *ensured that messages were properly routed from sender to receiver and that they arrived intact.*

Data transfer in Internet (Cont.)

IP – Internet Protocol

- *Specifies that each computer on the Internet should be assigned a unique address*
- *The data packets should contain the sending and receiving computers' addresses*

*The combined set of protocols is now commonly called **TCP/IP**.*

Data transfer in Internet (Cont.)

- The Internet does not use a central hub to direct information.
- When information is sent from your computer to another computer, the information is sent in multiple data packets which contain both the sending and receiving computers' IP addresses.
- As the packets pass through various computers on the way to its destination, it is sent to the next computer closer to its final destination.

Data transfer in Internet (Cont.)

- TCP/IP specifies how data on the Internet is sent from one computer to another, but there are different types of information that need to be handled differently.
- Different types of information should be handled differently and processed by different applications on the sending and receiving computers.
- The rules of how information should be handled on the Internet are called protocols.
 1. Web Pages -- http (hypertext transfer protocol)
 2. Email – POP (Post Office Protocol)
 3. File Transfer – FTP (File Transfer Protocol)
 4. Telnet – Terminal connection for direct communication

Online Links

- 1) <http://www.slideshare.net/Shashi04/internet-technology-basics>
- 2) <http://fcit.usf.edu/internet/chap1/chap1.htm>
- 3) <http://knowledgeway.org/living/basics/>