14	File structure and indexing: overview of File organizations, Indexing structures for files, examples
15	XML databases, noSQLsystems

Assessment Methods

Written tests, assignments, quizzes, presentations as announced by the instructor in the class.

Keywords

Entity-Relationship Modeling, Database Design, Transaction Processing, noSQL systems.

Internet Technologies (BHCS11) Discipline Specific Core Course - (DSC)

Credit: 06

Course Objective

This course introduces the protocols used in Internet, its architecture, and security aspect of Internet. Student will have an insight that how a search engine works and web crawls.

Course Learning Outcomes

On successful completion of the course, students will be able to:

1. Describe Internet, its architecture, services and protocol.
2. Implement a simple search engine.
3. Implement a web crawler.
4. Use javascript technologies to make a website highly responsive, more efficient and user friendly

Detailed Syllabus

Unit 1

Introduction: Network address translation, Subnet Masking, Difference between Intranet and Internet, Working of Internet, Dynamic and Static Routing, Domain Name Server , networking tools - ipconfig, ping, netstat, traceroute

Unit 2

Introduction to Internet Protocols: HTTP, HTTPS, FTP, SMTP, IMAP, POP3, VoIP

Unit 3

Web Servers: Introduction, Working, Configuring, Hosting and Managing a Web server,

Proxy Servers: Introduction, Working, Type of Proxies, setting up and managing a proxy server

Client-side Technologies, Server-side Technologies and hybrid technologies

Unit 4

Javascript, jQuery, JSON, NODE.js, BOOTSTRAP, Introduction to forums, blogging, portfolio, developing a responsive website, Combining Web Applications and Mobile Applications

Unit 5

Search Engines - components, working, optimization, Crawling, BOTS

Unit 6

Introduction to cookies and sessions, Introduction to e-commerce websites and e-carts.

Practical

Pre-requisites for course: Programming, Computer Networks, Web-Designing (HTML, CSS, Basic JavaScript)

1. Demonstrate the use of networking tools like ping, ipconfig, netstat and traceroute.

2. Configure a web-server on a personal system.

3. Demonstrate the network monitoring of the internet traffic through any predefined tool

4. Develop an interactive website using jquery, JSON, NODE.js and BOOTSTRAP with following functionalities.

1. Design a home page and other allied pages of the website using HTML and CSS
2. Create a registration form and insert the data into tables at the backend. Creating an html form with content validation using JavaScript.
3. Handle HTML form using jQuery, store the data in JSON objects, pass them to another page and display it there using jQuery
4. Logging system to manage various types of accounts
5. Create pages with dynamic content fetching and display
6. Perform event handling in node.js

References

1. Bayross, I. (2013). *Web enabled commercial application development using HTML, JavaScript, DHTML and PHP*. 4th edition. BPB Publication.

2. DComer. (2018). *The Internet Book: Everything You need to know about Computer networking and how the internet works*. 5th edition. CRC Press.

3. Duckett, J.(2014*). JavaScript and JQuery: Interactive Front-End Web Development*. Wiley

Additional Resources

1. Godbole, A. S.& Kahate A (2008). *Web Technologies*. Tata McGrawHill

2. Greenlaw R. & Hepp E, (2007). *Fundamentals of Internet and WWW*. 2nd edition. Tata McGrawHill.

3. Jackson. (2008). *Web Technologies*. Pearson Education

4. Patel, B & Barik, L.B , *Internet & Web Technology* , Acme Learning Publisher.

5. Reddy, S., Aggarwal, A., Sayer, M., Totty, B., & Gourley, D. (2002). *HTTP: The Definitive Guide*. Media: O'Reilly Media Inc.

6. Young, M. L. (2007). *The Complete reference to Internet*. Tata: McGraw Hill.

Course Teaching Learning Process

- Use of ICT tools in conjunction with traditional class-room teaching methods
- Interactive sessions
- Class discussions

Tentative weekly teaching plan is as follows:

Week	Content
1-2	Network address translation, Subnet Masking, Difference between Intranet and Internet, Working of Internet, Dynamic and Static Routing, Domain Name Server, networking tools - ipconfig, ping, netstat, traceroute
3	Introduction to Internet Protocols - HTTP, HTTPS, FTP, SMTP, IMAP, POP3, VoIP
4-7	Web Servers: Working, Configuring, Hosting and Managing a Web server Proxy Servers: Working, Type of Proxies, setting up and managing a

	proxy server, Client-side Technologies, Server-side Technologies and hybrid technologies
8-10	avascript, JSON jQuery
11-12	NODE.js, BOOTSTRAP
13-14	Introduction to forums, blogging, portfolio, Developing a responsive website, combining Web Applications and Mobile Applications
15	Search Engines - components, working, optimization, Crawling, BOTS Introduction to cookies and sessions, e-commerce websites and e-carts

Assessment Methods

Written tests, assignments, quizzes, presentations as announced by the instructor in the class.

Keywords

Internet, networks, JSON, AJAX, JQUERY, web application

Theory of Computation (BHCS12) Discipline Specific Core Course - (DSC)

Credit: 06

Course Objective

This course introduces formal models of computation, namely, finite automaton, pushdown automaton, and Turing machine; and their relationships with formal languages. Students will also learn about the limitations of computing machines.

Course Learning Outcomes

On successful completion of the course, a student will be able to:

1. Design a finite automaton, pushdown automaton or a Turing machine for a problem at hand.
2. Apply pumping lemma to prove that a language is non-regular/non-context-free.
3. Describe limitations of a computing machine.

Detailed Syllabus