

**Department of Computer Science
University of Delhi**

**Model Curricula under UGCF
June 2022**

DRAFT

TABLE-7

Illustration - 2: Sample UGCF for Courses of Study with more than Core Discipline

Semester	Core (DSC)	Elective (DSE)	Generic Elective (GE)	Ability Enhancement	Still Enhancement	Internship Appendix	Value Addition course (VAC)	Total Credits
I	DSC-1 (A/B) Introduction to Programming using C++						from a pool of courses (2)	
	Discipline A1 Programming Fundamentals using Python							
	Discipline- B1 (4)							
II	DSC-2 (A/B) Data Structures		Choose one from a				Choose one from a pool of courses (2)	22 credits
	Discipline -A2 Data Visualization Using Python							
	Discipline- B2 (4)							
Students on exit shall be awarded Under Semesters 1 and II						g the requisite 44 credits in		Total= 44
III	DSC-3 (A/B) Computer System Architecture		Choose one from			Intern ship/ Apprenticeship / Project / Community Outreach	Choose one from a pool of courses (2)	22 credits
	Discipline - A3 Database Management System I							
	Discipline - B3 (4)							
IV	DSC-4 (A/B) Operating Systems		Choose one from			Intern ship/ Apprenticeship / Project / comm unity outreach	Choose one from a pool of courses (2)	22 Credits
	Discipline - A4 Introduction to Web Programming							
	Discipline - B4 (4)							
Students on exit shall be awarded Under completion of Semester IV						the requisite 88 credits on		Total= 88

V	DSC - 5 (A/B) Database Management System II	Choose one from a pool of courses DSE-1 (A/B) (4)			Intern ship/ Apprenticeship/ Project / Research / Community		22 credits
	Discipline - A5 Multimedia and Its Applications						
	Discipline - B5 (4)						
VI	DSC- 6 (A/B) Computer Networks	Choose one from a pool of courses DSE-2 (A/B) (4)	Pool of courses G (4)		Intern ship/ Apprenticeship / Project / Research /Community Outreach (2)		22 credits
	Discipline - A6 Introduction to Cyber Security						
	Discipline - B6 (4)						
Students on exit shall be awarded Bachelor of (in the Field of Multidisciplinary Study) after securing the requisite 132 credits on completion of Semester VI							Total= 132

VII	DSC-13 (4) Design and Analysis of Algorithms	Choose three DSE (3x4) courses OR Choose two DSE- (2x4) and one GE course OR Choose one DSE (4) and two GE (2x4) courses (total= 12)				Dissertation on Major OR Dissertation on Minor OR Academic project/ Entrepreneurship (6)	22 credits
VIII	DSC-14 (4) Information Security	Choose three DSE (3x4) courses OR Choose two DSE- (2x4) and one GE course OR Choose one DSE (4) and two GE (2x4) courses (total= 12)				Dissertation on Major OR Dissertation on Minor OR Academic project/ Entrepreneurship (6)	22 credits
Students on exit shall be awarded Bachelor of (in the field of Multidisciplinary Study) (Honours or Honours with Academic Project/Entrepreneurship) after securing the requisite 176 credits on completion of Semester VIII							Total= 176



Department of Computer Science

University of Delhi

Curriculum

Multidisciplinary Courses of Study with Two Core Disciplines

under UGCF 2022

University of Delhi

Approved in

UG Committee meeting held on May 17, 2022

Faculty of Mathematical Sciences meeting held on May 25, 2022

1. [Table of DSCs](#)
2. [Table of Discipline Courses](#)

Table of DSCs

Semester	DSC -No.	Title	L	T	P	Total credits	Desirable but not Prerequisite
I	DSC 01	Introduction to Programming using C++	3	0	1	4	Nil
II	DSC 02	Data structures	3	0	1	4	DSC 01
III	DSC 03	Computer System Architecture	3	0	1	4	Nil
IV	DSC 04	Operating systems	3	0	1	4	DSC01 , DSC 02
V	DSC 05	Database Management System II	3	0	1	4	Nil
VI	DSC 06	Computer Networks	3	0	1	4	DSC 02 DSC 01 /a course in C/C++ at plus 2 level/** DSC 04
VII	DSC 07	Design and Analysis of Algorithms	3	1	0	4	DSC 02
VIII	DSC 08	Information Security	3	0	1	4	

Table of Discipline Courses

Semester	Discipline	Title	L	T	P	Total credits	Desirable but not Prerequisite
I	A1	Programming Fundamentals Using Python	3	0	1	4	Nil
II	A2	Data Visualization using Python	2	0	2	4	A1
III	A3	Database Management System I	3	0	1	4	Nil
IV	A4	Introduction to Web Programming	3	0	1	4	Nil
V	A5	Multimedia and its Applications	2	0	2	4	Nil
VI	A6	Introduction to Cyber Security (under preparation)	3	0	1	4	

Note: Batch size for Practicals will be (8-10) and Tutorials will be (12-15).

DSC 01: Introduction to Programming Using C++

Course Objective

This course is designed to introduce programming concepts using C++ to students. The course aims to develop structured as well as object-oriented programming skills using C++

programming language. The course also aims to achieve competence amongst its students to develop correct and efficient C++ programs to solve problems spanning multiple disciplines.

Course Learning Outcomes

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

1. Write simple programs using built-in data types of C++.
2. Implement arrays and user defined functions in C++.
3. Solve problems spanning multiple disciplines using suitable programming constructs in C++.
4. Solve problems spanning multiple disciplines using the concepts of object oriented programming in C++.

Syllabus

Unit 1 Introduction to C++: Need and characteristics of Object-Oriented Programming, Structure of a C++ Program (main () function, header files, output, input, comments), compile and execute a simple program.

Unit 2 Data types and Expressions: Keywords, built in data types, variables and constants, naming convention, Input-Output statements, operators and their precedence, expressions, typecasting, library functions.

Unit 3 Control Constructs in C++: Decision making using selection constructs, iteration using looping constructs.

Unit 4 Arrays, Pointers and User defined functions: Defining and initializing single and multi-dimensional arrays, user defined functions, passing arguments to functions, returning values from functions, inline functions, default arguments, introduction to pointers.

Unit 5 Classes and Objects: Need and implementation of abstraction creating classes, objects as function arguments, modifiers and access control, constructors and destructors.

References

1. E. Balaguruswamy, *Object Oriented Programming with C++*, 7th edition, McGraw-Hill Education, 2017.
2. Robert Lafore, *Object Oriented Programming in C++*, 4th edition, SAMS Publishing, 2008.

Additional References

- (i) D.S. Malik, *C++ Programming: From Problem Analysis to Program Design*, 6th edition, Cengage Learning, 2013.
- (ii) Herbert Schildt, *C++: The Complete Reference*, 4th Edition, McGraw Hill, 2003.

Suggested Practical List

1. Write a program to find the largest of n natural numbers.
2. Write a program to find whether a given number is prime or not.
3. Write a program that takes a positive integer n and the produce n lines of output as shown:
*
* *
* * *
* * * *
(for n = 4)
4. Write a menu driven program for following:
 - a. to check whether a given number is odd or even.
 - b. display a fibonacci series
 - c. compute factorial of a number
5. Write a program to accept a number, reverse it and print the sum of its digits.
6. Write a program using functions to print the series and its sum:
 $1 + 1/2! + 1/3! + \dots + 1/n!$
7. Write a program to perform the following operations on an input string
 - a. Print length of the string
 - b. Find frequency of a character in the string
 - c. Print whether characters are in uppercase or lowercase

- d. to check whether a given string is palindrome or not.
8. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
9. Design a class named Vehicle, having registration number and year as its private members. Define a suitable constructor and a method to print the details of a vehicle. Write a C++ program to test the above class.
10. Inherit a class Car from the Vehicle class defined above. Add model to the Car class. Define a suitable constructor and a method to print the details of a car. Write a C++ program to test inheritance of this class.

DSC 02: Data Structures

Course Objective

The course aims at developing the ability to use basic data structures like arrays, stacks, queues, lists, trees to solve problems. C++ is chosen as the language to understand implementation of these data structures.

Course Learning Outcomes

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

1. Compare two functions for their rates of growth.
2. Understand abstract specification of data-structures and their implementation.
3. Compute time and space complexity of operations on a data-structure.
4. Identify the appropriate data structure(s) for a given application and understand the trade-offs involved in terms of time and space complexity.
5. Apply recursive techniques to solve problems.

Syllabus

Unit 1 Arrays, Linked Lists, Stacks, Queues, Deques: Arrays: array operations, applications, sorting, two-dimensional arrays, dynamic allocation of arrays; Linked Lists: singly linked lists, doubly linked lists, circularly linked lists, Stacks: stack as an ADT, implementing stacks using arrays, implementing stacks using linked lists, applications of stacks; Queues: queue as an ADT, implementing queues using arrays, implementing queues using linked lists, double-ended queue as an ADT.

Unit 2 Searching and Sorting : Linear Search, Binary Search, Insertion Sort, Count Sort.

Unit 3 Recursion: Recursive functions, linear recursion, binary recursion.

Unit 4 Trees, Binary Trees: Trees: definition and properties, binary trees: definition and properties, traversal of binary trees.

Unit 5 Binary Search Trees: insert, delete (by copying), search operations.

References

1. Goodrich, M.T., Tamassia, R., & Mount, D., *Data Structures and Algorithms Analysis in C++*, 2nd edition, Wiley, 2011.
2. Cormen, T.H., Leiserson, C.E., Rivest, R. L., Stein C. *Introduction to Algorithms*, 4th edition, Prentice Hall of India, 2022.
3. Drozdek, A., *Data Structures and Algorithms in C++*, 4th edition, Cengage Learning, 2012.

Additional references

- (i) Sahni, S. *Data Structures, Algorithms and applications in C++*, 2nd edition, Universities Press, 2011.
- (ii) Langsam Y., Augenstein, M. J., & Tanenbaum, A. M. *Data Structures Using C and C++*, Pearson, 2009.

Suggested Practical List

1. Perform matrix addition and multiplication.
2. Implement following recursive functions:
 - a. Factorial of a number
 - b. Nth fibonacci number
 - c. Power function: x^y
3. Implement singly linked lists.
3. Implement doubly linked lists.
4. Implement circular linked lists.
5. Implement stack data structure and its operations using arrays.
6. Implement stack data structure and its operations using linked lists.
7. Convert Prefix expression to Infix and Postfix expressions, and evaluate.
8. Implement queue data structure and its operations using arrays.
9. Implement queue data structure and its operations using linked lists.
10. Implement Binary Trees and its traversals.

DSC 03: Computer System Architecture

Course Objective

This course introduces the students to the fundamental concepts of digital computer organization, design and architecture. It aims to develop a basic understanding of the building blocks of the computer system and highlights how these blocks are organized together to architect a digital computer system.

Course Learning Outcomes

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

1. Design Combinational Circuits using basic building blocks. Simplify these circuits using Boolean algebra and Karnaugh maps. Differentiate between combinational circuits and sequential circuits.
2. Represent data in binary form, convert numeric data between different number systems and perform arithmetic operations in binary.
3. Determine various stages of the instruction cycle and describe interrupts and their handling.
4. Explain how the CPU communicates with memory and I/O devices.
5. Simulate the design of a basic computer using a software tool.

Syllabus

Unit 1 Introduction: Logic gates, Boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexers, registers, memory units.

Unit 2 Data Representation and Computer Arithmetic (of integers): Number systems, complements, fixed and floating-point representation, character representation, Addition, subtraction, Magnitude comparison.

Unit 3 Central Processing Unit: Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control

Unit 4 Basic Computer Organization and Design: Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt.

Unit 5 Programming the Basic Computer: Instruction formats, addressing modes, instruction codes, machine language, assembly language.

Unit 6 Input – Output Organization: Peripheral devices, I/O interface, asynchronous data transfer, priority interrupt.

References

1. M. Morris Mano, *Computer System Architecture*, 3rd edition, Pearson Education, 2017.

Additional References

- (i) D. Comer, *Essentials of Computer Architecture*, 2nd edition, CRC Press, 2017.
- (ii) Linda Null, Julia Lobur, *Essentials of Computer Organization and Architecture*, 5th Edition, 2019.

Suggested Practical List

1. Write a program to convert unsigned number from binary to octal, hex to decimal.
2. Write a program to convert unsigned number from decimal to binary, octal, hex.
3. Write a program that will prompt for the input of two integer values. Then using the bitwise shift operators show the result of
 - a) Left shifting the first number by the second.
 - b) Right shifting the first number by the second.
4. Write a program that will prompt for the input of two integer values. Then using the bitwise shift operators show the result of
 - a) Exclusive OR of the first number by the second bitwise.
 - b) OR of the first number by the second bitwise.
 - c) AND of the first number by the second bitwise.
5. Write a program that will prompt for the input of a binary value and display its 1's complement value.
6. Write a program that will prompt for the input of a binary value and display its 2's complement value.
7. Write a program that will prompt for the two inputs to implement binary addition operation.
8. Write a program that will prompt for the two input to implement binary subtraction using 2's complement.

DSC 04: Operating Systems

Course Objective

The course introduces Operating System and its importance in computer systems. The focus is to explain the common services provided by an operating system like process management, memory (primary, secondary & virtual) management, I/O management, file management. The course talks about the various functional components of the operating system and their design.

Course Learning Outcomes

At the successful completion of the course, students will also be able to gain knowledge of different concepts of the operating System and its components. They would learn about shell scripts and would be able to use the system in an efficient manner.

Syllabus

Unit 1 Introduction: Operating Systems (OS) definition and its purpose, Multiprogrammed and Time Sharing Systems, OS Structure, OS Operations: Dual and Multi-mode, OS as resource manager.

Unit 2 Operating System Structures: OS Services, System Calls: Process Control, File Management, Device Management, and Information Maintenance, Inter-process Communication, and Protection, System programs, OS structure- Simple, Layered, Microkernel, and Modular.

Unit 3 Process Management: Process Concept, States. Process Control Block, Context Switch, Process scheduling, Schedulers, Overview of threads and Scheduling Algorithms: First Come First Served, Shortest-Job-First, Priority & Round-Robin.

Unit 4 Memory Management: Physical and Logical address space, Swapping Contiguous memory allocation strategies - fixed and variable partitions, Segmentation, Paging, virtual memory: Demand Paging.

Unit 5 File and Input / Output Device Management: File Concepts, File Attributes, File Access Methods, Directory Structure: Single-Level, Two-Level, Tree-Structured, and Acyclic-Graph Directories, Magnetic Disks, Solid-State Disks, Magnetic Tapes.

Unit 6 Shell Scripting: Shell variables, parameter passing conditional statements, iterative statements, writing and executing shell scripts, utility programs (cut, paste, grep, echo, pipe, filter etc.)

References

1. Galvin, S. P. B., Gagne, G., *Operating System Concepts*, 9th edition, John Wiley Publications, 2016.
2. Das, S., *Unix: Concepts and Applications*, 4th Edition, TMH, 2009.

Additional References

- (i) Dhamdhere, D. M., *Operating Systems: A Concept-based Approach*, 2nd edition, Tata McGraw-Hill Education, 2017.
- (ii) Kernighan, B. W., Pike, R., *The Unix Programming Environment*, Englewood Cliffs, NJ: Prentice-Hall, 1984.
- (iii) Stallings, W., *Operating Systems: Internals and Design Principles*, 9th edition, Pearson Education, 2018.
- (iv) Tanenbaum, A. S., *Modern Operating Systems*, 3rd edition. Pearson Education, 2007.

Suggested Practical List

1. Usage of following commands: ls, pwd, cat, who, rm, mkdir, rmdir, cd.
2. Usage of following commands: cal, cat(append), cat(concatenate), mv, cp, man, date.
3. Usage of following commands: chmod, grep, bc.
4. Write a shell script to display date in the mm/dd/yy format.
5. Write a shell script to display the multiplication table of a given number.
6. Write a shell script to find the factorial of a given number.
7. Program to show the pyramid of special character “*”.
8. Write a shell script to find the sum of digits of a given number.
9. Write a shell script to perform the tasks of a basic calculator.
10. Write a shell script to find the power of a given number.
11. Write a shell script to check whether the number is Armstrong or not.
12. Write a shell script to find the GCD (greatest common divisor) of two numbers.
13. Write a shell script to check if the number entered at the command line is prime or not.
14. Write a shell script to display on the screen sorted output of “who” command along with the total number of users.
15. Write a shell script to accept a login name. If not a valid login name display message – “Entered login name is invalid”.

16. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.
17. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
18. Write a shell script to check whether the file has all the permissions or not.
19. Write a shell script to modify “cal” command to display calendars of the specified months.
20. Write a shell script to modify “cal” command to display calendars of the specified range of months.

DSC 05: Database Management System II

Course Objective

The course will give an overview of categories of data models used by database management systems and writing queries in relational algebra. The importance of file indexing and controlled execution of transactions will be taught. The course would give students hands-on practice to write complex queries, nested queries using aggregate functions in SQL and to use basic database administration commands.

Course Learning Outcomes

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

1. Write queries using relational algebra, a procedural language.
2. Use the concept of functional dependencies to remove data anomalies and arrive at normalized database design.
3. Understand the data storage system, file organization and need of file indexing.
4. Learn the importance of transaction processing and concurrency control.
5. Write complex and nested SQL queries, and learn basic database administration commands.
6. Acquire information about emerging technologies.

Unit 1 Data models and Relational Algebra: Categories of data models, types of database users, Relational Algebra Operations from SET Theory, SELECT, PROJECT, JOIN, DIVISION Operations.

Unit 2 Normalization: Functional dependencies, minimal cover, normalizing database with multiple keys till 3NF, Boyce-Codd Normal Form

Unit 3 Database Storage and index Structures: Storage of data, file structure, file organization and its types: Sequential, Heap and Indexed, Hash file, need for file Indexing, single- and multi-level indexing.

Unit 4 Transaction Processing: Concurrent execution of transactions and their handling, ACID properties, need of data recovery and log files.

Unit 5 Advanced SQL: Nested and complex queries using Inner JOIN, Left JOIN, Right JOIN, Full JOIN, views, Database Administration Commands: COMMIT, ROLLBACK, drop database, control permissions etc.

Unit 6 Emerging Technology: Distributed Database Concepts, Introduction to emerging technologies like Data Warehousing and OLAP, Data Mining.

References

1. Elmasri R. and Navathe B. S. *Fundamentals of Database Systems*, 7th Edition, Pearson Education, 2016.
2. Murach J. *Murach's MySQL*, 3th Edition, Pearson, 2019.

Additional References

- (i) Silberschatz, A., Korth, H.F., & Sudarshan, S. *Database System Concepts*, 8th Edition, McGraw Hill, 2019.
- (ii) Ramakrishnan, R. & Gehrke, J. *Database Management Systems*, 3rd Edition, Tata McGraw Hill Education, 2014.

Suggested Practical List

MySQL might be used for practical purposes.

The following concepts must be introduced to the students:

- Multiple table queries (join on different and same tables)
- Nested select statements
- Set manipulation using (any, in, contains, all, not in, not contains, exists, not exists, union, intersect, minus, etc.)
- Categorization using group by.....having
- Arranging using order by

List of sample queries to be done using the above schema.

Create tables with relevant column and integrity constraints and populate the tables with data.

Perform the following queries on the database:

1. Display all the details of all employees working in the company.
2. Display ssn, lname, fname, address of employees who work in department no 7.
3. Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong' and who is a manager
4. Retrieve the name and salary of every employee working in department 'Production'
5. Display maximum and minimum salaries of each department
6. Retrieve all employee names whose address is in 'Bellaire' and working on at least one project
7. Modify the datatype of hours column to float in works_on table.
8. Retrieve all employees who age is more than 35 years
9. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
10. Add another column named "Join_Date" in the employee table and "Address" in the department table
11. Retrieve the names of all employees who do not have supervisors
12. Retrieve SSN and department name for all employees
13. Retrieve the name and address of all employees who work for the 'Research' department
14. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birthdate
15. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor
16. Retrieve all combinations of Employee Name and Department Name
17. Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan' either as a worker or as a manager of the department that controls the project
18. Increase the salary of all employees working on the 'ProductX' project by 15%. Retrieve employee name and increased salary of these employees
19. Retrieve a list of employees and the project name each works in, ordered by the employee's department, and within each department ordered alphabetically by employee first name
20. Select the names of employees whose salary does not match with salary of any employee in department 10
21. Drop the column "Join_Date" from the employee table
22. Retrieve the name of each employee who has a dependent with the same first name and same sex as the employee
23. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.
24. Change the name of existing table DEPT_LOCATIONS to DLOCATIONS

25. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary for each department. Display with proper headings
 26. Find the sum of the salaries and number of employees of the 'Marketing' department, as well as the maximum salary, the minimum salary, and the average salary in this department
 27. Select the names of employees whose salary is greater than the average salary of all employees in department 10
 28. For each department, retrieve the department number, the number of employees in the department and their average salary
 29. For each project, retrieve the project number, the project name, and the number of employees who work on that project for more than 10 hours
 30. Change the location and controlling department number for all projects having more than 5 employees to 'Bellaire' and 6 respectively
 31. For each department having more than 10 employees, retrieve the department name, number of employees drawing more than 40,000 as salary
 32. Display employee names having no dependent in descending order along with their age
 33. For each department, find the number of female and number of male employees along with name of manager of that department
 34. Find the name and age of youngest employee in each department
 35. Change the name of MINIT attribute of an employee table to MNAME using alter command
 36. Create a view to keep names of employees and their department names if they are not working on any project
 37. Create a view to keep track of all employee names who are working on same projects as that of employee 'Franklin T. Wong'
 38. Execute system administrative commands like commit, rollback, granting control permissions, etc.
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DSC 06: Computer Networks

Course Objective

The course objectives of this paper are to:

Understand the concepts behind computer networks and data communication.

Learn the different types of networks, network topologies and their characteristics.

Learn the working of protocols used at various layers.
Understand the utility of different networking devices.

Course Learning Outcomes

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

1. differentiate between various types of computer networks and their topologies.
2. understand the difference between the OSI and TCP/IP protocol suit.
3. distinguish between different types of network devices and their functions.
4. design/implement data link and network layer protocols in a simulated networking environment.

Syllabus

Unit 1 Review of: Types of computer networks, Internet, Intranet, network topologies (bus, star, ring, mesh, tree, hybrid topologies), network classifications. layered architecture approach, OSI Reference Model, TCP/IP Reference Model. Transmission Modes: simplex, half duplex and full duplex.

Unit 2 Physical Layer: Analog signal, digital signal, the maximum data rate of a channel, transmission media (guided transmission media, wireless transmission, satellite communication), multiplexing (frequency division multiplexing, time-division multiplexing, wavelength division multiplexing). Guided Media (Wired) (Twisted pair, Coaxial Cable, Fiber Optics). Unguided Media (Radio Waves, Infrared, Micro-wave, Satellite).

Unit 3 Data Link and MAC Layer: Data link layer services, error detection and correction techniques, error recovery protocols (stop and wait, go back n, selective repeat), multiple access protocols with collision detection, MAC addressing, Ethernet, data link layer switching, point-to-point protocol.

Unit 4 Network layer: Networks and Internetworks, virtual circuits and datagrams, addressing, subnetting, Dijkstra Routing algorithm, Distance vector routing, Network Layer protocol- (ARP, IPV4, ICMP).

Unit 5 Transport and Application Layer: Process to process Delivery- (client-server paradigm, connectionless versus connection-oriented service); User Datagram Protocols, TCP/IP protocol, Flow Control. FTP (File Transfer Protocol), SMTP (Simple Mail Transfer Protocol), Telnet (Remote login protocol), WWW (World Wide Web), HTTP (HyperText Transfer Protocol), URL (Uniform Resource Locator).

References

1. Tanenbaum, A.S. & Wethrall, D.J. *Computer Networks*, 5th edition. Pearson Education, 2012
2. Forouzan, B. A. *Data Communication and Networking*, 4th edition. McGraw-Hill Education, 2017

Additional References

- (i) Comer, D. E. *Computer Networks and Internet*, 6th edition. Pearson Education, 2015.
- (ii) Stallings, W. *Data and Computer Communications*, 10th edition. Pearson education India, 2017.

Suggested Practical List

1. Simulate Cyclic Redundancy Check (CRC) error detection algorithm for noisy channel.
2. Simulate and implement stop and wait protocol for noisy channel.
3. Simulate and implement go back n sliding window protocol.
4. Simulate and implement selective repeat sliding window protocol.
5. Simulate and implement distance vector routing algorithm.
6. Simulate and implement the Dijkstra algorithm for shortest-path routing.

DSC 07: Design and Analysis of Algorithms

Course Objective

The course is designed to develop understanding of different algorithm design techniques and use them for problem solving. The course shall also enable the students to verify correctness of algorithms and analyze their time complexity.

Course Learning Outcomes

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

1. Compute and compare the asymptotic time complexity of algorithms.
2. Use appropriate algorithm design technique(s) for solving a given problem.
3. Apply hashing and collision resolution techniques.

Syllabus

Unit 1 Sorting, Selection: Insertion Sort, Linear Time Sorting - Count Sort, Radix Sort, Selection Problem. Analysis of time complexity of all algorithms.

Unit 2 Graphs: Graph, representation of graphs, traversal of graphs, directed graphs, Directed Acyclic Graphs and Topological Ordering; all with analysis of time complexity.

Unit 3 Divide and Conquer: Introduction to divide and conquer technique, Merge Sort, Quick Sort with analysis of time complexity.

Unit 4 Greedy algorithms: Introduction to the Greedy algorithm design approach, application to minimum spanning trees, fractional knapsack problem, shortest path problem with analysis of time complexity.

Unit 5 Dynamic Programming: Introduction to the Dynamic Programming approach, application to weighted interval scheduling, integer knapsack problem with analysis of time complexity.

Unit 6 Hash Tables: Hash Functions, Collision resolution schemes.

References

1. Cormen, T.H., Leiserson, C.E., Rivest, R. L., Stein C. *Introduction to Algorithms*, 4th edition, Prentice Hall of India, 2022.
2. Kleinberg, J., Tardos, E., *Algorithm Design*. 1st edition. Pearson, 2013.

Additional References

- (i) Basse, S., Gelder, A. V. *Computer Algorithms: Introduction to Design and Analysis* 3rd edition. Pearson. 1999.

Suggested Practical List

1. Implement Insertion Sort, Selection sort, Bubble Sort (The program should report the number of comparisons).
2. Implement Merge Sort (The program should report the number of comparisons).
3. Implement Quick sort (The program should report the number of comparisons).
4. Implement Radix Sort.
5. Implement Count Sort.
6. Implement Searching Techniques: Linear and binary.
7. Implement BFS traversal on a graph.
8. Implement DFS traversal on a graph.
9. Implement 0-1 knapsack problem using DP

DSC 08: Information Security

Course Objective

The goal of this course is to make a student learn basic principles of information security. Over the due course of time, the student will be familiarized with cryptography, authentication and

access control methods along with software security. Potential security threats and vulnerabilities of systems are also discussed along with their impacts and countermeasures. This course also touches upon the implications of security in cloud and Internet of Things (IoT).

Course Learning Outcomes

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

1. Identify the major types of threats to information security.
2. Describe the role of cryptography in security.
3. Discover the strengths and weaknesses of private and public key cryptosystems.
4. Identify and apply various access control and authentication mechanisms.
5. Discuss data and software security and related issues.
6. Explain network security threats and attacks.
7. Articulate the need for security in cloud and IoT.

Unit 1 Overview: Computer Security Concepts, Threats, Attacks, and Assets, Security Functional Requirements, Fundamental Security Design Principles.

Unit 2 Cryptographic tools: Confidentiality with Symmetric Encryption, Message Authentication and Hash Functions, Public-Key Encryption, Digital Signatures and Key Management, Random and Pseudorandom Numbers, Practical Application: Encryption of Stored Data.

Unit 3 User authentication and Access Control: Digital User Authentication Principle, Password-Based Authentication, Remote User Authentication, Security Issues for User Authentication Access Control Principles, Subjects, Objects, and Access Rights, Discretionary Access Control, Example: UNIX File Access Control, Role-Based Access Control, Attribute-Based Access Control, Identity, Credential, and Access Management, Trust Frameworks.

Unit 4 Database and Data Center Security: The Need for Database Security, SQL Injection Attacks, Database Access Control.

Unit 5 Software Security: Types of Malicious Software, Advanced Persistent Threat, Propagation — Infected Content - Viruses, Propagation — Vulnerability Exploit - Worms, Propagation — Social Engineering — SPAM E-Mail, Trojans, Payload — System Corruption, Payload — Attack Agent — Zombie, Bots, Payload — Information Theft — Keyloggers, Phishing, Spyware, Payload — Stealthing — Backdoors, Rootkits, Countermeasures. **Overflow Attacks** - Stack Overflows, Defending Against Buffer Overflows, Other Forms of Overflow Attacks. **Software Security Issues** - Handling Program Input, Writing Safe Program Code, Handling Program Input.

Unit 6 Network Security: Denial-of-Service Attacks, Flooding Attacks, Distributed Denial-of-Service Attacks, Overview of Intrusion Detection, Honeypots, The Need for Firewalls, Firewall Characteristics and Access Policy, Types of Firewalls, Public-Key Infrastructure.

Unit 7 Wireless, Cloud and IoT Security: Cloud Computing, Cloud Security Concepts, Cloud Security Approaches, The Internet of Things, IoT Security. Wireless Security Overview, Mobile Device Security.

References

1. W. Stallings and L. Brown, *Computer Security: Principles and Practice*, 4th edition, Pearson Education, 2018.

Additional References

- (i) Pfleeger C.P., Pfleeger S.L., Margulies J. *Security in Computing*, 5th edition, Prentice Hall, 2015.
- (ii) Lin S., Costello D.J., *Error Control Coding: Fundamentals and applications*, 2nd edition, Pearson Education, 2004.
- (iii) Stallings W. *Cryptography and network security*, 7th edition, Pearson Education, 2018.
- (iv) Berlekamp E. *Algebraic Coding Theory*, World Scientific Publishing Co., 2015.
- (v) Stallings W. *Network security essentials Applications and Standards*, 6th edition, Pearson Education, 2018.
- (vi) Whitman M.E., Mattord H.J., *Principle of Information Security*, 6th edition, Cengage Learning, 2017.
- (vii) Bishop M., *Computer Security: Art and Science*, 2nd Revised edition, Pearson Education, 2019.
- (viii) Anderson R.J., *Security Engineering: A guide to building Dependable Distributed Systems*, 2nd edition, John Wiley & Sons, 2008.

Suggested Practical List

1. Demonstrate the use of Network tools: ping, ipconfig, ifconfig, tracert, arp, netstat, whois.
2. Use of Password cracking tools : John the Ripper, Ophcrack. Verify the strength of passwords using these tools.
3. Use nmap/zenmap to analyze a remote machine.
4. Use Burp proxy to capture and modify the message.
5. Implement caesar cipher substitution operation.
6. Implement monoalphabetic and polyalphabetic cipher substitution operation.
7. Implement playfair cipher substitution operation.

8. Implement hill cipher substitution operation.
9. Implement rail fence cipher transposition operation.
10. Implement row transposition cipher transposition operation.
11. Implement product cipher transposition operation.



A1 : Programming Fundamentals Using Python

Course Objective

This course is designed to introduce programming concepts using Python to students. The course aims to develop structured as well as object-oriented programming skills using Python. The course also aims to achieve competence amongst its students to develop correct and efficient Python programs to solve problems spanning multiple disciplines.

Course Learning Outcomes

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

1. Write simple programs using built-in data types of Python.
2. Implement arrays and user defined functions in Python.
3. Solve problems spanning multiple disciplines using suitable programming constructs in Python.
4. Solve problems spanning multiple disciplines using the concepts of object oriented programming in Python.

Syllabus

Unit 1 Introduction to Python Programming: Problem solving strategies; Structure of a Python program; Syntax and semantics; Python interpreter/shell, indentation; Executing simple programs in Python.

Unit 2 Creating Python Programs: Identifiers and keywords; literals, numbers, and strings; Operators and expressions; Input and output statements; control structures (conditional statements, loop control statements, break, continue and pass), Errors and exception handling.

Unit 3 User Defined Functions: Defining functions, passing arguments and returning values, default arguments

Unit 4 Built-in data structures: Strings, Lists, Tuples, Sets, Dictionaries; their built-in functions, operators and operations.

References

1. Kamthane, A. N., & Kamthane, A.A. *Programming and Problem Solving with Python*, McGraw Hill Education. 2017.
2. Balaguruswamy E., “*Introduction to Computing and Problem Solving using Python*”, 2nd Edition, McGraw Hill Education, 2018.
3. Taneja, S., Kumar, N. *Python Programming- A modular Approach*. Pearson Education India, 2018.

Additional References

- (i) Guttag, J. V. *Introduction to computation and programming using Python*. MIT Press. 2018
- (ii) Downey, A. B. *Think Python–How to think like a Computer Scientist* 2nd Edition. O’Reilly 2015

Suggested Practical List

1. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of three subjects are to be input by the user. Assign grades according to the following criteria:

Grade A : if Percentage ≥ 80
Grade B : if Percentage ≥ 60 and Percentage < 80
Grade C : if Percentage ≥ 40 and Percentage < 60
Grade D : if Percentage ≤ 40

2. WAP to print factors of a given number.
3. WAP to add N natural numbers and display their sum.
4. WAP to print the following conversion table (use looping constructs):

Height(in Feet)	Height(in inches)
5.0ft	60 inches
5.1ft	61.2inches

5.8ft	69.6inches
5.9ft	70.8inches
6.0ft	72inches

5. WAP that takes a positive integer n and the produce n lines of output as shown:

*

* *

* * *

* * * *

(for n =4)

6. Write a menu driven program using user defined functions to print the area of rectangle, square, circle and triangle by accepting suitable input from user.
7. Write a function that calculates factorial of a number n.
8. WAP to print the series and its sum: (use functions)
- $$1/1! + 1/2! + 1/3! + \dots + 1/n!$$
9. WAP to perform the following operations on an input string
- Print length of the string
 - Find frequency of a character in the string
 - Print whether characters are in uppercase or lowercase
10. WAP to create two lists: one of even numbers and another of odd numbers. The program should demonstrate the various operations and methods on lists.

11. WAP to create a dictionary where keys are numbers between 1 and 5 and the values are the cubes of the keys.
12. WAP to create a tuple $t1 = (1,2,5,7,2,4)$. The program should perform the following:
 - a. Print tuple in two lines, line 1 containing the first half of tuple and second line having the second half.
 - b. Concatenate tuple $t2 = (10,11)$ with $t1$.

A2 : Data Visualization using Python

Course Objective

This course introduces students to data visualization in the field of exploratory data science using Python.

Course Learning Outcomes

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

1. Import and export data using files
2. Perform data handling using Numpy arrays.
3. Load data in Pandas data frames and its manipulation.
4. Visualize data using Matplot library.

Syllabus

Unit 1 Introduction : Motivation for using Python for Data Visualization, Essential Python Libraries: NumPy, Pandas, Matplotlib, Import and Export of Data, Import and Export of data using files.

Unit 2 Array manipulation using Numpy: Numpy array: Creating Numpy arrays , Data Types for Numpy arrays, Arithmetic with NumPy Arrays Basic Indexing and Slicing, swapping axes, transposing arrays.

Unit 3 Data Manipulation using Pandas: Data Structures in Pandas: Series, DataFrame, Index objects, Loading data into Pandas data frame. Working with Data frames. Grouped and aggregate calculations

Unit 4 Plotting and Visualization: Using matplotlib to plot data: figures, subplots, markings, color and line styles, labels and legends, Plotting functions in Pandas: Line, bar, Scatter plots, histograms, stacked bars, boxplot.

References

1. McKinney W. *Python for Data Analysis: Data Wrangling with Pandas, NumPy and IPython*. 2nd edition. O'Reilly Media, 2018.
2. Chen D. Y, *Pandas for Everyone: Python Data Analysis*, Pearson, 2018.

Additional References

- (i) Molin S. *Hands-On Data Analysis with Pandas*, Packt Publishing, 2019.

Suggested Practical List

Use data set of your choice from Open Data Portal ([https:// data.gov.in/](https://data.gov.in/)) for the following exercises.

1. Practicals based on NumPy
2. Practicals based on Pandas
3. Practicals based on Data Visualization using matplotlib.

A3 : Database Management System I

Course Objective

The course introduces the students to the fundamentals of database management systems. Students will learn about the importance of database structure and its designing using conceptual approach using Entity Relationship Model and formal approach using Normalization. They will learn SQL to construct the database, manipulate and retrieve its contents.

Course Learning Outcomes

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

1. Understand the importance of a database system and its difference from the traditional file system processing.

2. Create conceptual data models using entity relationship diagrams for modeling real-life situations and map it to corresponding relational database schema.
3. Construct relational database and formulate queries for data retrieval and data update using SQL
4. Normalize a database upto 3NF to make it free from update anomalies.

Unit 1 Database: Introduction to database and DBMS, architecture of DBMS, data independence, components of database systems, difference between traditional file system and database management system.

Unit 2 Entity-Relationship Modeling: Entity types, types of attributes and key, relationships types, constraints on relationship, modeling ER diagram, Database design using ER diagrams.

Unit 3 Relational Data Model: Relational model concepts, relation characteristics, relational integrity constraints, types of keys, update anomalies.

Unit 4 Normalization: Functional dependencies, Use of normalization, First, Second and Third normal forms using single key.

Unit 5 Introduction to Structured Query Language: Overview of SQL query language, Data definition and manipulation languages, set operations. DDL: to construct the database and alter its contents, DML: Querying in SQL to retrieve data from the database, use of join and simple aggregate functions.

Suggested Practical List

MySQL might be used for practical purposes.

Suggestive list of database schemes and corresponding queries:

1. Create a database having the following three tables to store the details of students of the Computer Department in a college.

Student (Rollno, Name, DOB, Address, Phoneno)

Paper Details (Paper_code, Paper_Name)

Academic details (Rollno, Paper_code, Attendance, Marks)

1. Identify primary and foreign keys. Create the tables with keys and insert at least 5 records in each table.

2. Design a query that will return the records (from the second table) along with the name of the student from the first table, related to students who have attendance more than 75 and marks more than 60 in paper P2.
3. List all students who live in “Delhi” and have marks greater than 60 in paper with code P1.
4. Find the total attendance and total marks obtained by each student.
5. List the names of the students who have got the highest marks in paper P2.
6. Find the average marks obtained by each student.
7. Update the name of the paper with Paper code P1 from “Introduction to Computers” to “Computer Science Fundamentals”.
8. List the names of the students who have got the lowest marks in paper “Computer Science Fundamentals”.
9. List the names of all the students whose name ends with ‘sh’.
10. List the total number of students who have secured above 90 in paper P4.
11. Add another column ‘Email’ in the Student table.
12. Update the phone number of the student with Roll number 34 to ‘9888812345’.
13. List all student details whose marks in paper with code P4 are between 90 and 95.
14. Display the names of all the students in increasing order of their marks in paper P3.
15. Display the names of all the students whose marks are greater than the marks of ‘Ramesh’ in paper P2.

2. Create the following tables with primary key and foreign keys, enter at least 5 records in each table and answer the queries given below.

Suppliers (SNo, Sname, Status, SCity)

Parts (PNo, Pname, Colour, Weight, City)

Project (JNo, Jname, Jcity)

Shipment (Sno, Pno, Jno, Quantity)

1. Get supplier numbers for suppliers in Guwahati with status greater than 20.
2. Get supplier details for suppliers who supply part P2. Display the supplier list in increasing order of supplier numbers.
3. Get suppliers names for suppliers who do not supply part P2.
4. For each shipment get full shipment details, including total shipment weights computed as Weight*Quantity of corresponding parts.
5. Get all the shipments where the quantity is in the range 300 to 750 inclusive.
6. Get part nos. for parts that either weigh more than 1Kg or are supplied by suppliers S2 or both.

7. Get the names of cities that store more than two red parts.
8. Update the city of S1 supplier to “Delhi”.
9. Get part numbers for parts supplied by a supplier in Allahabad to a project in Chennai.
10. Find the names of all parts whose color starts with the letter b.
11. Change the datatype of the weight attribute in the Parts table from int to float.
12. Find the number of parts of each color.
13. Find the names of all the projects which are located in the city Jaipur and in which the part is supplied by supplier S3.
14. Delete all the projects which are located in Madras.

References

1. Elmasri R. and Navathe B. S. *Fundamentals of Database Systems*, 7th Edition, Pearson Education, 2016.
2. Murach J. *Murach's MySQL*, 3th Edition, Pearson, 2019.

Additional References

- (i) Silberschatz, A., Korth, H.F., & Sudarshan, S. *Database System Concepts*, 8th Edition, McGraw Hill, 2019.
- (ii) Ramakrishnan, R. & Gehrke, J. *Database Management Systems*, 3rd Edition, Tata McGraw Hill Education, 2014.

A4: Introduction to Web Programming

Course Objective

The course aims at introducing the basic concepts and techniques of client side web programming. The student shall be able to develop simple websites using HTML, CSS and Javascript.

Course Learning Outcomes

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

1. Build websites using the elements of HTML.
2. Build dynamic websites using the client side programming techniques with CSS, Javascript

and jQuery.

3. Learn to validate client-side data.

Syllabus

Unit 1 Introduction: Introduction to internet and web design. Basic concepts of web architecture.

Unit 2 HTML: Introduction to hypertext mark-up language (html), creating web pages, lists, hyperlinks, tables, web forms, inserting images, frames.

Unit 3 Cascading style sheet (CSS): Concept of CSS, creating style sheet, Importing style sheets, CSS properties, CSS styling (background, text format, controlling fonts), CSS rules, Style Types, CSS Selectors, CSS cascade, working with block elements and objects, working with lists and tables, CSS id and class, box model (introduction, border properties, padding properties, margin properties).

Unit 4 Javascript: Document object model, data types and variables, functions, methods and events, controlling program flow, JavaScript object model, built-in objects and operators, validations.

Unit 4 jQuery and JSON: Introduction to jQuery, syntax, selectors, events. JSON file format for storing and transporting data.

References

1. Nixon, R. (2018). Learning PHP, MySQL & JavaScript with jQuery, CSS and HTML5, O'Reilly.
2. Powell, T.A. (2010).HTML & CSS: The Complete Reference. 5th edition. Tata McGrawHill.
3. Duckett, J.(2014). JavaScript and JQuery: Interactive Front-End Web Development. Wiley

Additional References

- (i) Minnick, J. (2015). Web Design with HTML5 and CSS3. 8th edition. Cengage Learning.

- (ii) Boehm, A., & Ruvalcaba, Z. (2018). Munarch's HTML5 and CCS(4th Edition). Mike Murach & Associates.
- (iii) J. A. Ramalho (2007), Learn Advanced HTML 4.0 with DHTML, BPB Publications
- (iv) Ivan Bayross (2009), Web Enabled Commercial Application Development Using Html, Dhtml, Javascript, Perl CGI , BPB Publications.

Suggested Practical List

HTML

1. Create an HTML document with following formatting – Bold, Italics, Underline, Colors, Headings, Title, Font and Font Width, Background, Paragraph, Line Brakes, Horizontal Line, Blinking text as well as marquee text.
 2. Create an HTML document with Ordered and Unordered lists, Inserting Images, Internal and External linking
 3. Create an HTML displaying this semester's time table.
 4. Create a website with horizontal and vertical frames. Top horizontal frame showing your college's name and logo. Bottom horizontal frame split into two vertical frames. The left frame with hyperlinks to pages related to faculty, courses, student activities, etc. The right frame showing corresponding pages based on the link clicked on the leftframe.
1. Create a student registration form using HTML which has the following controls:
 - I. Text Box
 - II. Dropdown box
 - III. Option/radio buttons
 - IV. Check boxes
 - V. Reset and Submit button

CSS

Create a webpage for your department with drop down navigation menu for faculty, courses, activities, etc.. Implement the webpage using styles, rules, selectors, ID, class.

Javascript

Create event driven programs for the following:

1. Enter a number and on click of a button print its multiplication table.
2. Print the largest of three numbers entered by the user.
3. Find the factorial of a number entered by the user.
4. Enter a list of positive numbers using the prompt terminated by a zero. Find the sum and average of these numbers.

Create a student registration form using text, radio button, check box, drop down box, text field and all other required HTML elements. Customise the CSS and javascript to input and validate all data. Create functions to perform validation of each element, example:

- a. Roll number is a 7-digit numeric value
- b. Name should be an alphabetical value(String)
- c. Non-empty and valid fields like DOB

jQuery and JSON

1. Change text color and contents using button click events using jQuery
2. Select elements using ID, class, elements name, attribute name
3. Run code on click events in jQuery
4. Handle HTML form, store the data in JSON object, pass them to another page and display it there using jQuery/Javascript

A5 : Multimedia and its Applications

Course Objective

To learn about creativity and imagination for making them self- motivated artists with strength in creative vision and concept development.

Course Learning Outcomes

Introduce multimedia with the fundamentals of Art and Design, which will encourage the students for creativity and imagination. It includes Graphic Design for creating effective visual communication and web Design for global communication through a website and it offers very exciting opportunities for good jobs to students.

Syllabus

Unit 1 Introduction: Definition Multimedia and uses, applications, Hardware and Software requirements, multimedia presentation and authoring tools, LAN and multimedia, multimedia servers and database: vector graphics, 3-D graphics program, animation techniques, shading, anti-aliasing, morphing: video on demand.

Unit 2 Text and Graphics: Uses of text in multimedia, families and faces of fonts, outline fonts, bitmap fonts, International characters sets and hypertext digital font techniques.

Graphics- Introduction, types, color and color models, color palettes, vector drawing, 3-D drawing and rendering, making still images, editing and capturing images.

Unit 3 Audio and Video: Digital representation of sound, MIDI audio, MIDI vs. Digital Audio, Audio file formats, Adding sound to your multimedia project, Audio software and hardware, Video basic, how video works, broadcast video standard, Analog video, Digital video, shooting and editing video, video compression and file format.

Unit 4 Animation and multimedia authoring: Introduction, principles, types and uses, cell animation, computer animations, morphing, Animation software compression techniques: need and types of compression- lossy and lossless, CODECs, authoring basic, types of authoring tools.

Unit 5 Multimedia on the web: Introduction, Bandwidth, text on the web- Dynamic and embedded font technology, Audio and video on the web, buffering and streaming, webcasting, video conferencing.

References

1. Multimedia: Making It Work by Tay Vaughan, TataMcGraw-Hill
2. Computer Graphics and Multimedia by A. P. Godse, Technical Publication
3. Multimedia: An Introduction, Villamil and Molina, PHI
4. Sound and Video, Lozano. Multimedia, PHI

Suggested Practical List

1. Create an animated scene using the tools panel and the properties panel.
2. Create an animation using Free transform tool that should use
 - Move objects
 - Skew objects
 - Rotate objects
 - Stretch objects while maintaining proportion
3. Create an animation of Text using font, size, color and lighting effect.
4. Modify the document (changing background color etc.) using the following tools
 - Eraser tool
 - Hand tool
 - Ink bottle tool
 - Zoom tool
 - Paint Bucket tool
 - Eyedropper tool
5. Create an animated Flag
6. Create a scene to show animated walk and run cycles.(using multiple layers and motion tweening)
7. Create an animation having an images having morphing effect.
8. Create an animation using (Shape Tweening and shape hints) for transforming one shape into another.
9. Create an animation of a cartoon picture using sound.
10. Create an animation of a character using key frames.
11. Create an animation for a bouncing ball.(use motion guide layer)
12. Create an animated scene of rain using the ripple effect.

A6 : Introduction to Cyber Security

Under Preparation



Digital Empowerment

VAC- Value Addition Course
(Undergraduate Courses)
University of Delhi

Credit distribution, Eligibility and Pre-requisites of the Course

Course Title and Code	Credits	Credit Distribution of the Course			Eligibility Criteria	Prerequisite of the Course
Digital Empowerment	02	Lecture	Tutorial	Practical/ Practice	Pass in Class 12th	NIL
		1	0	1		

Learning Objectives

The Learning Objectives of this course are as follows:

- Understand the digital world and need for digital empowerment
- Create awareness about Digital India.
- Explore, communicate and collaborate in cyberspace.
- Imparting awareness on cyber safety and security.

Learning Outcomes

The Learning Outcomes of this course are as follows:

- Use ICT and digital services in daily life.
- Develop skills to communicate and collaborate in cyberspace using social platforms, teaching/learning tools.
- Understand the significance of security and privacy in the digital world.
- Recognizing ethical issues in the cyber world.

Digital Empowerment Syllabus

Unit	Unit name	Topic
I	Digital inclusion and Digital Empowerment	Needs and challenges, Vision of Digital India
		DigiLocker, E-Hospitals, e-Pathshala, BHIM, e-Kranti (Electronic Delivery of Services), e-Health Campaigns
		Public utility portals of Govt. of India such as RTI, Health, Finance, Income Tax filing, Education
II	Communication and Collaboration in the Cyberspace	Electronic Communication: electronic mail, blogs, social media
		Collaborative Digital platforms
		Tools/platforms for online learning, Collaboration using file sharing, messaging, video conferencing
III	Towards Safe and Secure Cyberspace	Online security and privacy
		Threats in the digital world: Data breach and Cyber Attacks
		Blockchain Technology
		Security Initiatives by the Govt of India
IV	Ethical Issues in Digital World	Netiquettes
		Ethics in digital communication, Ethics in Cyberspace

Practicals / Activities Component

- The course should be conducted in an interactive mode through demonstration, using appropriate tools.
- Conduct workshops on-services initiated under Digital India.
- Spread digital literacy/awareness amongst the vulnerable groups and marginalized sections of the society like street vendors, domestic help, security guards, senior citizens.
- Students will take up team activities/ projects exploring digital services in the areas such as education, health, planning, farming, security, cyber security, financial inclusion, and justice, e-Kranti.
- Any other Practical/Practice as decided from time to time.

Operational Guidelines

- At least 5 Value Addition Courses from the pool of VACs may be offered in the College
- The Colleges shall make teaching arrangements for VACs by involving teachers belonging to the relevant/related discipline and/or having expertise/prior experience relevant to the course. Visiting/Special lectures, wherever required, may be arranged by the colleges for teaching the Courses.

Organizational Structure

At University Level

VAC COMMITTEE

- Body for making policy decisions on VACs

STEERING COMMITTEE

- For operation, implementation and monitoring of courses

COURSE COMMITTEES

- To ensure quality and uniformity in pedagogy

At College Level

NODAL OFFICER

- Will coordinate with University Level Committees

VAC COMMITTEE

- Three Members Committee
- Will oversee Implementation of VACs in the college.

Unit 1: Digital inclusion and Digital Empowerment

Unit	Unit name	Week No	Topic	Teaching Resources
I	Digital inclusion and Digital Empowerment	1	Needs and challenges, Vision of Digital India	https://www.digitalindia.gov.in
		2-3	DigiLocker, E-Hospitals, e-Pathshala, BHIM, e-Kranti (Electronic Delivery of Services), e-Health Campaigns	https://digilocker.gov.in/ https://nha.gov.in/ https://pmjay.gov.in/ https://diksha.gov.in/ https://swayam.gov.in/ https://digitalindia.gov.in/content/ekranti
		4-5	Public utility portals of Govt. of India such as RTI, Health, Finance, Income Tax filing, Education	https://www.india.gov.in/ https://rtionline.gov.in/index.php https://www.bhimupi.org.in/ https://www.incometax.gov.in/iec/foportal https://nha.gov.in/ https://swayam.gov.in/ https://nptel.ac.in/

Unit 1: Digital Inclusion and Digital Empowerment

(Cont.)

Introduction to basic terminology:

- Digital world
- Digital citizen
- Digital inclusion
- Digital divide
- Digital empowerment

Need

- Sustainable economy
- Healthcare
- Educational Achievements
- Efficient Civic Engagements

Challenges

- Digital literacy among vulnerable groups
- ICT infrastructure
- Data Security
- e-Waste management

Digital India (<https://www.digitalindia.gov.in>)

Vision: *“The vision of Digital India programme is to transform India into a digitally empowered society and knowledge economy.”*

The screenshot displays the Digital India website's 'Vision and Vision Areas' page. The browser address bar shows the URL [digitalindia.gov.in/content/vision-and-vision-areas#collapseone--13](https://www.digitalindia.gov.in/content/vision-and-vision-areas#collapseone--13). The page features a blue header with the Digital India logo and navigation menu items: HOME, ABOUT DI, DI INITIATIVES, ECOSYSTEM, NEWSTRACK, OPPORTUNITIES, and FEEDBACK. A search icon is also present. The main content area has a dark background with a network diagram and the title 'Vision and Vision Areas'. A breadcrumb trail shows 'Home > Vision and Vision Areas'. On the left, a sidebar menu lists: Introduction, Vision and Vision Areas (highlighted), Approach and Methodology, Management Structure, and Management Team. The main content includes the heading 'Vision of Digital India' followed by the text: 'The vision of Digital India programme is to transform India into a digitally empowered society and knowledge economy.' Below this is the heading 'Vision Areas of Digital India' and the text: 'The Digital India programme is centred on three key vision areas:'. Three empty boxes are visible at the bottom of the page, representing the three key vision areas.

Digital India (<https://www.digitalindia.gov.in>)



The screenshot shows the website [digitalindia.gov.in/content/programme-pillars](https://www.digitalindia.gov.in/content/programme-pillars). The page features the Indian government logo and the Digital India logo with the tagline "Power To Empower". The navigation menu includes HOME, ABOUT DI, DI INITIATIVES, ECOSYSTEM, NEWSTRACK, OPPORTUNITIES, and FEEDBACK. The main heading is "How Digital India will be realized: Pillars of Digital India".

The diagram illustrates the Pillars of Digital India, consisting of nine interconnected diamond-shaped elements:

1. Broadband Highways
2. Universal Access to Mobile Connectivity
3. Public Internet Access Programme
4. e-Governance - Reforming Government through Technology
5. eKranti - Electronic delivery of services
6. Information for All
7. Electronics Manufacturing
8. IT for Jobs
9. Early Harvest Programmes

Digital India is an umbrella programme that covers multiple Government Ministries and Departments. It weaves together a large number of ideas and thoughts into a single, comprehensive vision so that each of them can be implemented as part of a larger goal.

Each individual element stands on its own, but is also part of the larger picture. Digital India is to be implemented by the entire Government with overall coordination being done by the Department of Electronics and Information Technology (DeitY).

DigiLocker (<https://www.digilocker.gov.in/>)

The banner features an illustration of two students, a boy and a girl, looking at a laptop. The text reads: **CBSE 2022 Class XII Marksheets are Available Now**. Below the text is a button labeled **Get Yours**. The DigiLocker logo and navigation links for English, SIGN IN, and SIGN UP are visible at the top.

The dashboard shows the user's profile and a sidebar with navigation options: Home, Issued Documents, Search Documents, Drive, DigiLocker Services, My Profile, Activities, About DigiLocker, and Logout. The main content area displays the **ICAR AIEEA (UG) Confirmation Page** with the following details:

- Get your document by entering the required details**
- Name (as per Aadhaar): _____
- Date of Birth: _____
- Application No: Enter Application No
Ex. 22XXXXXXXXXX
- I provide my consent to DigiLocker to share my details with the Issuers for the purpose of fetching my documents.
- Get Document** button

A yellow information box on the right states: **National Testing Agency (NTA) conducts entrance examinations for admissions/fellowship in higher educational institutions. Related academic awards of 2022 are currently available in DigiLocker.**

The taskbar at the bottom shows several open PDF files: Pasha_2020_IOP_C..., s12859-020-03626..., 2020 ICACCS4870..., 2209.01416.pdf, and Stock Verification...pdf. The system tray shows the date and time as 15:54 on 14-09-2022.

Public Utility portals of Government of India

ABDM (<https://abdm.gov.in/>)

The screenshot shows the ABDM website homepage. At the top, there is a navigation bar with the following items: "Our Toll Free Number : 14477", "Service Update", "Old ABDM Website", and a menu icon. Below this is a header section with the logos of the National Health Authority and the Digital Mission, followed by a main navigation menu: "HOME", "ABOUT", "PUBLICATIONS", "MEDIA", "TENDERS", "OUR PARTNERS", "CAREERS", "FAQ", and "SUPPORT".

The main content area is titled "ABDM Components" and features five icons representing different services: "ABHA Number", "Health Facility Registry", "ABHA App", "Healthcare Professionals Registry", and "Unified Health Interface (UHI)".

Below the components, there is a text block explaining the ABHA Number: "Your Ayushman Bharat Health Account (ABHA) Number is a hassle-free method of accessing and sharing your health records digitally. It enables your interaction with participating healthcare providers, and allows you to receive your digital lab reports, prescriptions and diagnosis seamlessly from verified healthcare professionals and health service providers".

At the bottom left, there is a prominent orange button labeled "Create ABHA Number".

On the right side, there is a vertical button labeled "Download ABHA App".

At the bottom right, there is a graphic of a hand holding a card that displays a sample ABHA card for "Suresh". The card includes the following information: "Suresh", "ABHA Number: XX-XXXX-XXXX-XXXX", "ABHA Address: XXXXX@abdm", "Date of Birth: 04/05/1990", "Gender: Male", and "Mobile: +91 97112XXXX". A QR code is also visible on the card.

Digital Infrastructure for Knowledge Sharing (DIKSHA) (<https://diksha.gov.in/>)

The screenshot displays the DIKSHA website interface. At the top, there is a navigation bar with the text "Skip to Main Content | Screen Reader Access | Site Map" and accessibility controls (A-, A, A+). The main header includes the Government of India logo, the DIKSHA logo, and navigation links for "Home", "Digital textbooks", "Courses", "TV classes", and "All". A search bar is present with the text "Search or enter QR code" and a "Search" button. Below the search bar, there are filters for "CBSE/NCERT" and "English Medium". A row of buttons allows selection of class levels from "Class 1" to "Class 12", with "Class 12" currently selected. Further down, there are filters for "1 {FrameworkCategory4}" and "1 User Type", along with a "Reset" button. The main content area is titled "Digital textbooks" and shows a list of books under the "Hindi" category. Three books are visible: "अंतरा (NEW) अंतरा भाग-2" (Hindi, Class 12), "आरोह (NEW) आरोह भाग-2" (Hindi, Class 12), and "रिमझिम 3 (NEW) रिमझिम 3" (Hindi, Class 3). Each book card includes a cover image, title, class level, and medium information. A "Ask Tara" chatbot icon is located in the bottom right corner.

Home Digital textbooks Courses TV classes All

Enter QR code Search or enter QR code Search Select language : English


CBSE/NCERT Bengali Medium English Medium Gujarati Medium Hindi Medium Kannada Medium Malayalam Medium Marathi Medium Odia Medium Punjab


Class 1 Class 2 Class 3 Class 4 Class 5 Class 6 Class 7 Class 8 Class 9 Class 10 Class 11 Class 12 CPD Others


1 {FrameworkCategory4} 1 User Type Reset


Digital textbooks

Hindi 5

 (NEW) अंतरा भाग-2
Hindi • Class 12
Medium: Hindi,English
CBSE

 (NEW) आरोह भाग-2
Hindi • Class 12
Medium: Hindi,English
CBSE

 (NEW) रिमझिम 3
Hindi • Class 3
Medium: Hindi,English
CBSE

Ask Tara 

Study Webs of Active Learning for Young Aspiring Minds (SWAYAM) Portal (<https://swayam.gov.in/>)

The screenshot shows the SWAYAM portal homepage. At the top, there is a navigation bar with the SWAYAM logo on the left and links for 'About Swayam', 'All Courses', 'National Coordinators', and 'Local Chapters' on the right. Below the navigation bar, there is a 'COURSE CATALOG' dropdown menu, a search bar with the placeholder text 'Search Catalog...', and a red 'SIGN-IN / REGISTER' button. The main content area features a corkboard background with four yellow boxes containing the following text: 'Submit your credit transfer grievances', 'SWAYAM Courses in Regional languages', 'Let COVID-19 not Stop your Learning. Continue with SWAYAM', and 'Admit cards live for Exam of Jan 2022 Sem scheduled on 29-30 August 2022'. Below this, the 'NATIONAL COORDINATORS' section displays logos for AICTE, CEC, IGNOU, IIMB, NCERT, NIOS, NITTTR, NPTEL, and UGC. The 'SWAYAM BENEFITS' section is partially visible at the bottom, showing the text 'Best-in-Class Instructors' and a green arrow button.

National portal of India (<https://www.india.gov.in/>)

The screenshot shows the homepage of the National Portal of India. At the top, there is a navigation bar with the URL 'india.gov.in', a search bar, and links for 'Skip to main content', 'Sign In', and 'Register'. Below this is the main header featuring the national emblem and the text 'india.gov.in national portal of india'. A row of icons represents 'TOPICS', 'SERVICES', 'MY GOVERNMENT', 'PEOPLE GROUPS', and 'INDIA AT A GLANCE'. A blue banner contains a search bar and a 'MOST SEARCHED' section listing 'Birth Certificate', 'Driving Licence', and 'Pan card'. The main content area features a large banner for 'DEFEXPO 22 INDIA' (18-22 October 2022, Gandhinagar, Gujarat) with images of a tank, a jet, a helicopter, a ship, and a statue. Below the banner are three columns: 'News Highlights' with a 'News & Press Releases' section listing meetings by the Raksha Mantri; 'Most Requested Information & Forms' with an 'Information' section listing various government services; and 'Activities & Initiatives' featuring the '75 Azadi Ka Amrit Mahotsav' logo.

india.gov.in
national portal of india

Search - Keyword, Phrase Search Advanced Search MOST SEARCHED Birth Certificate | Driving Licence | Pan card

defexpo 2022 India : The Emerging Defence Manufacturing Hub DEFEXPO 22 INDIA 18 - 22 OCTOBER, 2022 GANDHINAGAR Ministry of Defence 18TH-22ND OCTOBER, 2022 AT GANDHINAGAR, GUJARAT india.gov.in

News Highlights

News & Press Releases

- » Raksha Mantri Shri Rajnath Singh holds bilateral meetings with...
- » Defence Secretary conducts bilateral meetings ahead of DefExpo...

Most Requested Information & Forms

Information

- » Department of Women, Children, Disabled and Senior Citizens...
- » Indira Gandhi National Open University (IGNOU)
- » Information on senior citizens schemes in Karnataka

Activities & Initiatives

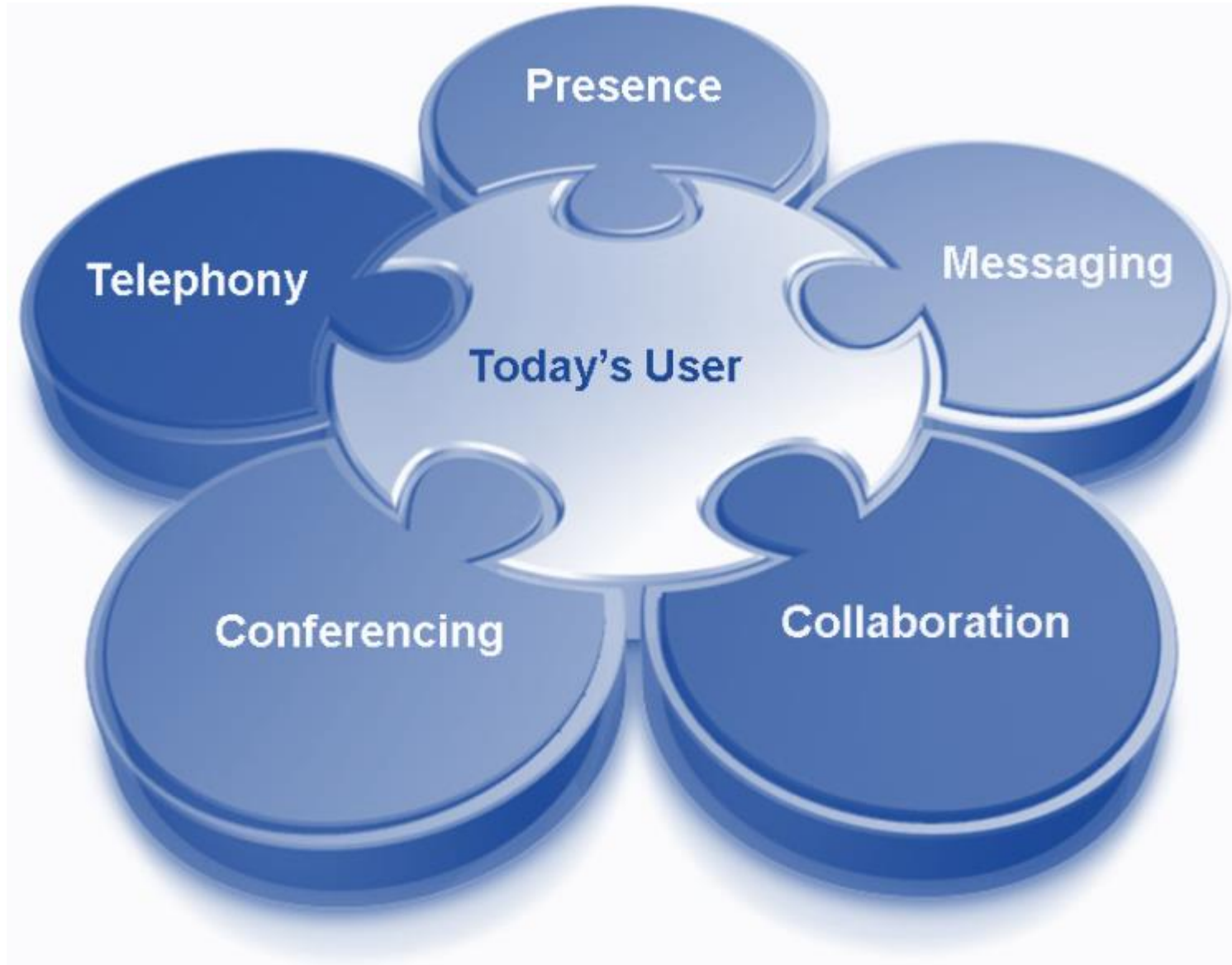
75 Azadi Ka Amrit Mahotsav initiative of the Government of

<https://defexpo.gov.in>

Unit-2: Communication and Collaboration in the Cyberspace

Unit	Unit name	Week No	Topic	Teaching Resources
II	Communication and Collaboration in the Cyberspace	6	Electronic Communication: electronic mail, blogs, social media	https://static.vikaspedia.in/media/files_en/education/Digital%20Literacy/Email5.pdf https://www.nidirect.gov.uk/articles/email-internet-and-social-media
		7	Collaborative Digital platforms	https://en.wikipedia.org/wiki/Digital_collaboration
		8-9	Tools/platforms for online learning, Collaboration using file sharing, messaging, video conferencing	https://vikaspedia.in/education/interactive-resources/digital-learning-resources https://www.prodigygame.com/in-en/blog/virtual-learning-tools/ https://dexterredward.com/secure-collaboration/

Unit-2: Communication and Collaboration in the Cyberspace



Unit-2: Communication and Collaboration in the Cyberspace

- Electronic mail
 - Gmail
 - Outlook
 - Yahoo!
- Blogs
 - www.wordpress.org
 - www.blogger.com
- Social media
 - Facebook
 - Twitter
 - Instagram
 - Snapchat
- Tools/platforms for online learning, Collaboration using file sharing, messaging, video conferencing
 - Zoom
 - MS Teams
 - Various Google products (<https://about.google/products/#all-products>)
 - Webex
 - JioMeet

Unit-2: Communication and Collaboration in the Cyberspace

Staying safe while communicating and collaborating in the Cyberspace:

- For teachers
 - Where ever possible create separate accounts for demonstrations during classes
- For all
 - Log out of accounts on all the websites be it email account, your account on Digi locker, etc. when logged in through some system that is not yours
 - Be careful about the content that you post / share on the online media.
 - think about its consequences in future
 - data on the Internet becomes ‘immortal’
 - At the end of the lab class, delete all the important files (from recycle bin/trash also) that you have downloaded during the lab class

Unit-3: Towards Safe and Secure Cyberspace

Unit	Unit name	Week No	Topic	Teaching Resources
III	Towards Safe and Secure Cyberspace	10	Online security and privacy	https://safety.google/security-privacy/
		11	Threats in the digital world: Data breach and Cyber Attacks	https://www.csoonline.com/article/3541148/the-biggest-data-breaches-in-india.html https://www.secureworld.io/industry-news/top-10-data-breaches-of-all-time https://onlinedegrees.und.edu/blog/types-of-cyber-security-threats/
		12	Blockchain Technology	https://blockchain.gov.in/ https://blockchain.gov.in/assets/docs/blockchain_informatics.pdf https://blockchain.gov.in/assets/docs/Whitepaper_30jan.pdf
		13	Security Initiatives by the Govt of India	https://safety.google/ https://www.aicte-india.org/CyberSecurity https://www.niti.gov.in/sites/default/files/2019-07/CyberSecurityConclaveAtVigyanBhavanDelhi_1.pdf

Unit-3: Towards Safe and Secure Cyberspace

Online Security	Online Privacy
Protect Your Phone, Personal Information and Data From Hackers	Protect Your Privacy on Apps
Recognize, Remove, and Avoid Malware	Protect Your Privacy Online
Recover Your Hacked Email or Social Media Account	Secure Your Voice Assistant and Protect Your Privacy
Remove Your Personal Information Before You Get Rid of Your Phone and/or Computer	Stalking Apps: What To Know
Secure Your Home Wi-Fi Network and Safely Use Public Wi-Fi Networks	What To Do if You're the Target of Revenge Porn
Use Two-factor Authentication to Protect Your Accounts	What To Do if You're the Target of Revenge Porn

Threats in the digital world

- **Data breach:** A data breach is a theft of data by a malicious actor. Motives for data breaches include crime (i.e. identity theft), a desire to embarrass an institution (e.g. Edward Snowden or the DNC hack), and espionage.
- **Cyber Attacks:** A cyber attack is an attack that is mounted against us (meaning our digital devices) by means of cyberspace.

Recent Data breaches in India

Source: <https://www.secureworld.io/industry-news/top-10-data-breaches-of-all-time>

- Air India data breach highlights third-party risk, May 2021
- CAT burglar strikes again: 1,90,000 applicants' details leaked to dark web, May 2021
- Hacker delivers 180 million Domino's India pizza orders to dark web, April 2021
- Trading platform Upstox resets passwords after breach report, April 2021
- Police exam database with information on 500,000 candidates goes up for sale, February 2021
- COVID-19 test results of Indian patients leaked online, January 2021
- User data from Juspay for sale on dark web, January 2021
- BigBasket user data for sale online, October 2020
- Unacademy learns lesson about security, May 2020
- Hackers steal healthcare records of 6.8 million Indian citizens, August 2019
- Local search provider JustDial exposes data of 10 crore users, April 2019
- SBI data breach leaks account details of millions of customers, January 2019

International Data breaches

Source:<https://www.secureworld.io/industry-news/top-10-data-breaches-of-all-time>

- Yahoo data breach (2013)
- First American Financial Corporation data breach (2019)
- Equifax data breach (2017)
- Marriott International data breach (2018)
- Adult FriendFinder Networks data breach (2016)
- Facebook data breach (2019)
- Target data breach (2013)
- U.S. Office of Personnel Management data breach (2015)
- MySpace data breach (2013)
- LinkedIn data breach (2012)
- Adobe data breach (2013)
- SolarWinds supply chain data breach (2020)

Cyber Attacks Examples

- Malware– Malicious software to disrupt computers
- Viruses, worms, ...
- Theft of Intellectual Property or Data
- Hactivism– Cyber protests that are socially or politically motivated
- Mobile Devices and applications and their associated Cyber Attacks
- Social Engineering– Entice Users to click on malicious links
- Spear Phishing– Deceptive Communications (e-mails, texts, tweets)
- Domain Name System (DNS) Attacks
- Router Security– Border Gateway Protocol (BGP) Hijacking
- Denial of Service (DoS)– blocking access to websites

Blockchain Technology (<https://blockchain.gov.in/>)

Source: https://blockchain.gov.in/assets/docs/blockchain_informatics.pdf

- A business involves transactions and information exchange among various stakeholders. Since most of the existing systems are centralized, there is greater risk to security, and this necessitates a secure and shareable system to help stakeholders interoperate efficiently.
- Blockchain is a distributed system where transaction records are bundled in blocks and linked with previous ones.
- Transaction data within a block is secure because it is encrypted and digitally signed.
- Bitcoin network is a peer to peer payment network, and it is an application of blockchain technology.

Security Initiatives by the Govt of India

- cert-in.org.in



- <https://www.csk.gov.in/>



- <https://infosecawareness.in/>



▶ Twitter

▶ Instagram

▶ Facebook

▶ LinkedIn

▶ You Tube

▶ Public

<https://infosecawareness.in/>

Steps taken by the Central Government to spread awareness on prevention of cyber crime

- i. MHA's has launched '@CyberDost' twitter handle to spread awareness on cybercrime prevention and tweeted over 1066 cyber safety tips through short videos, images and creatives. It has more than 3.64 lakh followers.
- ii. Radio campaign.
- iii. Sent more than 100 crore SMSs on cybercrime awareness to public.
- iv. Publicity at regular interval on prevention of cyber crime and cyber safety tips through various Videos/GIFs initiated on various platforms as under:

Twitter	https://twitter.com/Cyberdost
Facebook	https://www.facebook.com/CyberDostI4C
Instagram	https://www.instagram.com/cyberdosti4c
Telegram	https://t.me/cyberdosti4c

- v. MyGov has been engaged by the I4C for the publicity on the topic of prevention of cyber crimes through multiple mediums.
- vi. Published 'Handbook for adolescents/students on cyber safety'.
- vii. Published 'Information Security Best practices' for the benefit of Government Officials.
- viii. Organized of Cyber Safety and Security Awareness weeks through the C-DAC in association with Police Department in different States.
- ix. 148 Cyber Crimes Advisories have been shared by the I4C with States/UTs, Ministries/Departments as a preventive measure.
- x. Issued alerts/advisories to States/UTs from time to time.
- xi. Delhi Metro has been requested to publicize the National Cyber Crime Reporting Portal and National Toll-Free Helpline Number '1930'.
- xii. Two bilingual Manuals on "Cyber Hygiene for Cyber Space - Do's and Don'ts" (Basic and Advanced version) released in January, 2022 to provide basic cyber hygiene regarding internet safety, email, mobile safety, etc.
- xiii. States/UTs have been requested by the MHA to organize "Cyber Jaagrookta Diwas" on first Wednesday of every month at 11 am on cyber hygiene commencing from 6th October 2021 (Wednesday) onwards and launch mass awareness campaign in vernacular languages for all schools/colleges. Also requested to prepare 'Annual Action Plan' in this regard.
- xiv. The Ministry of Education has been requested to commence Curriculum in cyber security and cyber hygiene from 6th to 12th standards for all the streams, so as to provide basic awareness to all students in schools for all CBSE schools at Central/State/UT level.
- xv. Quarterly Newsletter of I4C (1st and 2nd Edition) launched in January, 2022 to share information to counter the menace of cyber crime to Law Enforcement Agencies and Policymakers. The Newsletter comprises of latest cyber crimes trends, cyber crime statistics, National/International developments relating to prevention of cyber crimes, etc.

*** <https://infosecawareness.in/>

Governments Initiatives

▶ Cyber Crime Awareness Booklet on Cyber Security Awareness

▶ Cyber Hygiene for cyber space

▶ Handbook on Cyber Safety for Students

▶ UGC Public Notice regarding: Initiatives for promoting Cyber Hygiene/Cyber Security in HEIs

▶ Steps taken by Central Governments to spread awareness on prevention of Cyber Crime

▶ Photo Gallery

▶ Radio Jingles

<https://infosecawareness.in/>

Unit-4: Ethical Issues in Digital World

Unit	Unit name	Week No	Topic	Teaching Resources
IV	Ethical Issues in Digital World	14	Netiquettes	https://www.kaspersky.com/resource-center/preemptive-safety/what-is-netiquette https://www.britannica.com/topic/netiquette
		15	Ethics in digital communication, Ethics in Cyberspace	https://onlinelibrary.wiley.com/doi/book/10.1002/9781118968888 https://iccopr.com/wp-content/uploads/2017/10/Ethics-in-Digital-Communications-Guidelines.pdf https://link.springer.com/chapter/10.1007/978-90-481-2370-4_1

Unit-4: Ethical Issues in Digital World

NETIQUETTES



**Communication
Etiquettes**



**Social Media
Etiquettes**



**Internet
Etiquettes**

Ethics in digital communication

1. Contribute to society and human being
2. Avoid harm to others
3. Be honest and trustworthy
4. Be fair and take action not to discriminate
5. Honor property rights including copyrights and patents
6. Give proper credit for intellectual property
7. Respect the privacy of others
8. Honor confidentiality

Ethics in Cyberspace

- Do not use a computer to harm other people.
- Do not interfere with other people's computer work.
- Do not snoop around in other people's files.
- Do not use a computer to steal.
- Do not use a computer to bear false witness.
- Do not use or copy software for which you have not paid.
- Do not use other people's computer resources without authorization.
- Do not appropriate other people's intellectual output.
- Do think about the social consequences of the program you write.
- Do use a computer in ways that show consideration and respect.

Suggestive list of Practicals / Activities

1. Identify few people of different age groups among family members, domestic help, neighborhood etc. Find out digital literacy among these groups. For example Usage of Smart phones, Internet, computer systems, and awareness of accessing an app.
2. Access your Digi Locker account. Fetch and use any three important documents from the Digi Locker such as class 10th certificate, 12th certificate, Aadhaar card, Driving License and vaccination certificate etc.
3. Students will explore digital services in the areas such as e-Kranti: education, health, planning, farming, security, financial inclusion, and justice. (any one site)
4. Explore the Digital India website (<https://www.digitalindia.gov.in>). List down any four achievements of the government towards the realization of the Digital India vision.
5. Prepare 2-3 page report on 9-pillars of Digital India.

Suggestive list of Practicals / Activities (Cont.)

6. Create an email account, if you don't have one and explore it. Perform the following activities on your existing / new email account:
 - Create a group of your friends and post a welcome message on it.
 - Share a google document with your friends and give edit rights to a few of them.
 - Make changes to the account settings such that every outgoing email has your name, designation (if any) and your contact number.
 - Draft a mail and schedule it to be sent to some acquaintance the next day at 11am.
 - If you cannot attend to the emails for some days due to some urgent work, then change the settings such that an automatic reply mail is sent to the sender during those days.

7. Create an account on Twitter, if you don't have one and explore it. Perform the following activities on your existing / new Twitter account:
 - Follow the official handles of your college (@ your_college), University of Delhi (@UnivofDelhi), or any other relevant entity
 - Send a message to someone you are following
 - Retweet a message

Suggestive list of Practicals / Activities (Cont.)

8. Create an account on Facebook, if you don't have one and explore it. Perform the following activities on your existing / new Facebook account:
 - Follow the official page of your college, University of Delhi, or any other relevant authority.
 - Manage your privacy to limit who can interact with you and what you share.
 - Control who can see what you share on Meta.
9. Write a blog about your experience on your first day in the college.
10. Identify at least three collaborative digital platforms that can be used for group study. List their advantages and disadvantages, if any. Out of these platforms, which one you would like to use and why? Prepare 2-3 slides and present them.
11. Schedule a video meeting with your friend in the digital platform of your choice. After joining the meeting, send message, chat, and share a file.

Suggestive list of Practicals / Activities (Cont.)

12. Students need to explore various blogs/ social media. Students may share their experiences through 10-15 minutes audio-visual presentation.
13. Students need to explore any one of the digital platform related to financial or banking or education sector.
14. Create your account in the NPTEL/ SWAYAM education portal. Enroll in any course of your choice.
15. Prepare a small report on either a data breach or a cyber attack.

Suggestive list of Practicals / Activities (Cont.)

16. Browse the Govt blockchain website "blockchain.gov.in". Explore and present any one case study present on the website.
17. Explore the site "<https://www.csk.gov.in/>".
18. When students' online behavior draws criticism from others, what kind of guidelines help us as a society determine what is acceptable in cyberspace?
19. Do important people in your life talk with you about the dangers of certain online behavior?
20. Do young people fully understand the consequences of their online activity? Why or why not?