Subject : B.Sc Computer Science -Honours (Structure)

Semester	Sr l	Course Code	Course Title	Credits	Marks	Hours
FYBSc (Semester I & II) (Honours Programme)						
	Core Courses					
Semester I	1	CSC101	Programming Fundamentals using C	4T+2P	100T+50	60T+60P
Semester II	2	CSC102	Data Structures	4T+2P	100T+50	60T+60P
SYBSc (Semester III & IV) (Honours Programme)						
	Core Courses					
Semester III	1	CSC103	Database Management Systems	4T+2P	100T+50	60T+60P
Semester IV	2	CSC104	Computer Organization and Operating Systems	4T+2P	100T+50	60T+60P
	Skill Based Papers					
Semester III	1	CSS103	Programming in Python	3T+1P	75T+25	45T+30P
Semester IV	2	CSS104	Web Application Development using Flask	3T+1P	75T+25	45T+30P
	3	CSS105	Web Application Development using ASP.NET	3T+1P	75T+25	45T+30P
	4	CSS106	Web Application Development using Django	3T+1P	75T+25	45T+30P
TYBSc (Semester V & VI) (Honours Programme)						
Semester V	**Core Courses**					
	1	CSC105	Computer Networks	4T+2P	100T+50	60T+60P
	2	CSC106	Object Oriented Programming	4T+2P	100T+50	60T+60P
	3	CSC107	Software Engineering	4T+2P	100T+50	60T+60P
	Discipline Specific Electives (Any 2 DSE's)					
	4	CSD101	Human Computer Interaction	3T+1P	75T+25P	45T+30P
		CSD102	Data Mining	3T+1P	75T+25P	45T+30P
	5	CSD103	Natural Language Processing	3T+1P	75T+25P	45T+30P
		CSD104	Embedded Systems	3T+1P	75T+25P	45T+30P
	Core Courses					
Semester VI	6	CSC108	Mobile Application Development	4T+2P	100T+50	60T+60P
	7	CSC109	Full Stack Web Development	4T+2P	100T+50	60T+60P
	8	CSC110	Internet of Things	4T+2P	100T+50	60T+60P
	Discipline Specific Elective (Any 1 DSE)					
	9	CSD105	Network Security	3T+1P	75T+25P	45T+30P
		CSD106	Multimedia Techniques	3T+1P	75T+25P	45T+30P
		CSD107	Introduction to Data Analytics	3T+1P	75T+25P	45T+30P
	1	CSP101	Project	4	100	
TYBSc (Semester V & VI) (General Programme)						
Semester V	**Skill Enhancement Course**					
	1	CSS107	Agile Software Development	3T+1P	75T+25P	45T+30P
	2	CSS108	Network Administration	3T+1P	75T+25P	45T+30P
	Discipline Specific Elective (Any 1 DSE from the following)					
	3	CSD101	Human Computer Interaction	3T+1P	75T+25P	45T+30P
		CSD102	Data Mining	3T+1P	75T+25P	45T+30P
		CSD103	Natural Language Processing	3T+1P	75T+25P	45T+30P
		CSD104	Embedded Systems	3T+1P	75T+25P	45T+30P
Semester VI	**Skill Enhancement Course**					

	4	CSS109	PHP Programming	3T+1P	75T+25P	45T+30P
	Discipline Specific Elective / Project (any 1)					
	5	CSD105	Network Security	3T+1P	75T+25P	45T+30P
		CSD106	Multimedia Techniques	3T+1P	75T+25P	45T+30P
		CSD107	Introduction to Data Analytics	3T+1P	75T+25P	45T+30P
		CSP101	Project	4	100	

- Approved by Academic Council on 2nd May 2017

B.Sc. In Computer Science (Core Courses)

First Year B. Sc. **Semester I**

Computer Science - CSC101 : Programming Fundamentals Using C

Effective from : 2017-18

(Credits: Theory-04, Practicals-02) Theory : 60 Lectures
Practical : 60 Lectures

Marks: 100T + 50P = 150

1) Overview of programming : (5 Lectures)
Introduction to computer based problem solving : Requirement of problem solving by computers, Problem definition, use of examples for problem solving, similarities between problems, problem solving strategies, Steps involved in problem solving

2) Program design and Implementation issues : (5 Lectures)
Programs and algorithms, Top down design and stepwise refinement, construction of loops , basic programming constructs, implementations

3) Programming environment : (3 Lectures)
Programming language classification, assemblers, examples of high level languages, compiler linking and loading, algorithms for problem solving.

4) Algorithms for Problem Solving : (18 Lectures)
Examples : exchanging values of two variables, summation of set of numbers, decimal to binary , reversing of digits of integer, greatest common divisor of two numbers, to verify whether a integer is prime or not, organize a given set of numbers in ascending order, find a square root of a integer, factorial of a given number, generate Fibonacci numbers for n terms, to find the value of power of a number raised by a integer , reverse order elements of a array, find the largest number in a array, print elements of upper triangular matrix, multiplication of two matrices, compute roots of a quadratic equations

5) Overview of C : (15 Lectures)
Structure of a C program, data types, Constants and variables, operators and expressions, operators : arithmetic, logical, relational, assignment, ternary, comma operators ; Control constructs: selection , iterative, branching statements; array constructs, Strings, basic I/O, functions, recursion. Macro, preprocessor directives

6) Pointers and structured data types (9 Lectures)

Pointers , structures and unions, enumerated data type

Implementation of arrays and structure using pointers , Sparse Matrices (Array and Linked Representation)

7) FILE HANDLING : Text and data file create, open , read and write . **(5 Lectures)**

Reference Books :

1). Harsha Priya, R. Ranjeet, “Programming and problem solving through C language”, Firewall Media

2). Jeri R. Hanly, Elliot B. Koffman, “Problem solving and program design in C”, Pearson Addison Wesley.++

3). R. G. Dromey, “How to solve it by computer”, PHI

4). E Horowith, S Sahni, S Rajasekaran, “Fundamentals of computer algorithm”, Galgotia.

5). Byron Gottfried, “Programming with C”, Tata McGraw Hill

6). Forouzan, “A Structured Programming Approach using C”, 2nd Edition, Cengage Learning India, 2008.

Practical’s : 60 Lectures

Algorithms should be developed for solving a given problem. ‘C’ programs should be written based on the algorithms.

The following list of problems may be used as exercises :

1. Print the sum and product of digits of an integer.

2. Reverse a number.

3. Compute the sum of the first n terms of the following series S = 1+1/2+1/3+1/4+……

4. Compute the sum of the first n terms of the following series S =1-2+3-4+5……

5.Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.

6.Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.

7. Compute the factors of a given number.

8. Write a macro that swaps two numbers. WAP to use it.

9. Print a triangle of stars as follows (take number of lines from user):

```
*
***
*****
*******
*********
```

10. Perform following actions on an array entered by the user:

i) Print the even-valued elements
ii) Print the odd-valued elements
iii) Calculate and print the sum and average of the elements of array
iv) Print the maximum and minimum element of array
v) Remove the duplicates from the array
vi) Print the array in reverse order

The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.

11.Take the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.

12. Display Fibonacci series (i)using recursion, (ii) using iteration

13. Calculate Factorial of a number (i)using recursion, (ii) using iteration

14. Calculate GCD of two numbers (i) with recursion (ii) without recursion.
15 recursion

1. Write a program in C to print first 50 natural numbers using recursion. *Expected Output* :

```
 The natural numbers are : 1  2  3

  4  5  6  7  8  9  10  11  12  13

  14  15  16  17  18  19  20  21

22  23  24  25  26  27  28  29  30

  31  32  33  34  35  36  37  38

39  40  41  42  43  44  45  46  47

  48  49  50
```

2. Write a program in C to calculate the sum of numbers from 1 to n using recursion.
Test Data :
Input the last number of the range starting from 1 : 5
Expected Output :

```
The sum of numbers from 1 to 5 :

15
```

3. Write a program in C to Print Fibonacci Series using recursion.
Test Data :
Input number of terms for the Series (< 20) : 10
Expected Output :

```
 Input number of terms for the Series (< 20) : 10

 The Series are :

 1  1  2  3  5  8  13  21  34  55
```

4. Write a program in C to print the array elements using recursion.
Test Data :
Input the number of elements to be stored in the array :6
Input 6 elements in the array :
element - 0 : 2
element - 1 : 4
element - 2 : 6
element - 3 : 8
element - 4 : 10
element - 5 : 12
Expected Output :

```
The elements in the array are : 2  4  6  8  10  12
```

5. Write a program in C to count the digits of a given number using recursion. Test Data :
Input a number : 50
Expected Output :

```
The number of digits in the number is :  2
```

16 Pointers
1. Write a program in C to show the basic declaration of pointer. *Expected Output* :

```
z sotres the address of m  = 0x7ffe97a39854

 *z stores the value of m = 10

 &m is the address of m = 0x7ffe97a39854

 &n stores the address of n = 0x7ffe97a39858

 &o  stores the address of o = 0x7ffe97a3985c

 &z stores the address of z = 0x7ffe97a39860
```

2. Write a program in C to demonstrate how to handle the pointers in the program.
Expected Output :

```
Address of m : 0x7ffcc3ad291c

 Value of m : 29



 Now ab is assigned with the address of m.

 Address of pointer ab : 0x7ffcc3ad291c

 Content of pointer ab : 29



 The value of m assigned to 34 now.

 Address of pointer ab : 0x7ffcc3ad291c

 Content of pointer ab : 34



 The pointer variable ab is assigned with the value 7 now.

 Address of m : 0x7ffcc3ad291c
```

```
Value of m : 7
```

3. Write a program in C to demonstrate the use of &(address of) and *(value at address) operator.

Expected Output :

```
Using & operator :

-----------------------------------------

 address of m = 0x7ffea3610bb8

 address of fx = 0x7ffea3610bbc

 address of cht = 0x7ffea3610bb7


 Using & and * operator :


 value at address of m = 300

 value at address of fx = 300.600006

 value at address of cht = z


 Using only pointer variable :

-----------------------------------------------------------

 address of m = 0x7ffea3610bb8

 address of fx = 0x7ffea3610bbc

 address of cht = 0x7ffea3610bb7


 Using only pointer operator :

-----------------------------------------------------------

 value at address of m = 300

 value at address of fx= 300.600006

 value at address of cht= z
```

4. Write a program in C to add two numbers using pointers.

Test Data :

Input the first number : 5

Input the second number : 6

Expected Output :

```
The sum of the entered numbers is : 11
```

5. Write a program in C to add numbers using call by reference. Go to the editor

Test Data :

Input the first number : 5

Input the second number : 6

Expected Output :

```
 The sum of 5 and 6  is 11
```

17 File Handling

1. Write a program in C to create and store information in a text file. Test Data :
Input a sentence for the file : This is the content of the file test.txt.
Expected Output :

```
The file test.txt created successfully...!!
```

2. Write a program in C to read an existing file.
Test Data :
Input the file name to be opened : test.txt
Expected Output :

```
The content of the file test.txt is  :

This is the content of the file test.txt.
```

3. Write a program in C to write multiple lines in a text file. Test Data :
Input the number of lines to be written : 4
:: The lines are ::
test line 1
test line 2
test line 3
test line 4
Expected Output :

```
The content of the file test.txt is :

test line 1

test line 2

test line 3

test line 4
```

4. Write a program in C to read the file and store the lines into an array.
Test Data :
Input the file name to be opened : test.txt
Expected Output :

```
The content of the file test.txt are :

test line 1

test line 2

test line 3

test line 4
```

5. Write a program in C to Find the Number of Lines in a Text File.
Test Data :
Input the file name to be opened : test.txt
Expected Output :

```
The lines in the file test.txt are : 4
```

First Year B. Sc. **Semester II**

Computer Science - CSC102 : Data Structures

Effective from : 2017-18

(Credits: Theory-04, Practicals-02) Theory : 60 Lectures
Practical : 60 Lectures

Marks: 100T + 50P = 150

1)Stacks **(7 Lectures)**

Implementing single / multiple stack/s in an Array; Prefix, Infix and Postfix expressions, Utility and conversion of these expressions from one to another; Applications of stack; Limitations of Array representation of stack

2).Linked Lists **(10 Lectures)**

Singly, Doubly and Circular Lists (Array and Linked representation); Normal and Circular representation of Stack in Lists; Self Organizing Lists; Skip Lists

3).Queues **(6 Lectures)**

Array and Linked representation of Queue, De-queue, Priority Queue.

4).Recursion **(5 lectures)**

Developing Recursive Definition of Simple Problems and their implementation; Advantages and Limitations of Recursion; Understanding what goes behind Recursion (Internal Stack Implementation)

5).Trees **(19 Lectures)**

Introduction to Tree as a data structure; Binary Trees (Insertion, Deletion , Recursive and Iterative Traversals on Binary Search Trees); Threaded Binary Trees (Insertion, Deletion, Traversals); Height-Balanced Trees (Various operations on AVL Trees).

6).Searching and Sorting **(7 Lectures)**

Linear Search, Binary Search, Comparison of Linear and Binary Search, Bubble sort, Selection Sort, Insertion Sort, Comparison of Sorting Techniques.

7).Hashing **(6 Lectures)**

Introduction to Hashing, Deleting from Hash Table, Efficiency of Rehash Methods, Hash Table Reordering, Resolving collusion by Open Addressing, Coalesced Hashing, Separate Chaining, Dynamic and Extendible Hashing, Choosing a Hash Function, Perfect Hashing Function

Reference Books :

1). Aaron M. Tenenbaum, Moshe J. Augenstein, Yedidyah Langsam, "Data Structures Using C and C++:, Second edition, PHI, 2009.

2). Richard F. Gilberg, Behrouz A. Forouzan, “Data Structures : A Pseudocode Approach with C”, Cengage Learning, 2 Edition (Paperback), 2007.

3). Ellis Horowitz, Sartaj Sahni, “Fundamentals of Data Structures in C”, Universities Press, 2nd Edition, 2008.

4). Seymour Lipschutz: “Data Structures with C”, Schaum’s ouT*lines*, Tata McGraw-Hill, 2011

Practical's : 60 lectures

Suggested list of Practical

1. Write a program to search an element from a list. Give user the option to perform Linear or Binary search. Use Template functions.
2. WAP using templates to sort a list of elements. Give user the option to perform sorting using Insertion sort, Bubble sort or Selection sort.
3. Implement Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list and concatenate two linked lists (include a function and also overload operator +).
4. Implement Doubly Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.
5. Implement Circular Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.
6. Perform Stack operations using Linked List implementation.
7. Perform Stack operations using Array implementation. Use Templates.
8. Perform Queues operations using Circular Array implementation. Use Templates.
9. Create and perform different operations on Double-ended Queues using Linked List implementation.
10. WAP to scan a polynomial using linked list and add two polynomial.
11. WAP to calculate factorial and to compute the factors of a given no. (i)using recursion, (ii) using iteration
12. (ii) WAP to display fibonacci series (i)using recursion, (ii) using iteration
13. WAP to calculate GCD of 2 number (i) with recursion (ii) without recursion
14. WAP to create a Binary Search Tree and include following operations in tree:

a) Insertion (Recursive and Iterative Implementation)

b) Deletion by copying

c) Deletion by Merging

d) Search a no. in BST

e) Display its preorder, postorder and inorder traversals Recursively

f) Display its preorder, postorder and inorder traversals Iteratively

g) Display its level-by-level traversals

h) Count the non-leaf nodes and leaf nodes

i) Display height of tree

j) Create a mirror image of tree

k) Check whether two BSTs are equal or not

15 WAP to convert the Sparse Matrix into non-zero form and vice-versa.

16 WAP to reverse the order of the elements in the stack using additional stack. 17 WAP to reverse the order of the elements in the stack using additional Queue. 18 WAP to implement Diagonal Matrix using one-dimensional array.

19 WAP to implement Lower Triangular Matrix using one-dimensional array. 20 WAP to implement Upper Triangular Matrix using one-dimensional array. 21 WAP to implement Symmetric Matrix using one-dimensional array.

22 WAP to create a Threaded Binary Tree as per inorder traversal, and implement operations like finding the successor / predecessor of an element, insert an element, inorder traversal.

23 WAP to implement various operations on AVL Tree.

Second Year B. Sc.		Semester III
Computer Science - CSC103 : Database Management **Systems**		
(Credits: Theory-04, Practicals-02) Theory : 60 Lectures		Practicals : 60 Lectures
Course Objectives : a) Provide a strong foundation in database concepts, technology, and practice. b) Practice SQL programming through a variety of database problems. c) Understand the use of concurrency and transactions in database		
(Theory)		
1.	Introduction to Data Base Systems: File Systems versus a DBMS, The Relational Model, Levels of abstraction in a DBMS, Data independence, Queries in DBMS, Concurrent Access and Crash Recovery, Structure of DBMS, Advantage of DBMS, People who deal with Databases.	4 L
2.	Conceptual design and Entity Relationship model: Overview of Data Base Design, The ER model-features, Key Constraints, Participation Constraints, weak Entities, Class Hierarchies, Aggregation, Entity versus attribute, Entity versus relationship, Binary versus ternary relationship, aggregation versus ternary relationships.	6 L
3.	The Relational Model: Attributes and domains, Relations, Integrity Constraints, Key Constraints, Foreign Key Constraints, General Constraints, Enforcing Integrity constraints.	2 L
4.	Logical Database design ER to relational : Entity sets to tables, Relationship sets (without constraints) to tables, translating relationship sets with key constraints, translating relationship sets with participation constraints, translating weak entity sets, translating class hierarchies, translating ER diagrams with aggregation.	8 L
5.	Schema Refinement and Normal forms: Introduction, Why Schema Refinement? Functional Dependencies, Normal Forms: BCNF, Third Normal Form, Normalisation-Decomposition up to BCNF	5 L

6.	Relational Algebra: Relational algebra operations- select, project, join, natural join, equijoin and their implementation.	4 L
7.	SQL: The Form of Basic SQL query, Condition specification, SQL Joins, Outer joins, Union, Intersect, Except, Nested queries, Aggregate Operators, Null values.	12 L
8.	SQL: Embedded SQL, Cursors, Dynamic SQL, Triggers and active databases	4 L
9.	Transaction management : The concept and properties of transaction, transaction and schedule, Notion of consistency, Serializability, Isolation levels, Lock based concurrency control, concurrency control without locking, deadlocks	10 L
10.	Crash Recovery: Introduction to crash recovery, Recovery and atomicity, Log based recovery, Shadow paging.	5 L

(Practicals)

List of Practicals (a minimum of 15 Practicals need to be completed)

1. Gathering information, Analysing data, ER Diagram, Reduction to Tables.
2. Creation/modification of database tables using DDL statements and GUI tools of the DBMS software.
3. SQL queries
4. SQL Joins
5. Stored Procedures, Triggers
6. Views and User management, granting/revoking privileges, roles.
7. Report Generation using a reporting tool
8. Database Design : Normalisation examples
9. Use of any front-end to develop forms on desktop/web based applications.
10. Database User Level Security for Databases for tables, Views.

Note :

a. A minimum of 3 example sets covering all concepts should be done for topics under Serial No 1(ERDs), 3 (SQL) and 8 (Normalisation). (each is a separate practical)

b. Practicals should be done using a DBMS software like Oracle, SQL Server, MYSQL, POSGRES and a compatible Front-End Tool

Text Books :

1). Abraham Silberschatz, Henry F. Korth, S. Sudarshan, “Database System Concepts”, McGraw Hill Education, 6th Edition.

Reference Books :

1). Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Pearson Education, 7th Edition

2). Raghu Ramakrishnan, Johannes Gehrke, “Database Management Systems”, McGraw Hill Education, 3rd Edition.

Second Year B. Sc.		Semester IV
Computer Science -CSC104: Computer Organization and Operating Systems		
(Credits: Theory-04, Practicals-02) Theory : 60 Lectures Practicals : 60 Lectures		
Learning Objectives: To give knowledge about fundamentals of Computer System Architecture and different types of Operating Systems.		
(Theory)		
1.	Introduction to digital electronics Logic gates, Boolean algebra, combinational circuits, circuit simplification, registers, counters and memory units.	4 L
2.	Data Representation and Basic Computer Arithmetic Number systems, complements, fixed and floating point representation, character representation, addition, subtraction, magnitude comparison.	4 L
3.	Basic Computer Organization and Design Computer registers, bus system, instruction set, instruction cycle, memory reference, input-output and interrupt, Register organization, arithmetic and logical micro-operations, stack organization, Instruction formats, addressing modes, instruction codes, machine language, assembly language, RISC, CISC architectures, pipelining and parallel architecture.	14 L
4.	Input-Output Organization Input / Output, External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access.	8 L
5.	Introduction to Operating Systems Basic OS functions, resource abstraction, types of operating systems–multiprogramming systems, batch systems , time sharing systems; operating systems for personal computers & workstations, process control & real time systems, network operating system, mobile operating systems.	5 L
6.	Operating System Organization Processor and user modes, kernels, system calls and system programs.	5 L
7.	Process Management System view of the process and resources, process abstraction, process hierarchy, Process Scheduling, non-pre-emptive and preemptive scheduling algorithms; concurrent processes, deadlocks.	8 L
8.	Memory Management Physical and virtual address space, paging, segmentation, virtual memory, Cache memory.	7 L
9.	File , I/O Management , Protection and Security Directory structure, file operations, file allocation methods, device management. Authentication and Authorization.	5 L

Text Books :

1). M. Morris Mano, Rajib Mall, “Computer System Architecture”, Revised 3rd Edition, Pearson Education

2). Carl Hamacher, Zvonko Viranesic, Safwat Zaky, “Computer Organization”, 5th Edition, McGraw Hill

3). Abraham Silberschatz, Peter B. Galvin, Greg Gagne ,"Operating Systems Concepts", International Student Version, Wiley Student Edition
4). Andrew S. Tanenbaum, Herbert Bos, "Modern Operating Systems", 4th Edition, Pearson Education

Reference Books :

1). William Stallings, "Computer Organization and Architecture : Designing for Performance", 9th Edition, Prentice Hall of India

2). Milan. Milenkovic, "Operating Systems Concepts and design", 2nd Edition, Tata McGraw Hill.

3).Garry Nutt, "Operating Systems: A Modern Perspective", 2nd Edition, Pearson Education

(Practicals)

List of Practicals

(At least 15 Practicals from the following)

1). Introduction to 8086 architecture and instruction set and Writing assembly language programs in 8086 using MASM or compatible assembler either in windows or Linux.

2) Find the sum of 1 + 2 + 3.....+ n

3). Display the multiplication table of a number

4) Store and retrieve numbers from memory

5). Sort the numbers stored in the memory

6). Installing Linux / Windows Operating System, Partitioning and formatting disk, Installing applications device drivers, working with files, mounting file systems, checking system space, creating, modifying and deleting user accounts

7). Study of Basic commands of Linux.

8). Study of Advance commands of Linux.

9). Shell Programming in Unix/Linux, arithmetic operations, loops, files
Ex. Write a BASH shell script prime which will accept a number b and display first n prime numbers in standard output.

10). Shell scripting using general-purpose utilities.
Ex. A) Write a menu driven shell script which will print the following menu and execute the given task to display result on standard output.
a) Display calendar of current month
b) Display today"s date and time

c) Display usernames those are currently logged in the system
d) Display your name at given x, y position
e) Display your terminal number
f) Exit

11). Shell programming using filters (including grep, egrep, fgrep)

12). Write a shell script to validate the entered date. (eg. Date format is : dd-mm-yyyy)

13). Write a shell script to check entered string is palindrome or not

14). WRITE A PROGRAM in C using fork() and/or exec() commands where parent and child
Execute :

a. same program, same code.
b. same program, different code.
c. before terminating, the parent waits for the child to finish its task.

15). WRITE A PROGRAM in C to report behavior of Linux kernel including kernel version,
CPU type and model. (CPU information)

16). WRITE A PROGRAM in C to report behavior of Linux kernel including information on configured memory, amount of free and used memory. (memory information)

17). WRITE A PROGRAM in C to print file details including owner access permissions and file access time, the file name is given as argument.

18). WRITE A PROGRAM in C to copy files using system call

Skill Enhancement Courses

Second Year B. Sc.		**Semester III**
Computer Science -CSS103 : Programming in Python		
(Credits: Theory-03, Practicals-01) Theory : 45 Lectures Practicals : 30 Lectures		
Pre-requisites : Basic working knowledge of Computers and Internet		
Course Objectives: 1. To introduce programming concepts using Python. 2. To introduce object oriented programming concepts.		
(Theory)		
1.	Python Interpreter, Python Shell, strings, relational operators, logical operators, precedence of operators, bitwise operators, variables and assignment statements, script mode, functions, modules, command line arguments, control structures- if conditional statements, iteration for and while statements, break, continue and pass statements.	4 L
2.	Data types- Boolean, numbers, coercing integers to floats and vice versa, numerical operations, lists, creating a list, slicing a list, adding and removing items from a list, searching for values in a list, tuples, immutability property, converting tuples into a list, sets, set operations, dictionaries, strings, Unicode, formatting strings, docString, modules, packages, scope, recursion	12 L
3.	Object Oriented Concepts- Classes, Objects, Abstract Data types, polymorphism, encapsulation, modifier, accessor methods, static method, adding methods dynamically, composition, inheritance, built-in functions for classes.	14 L
4.	Files, Exceptions	4 L
5.	Applications of Python - use of Python libraries such as Matplotlib, Pandas, using databases with python, collecting information from Twitter etc. (at least three applications to be covered).	11 L

Text book :

1) Taneja Sheetal, Kumar Naveen , “Python Programming - A modular approach”, Pearson

Reference book:

1). Guttag John V., “Introduction to Computation and Programming using Python”, MIT Press, 2nd Edition.

(Practicals)

List of Practicals :

(at least 8 practicals from the following)

1) a)Write a function that returns the sum of digits of a number, passed to it as an argument.
   b)Write a function that returns True or False depending on whether the given number of a palindrome.
   c)Take the radius of circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the values.
   d) Write a function that finds the sum of the n terms of the following series:

$$1 - x^2 / 2! + x^4 / 4! - x^6 / 6! +. \ldots x^n / n!$$

2) Perform following actions on a list :
   Print the even-valued elements
   Print the odd-valued elements
   Calculate and print the sum and average of the elements of array
   Print the maximum and minimum element of array.
   Remove the duplicates from the array
   Print the array in reverse order

3) a)Define a function which can generate and print a list where the values are square of numbers between 1 and 20 (both included). Then the function needs to print all values except the first 5 elements in the list.

   b) Write a program which takes 2 digits, X,Y as input and generates a 2-dimensional array. The element value in the i-th row and j-th column of the array should be i*j.

4) a)Write a program that accepts sequence of lines as input and prints the lines after making all characters in the sentence capitalized.

   b) Write a program that accepts a sentence and calculate the number of letters and digits.

   c) Given an array of integers, find two numbers such that they add up to a specific target number.

5) a)Write a function that takes a list of values as input parameter and returns another list without any duplicates.

   b) Write a program that takes a sentence as input from the user and computes the frequency of each letter. Use a variable of dictionary type

to maintain the count.

6) a)Write a recursive function that multiplies two positive numbers a and b and return the result. Multiplication is to be achieved as a+a+a (b times).

b) Write a recursive function that inserts the element x at every n th position in the given list and returns the modified list.

7) a)Given a list of strings, return the count of the number of strings where the string length is 2 or more and the first and last characters of the string are the same

b) Given a list of strings, return a list with the strings in sorted order, except group all the strings that begin with 'x' first. e.g.
['mix', 'xyz', 'apple', 'xanadu', 'aardvark'] yields ['xanadu', 'xyz', 'aardvark', 'apple', 'mix']

8) Define a class Student that keeps track of academic record of students in a school. The class should contain the following data members:

rollnum - roll number of the student
name - name of the student
marksList - List of marks in 5 subjects
stream - A: Arts, C: Commerce, S: Science
percentage - percentage computed using marks
grade - grade in each subject computed using marks
division - division computed on the basis of overall percentage

The class should support the following methods:

a. __init__for initializing the data members
b. setMarks to take marks for five subjects as an input from the user
c. getStream for accessing the stream of the student.
d. Percentage for computing the overall percentage of for the student.
e. gradeGen that generates grades for each student in each course on the basis of marks.

Marls	Grade
>=90	A
<90 and >=80	B

<80 and >=65	C
<65 and >=40	D
<40	E

f. division for computing division on the basis of the following criteria based on overall percentage of marks scored:

Percentage	Division
>=60	I
<60 and >=50	II
<50 and >=35	III

g. __str__that displays student information.

9) Define a base class Vehicle , having attributes registration number, make, model and color. Also, define classes PassengerVehicle and CommercialVehicle that derive the class Vehicle. The PassengerVehicle class should have additional attribute for maximum passenger capacity. The CommercialVehicle class should have an additional attribute for maximum load capacity. Define_ init_ method for all theses classes. Also, get and set methods to retrieve and set the value of the data attributes.

10) Define classes Car, Autorickshaw and Bus which derive from the PassengerVehicle class mentioned in the previous question. The Car and Bus should have attributes for storing information about the number of doors, not shared by Autorickshaw. The Bus should have Boolean attribute doubleDecker not shared by Car and Autorickshaw. Define_ init_ method for all these classes. Also define get and set methods to determine and set the value of the day attributes.

11) Develop a program to sort the employee data on the basis of pay of the employees using i) selection sort ii) bubble sort. iii) insertion sort. Consider a list L containing objects of class Employee having empNum, name and salary.

12) Write a function that takes two file names, file1 and file2 as input. The function should read the contents of the file file1 line by line and should write them to another file file2 after adding a newline at the end of each line.

13) Write a function that reads a file file1 and displays the number of words and the number of vowels in the file.

14) Write a function that reads the contents of the file Peom.txt and counts the number of alphabets, blank spaces, lowercase letters and uppercase letters, the number of words starting with a vowel and the number of occurrences of word “beautiful” in the file.

15) Write a function that takes two files of equal size as an input from the user. The first file contains weights of items and the second file contains corresponding prices. Create another file that should contain price per unit weight for each item.

Note : Testing and Debugging tools to be used during the practical sessions.

Second Year B. Sc.		**Semester IV**
Computer Science -CSS104: Web Application Development using Flask		
(Credits: Theory-03, Practicals-01) Theory : 45 Lectures Practicals : 30 Lectures		
Pre-requisites : 1) Should be able to write code in Python 2) Knowledge of object oriented concepts and databases		
Course Objectives: 1). To learn how to create a basic web page using HTML and CSS. 2). To perform basic database operations using Python Flask Framework		
(Theory)		
1.	Introduction to world wide web, how the web works, Introduction to HTML5, anatomy of an HTML element, nesting elements, block versus inline elements, empty elements, attributes, Boolean attributes, anatomy of a HTML document, entity references, HTML comments, head, title, body, metadata, headings, paragraphs, lists, emphasis and importance, hyperlinks, anatomy of a link, block level links, URLs, absolute versus relative URLs, email links, description lists, quotations, abbreviations, superscript, subscript, date and time , image.	3 L
2.	Document and Website Structure, Structuring Content - semantic tags -header, navigation bar, main content, sidebar, footer, non-semantic wrappers- div and span, line breaks and horizontal rules, html table basics, span rows and columns, HTML table and advanced features and accessibility, designing form, fieldset, legend widgets, sending form data, form data validation, iframe.	4 L
3.	Introduction to CSS, how browsers affect CSS, internal and external style sheet, CSS syntax, selectors - simple selectors, attribute selectors, combinators, multiple selectors, pseudo-classes, pseudo-elements, cascade and inheritance, box model, fundamental text and font styling, values, units, colors, media queries, layout- static, liquid, adaptive and responsive, floats, positioning, flex box , grids.	14 L
4.	DOM, Introduction to JavaScript, statements, syntax, variables, functions, Event handlers, Introduction to Bootstrap Framework.	4 L
5.	Dynamic Pages v/s Static Pages , HTTP Request/Response Model, HTTP methods get and post ,Installing Flask, Basic Flask Application :_init_.py package, Using python decorators to modify the function that follows it. Routing : route() decorator, creating URL routes, passing variables, URL Binding : url_for() function, Flask-HTTP methods.	4 L
6.	Jinja2 Templating Engine : Separating code and User interface, render template() function, Conditional Statements, Loops, Template Inheritance.	2 L

7.	Flask Extensions, Installing flask-wtf extension, Flask WTF : Disadvantages of HTML Forms; flexible wtf forms, rendering and validation library; Standard Form Fields in WTF : TextField, BooleanField, IntegerField, RadioField, SelectField, TextareaField, PasswordField, SubmitField; Validator class : Length, NumberRange, URL; a Form example : Form class, Templates (HTML), Views, Receiving form data, Field Validations, Generating Links.	5 L
8.	SQLAlchemy a ORM for many relational databases, installing flask extension for SQL Alchemy, Flask-SQLAlchemy configuration for SQLite/PostgresSQL/MYSQL database, Database Models, Creation of a Migration Repository, Database Migration, Database Upgrade and Downgrade, Database Relationships, Basic database operations using SQLAlchemy.	5 L
9.	Session Handling in Flask, Introduction to Flask-Login, The User Model for Flask-Login, Password Hashing, User Loader Function, Logging Users In, Logging Users Out, Showing the Logged in users in templates, User registration.	4 L

Text Books :

1. Laura Lemay , Rafe Colburn , Jennifer Kyrnin, “Mastering HTML, CSS & JavaScript Web Publishing”, BPB Publications

2. Alex Libby, Gaurav Gupta, Asoj Talesra , “Responsive Web Design with HTML5 and CSS3 Essentials”, PACKT Publishing

3. Thomas Powell, “HTML & CSS: The Complete Reference”, Fifth Edition, MCGraw Hill

4. Miguel Grinberg, “Flask Web Development 2e”, OReilly

Reference Books :

1. Elisabeth Robson, Eric Freeman, Head First HTML with CSS & XHTML A Learner’s Companion to HTML, CSS and XHTML, O’Reilly Media

2. Jon Duckett, “Web Design with HTML, CSS, JavaScript and jQuery”, Wiley; Pck edition

3. Jack Stouffer , “Mastering Flask”, Packt Publishing Limited

(Practicals)

List of Practicals

(at least 8 Practicals from the following)

1. a). .Create web pages using text, paragraphs, header tags, links, lists tags
   b). Create web pages using table tags, column and row span
   c). Creating tables using scope, id and header attributes
2. a). Design a form using widgets
   b). Form validations
3. a). Use of different CSS selectors, pseudo-classes and pseudo-elements
   b). Design a landing page layout
   c). Use of CSS font style
4. Form validation using JavaScript
5. Use of Bootstrap
6. Installing Python3, Creating virtual environment , Installing Flask, Flask extensions flask-wtf, flask-bootstrap, flask-sqlalchemy, flask-migrate, flask-login
7. Using Jinja 2, template directory, render_template to display content from a Python Dictionary. Use Jinja2 conditional statements, loops, template inheritance
8. Create a Login Form using flask-wtf and flask-bootstrap
9. Create a User Registration Form using flask-wtf and flask-bootstrap
10. Develop a database application using Python Flask Framework

Second Year B. Sc.		**Semester IV**
Computer Science -CSS105: Web Application Development using ASP.NET		
(Credits: Theory-03, Practicals-01) Theory : 45 Lectures Practicals : 30 Lectures		
Pre-requisites : 1) Knowledge of object oriented concepts and databases		
Course Objectives: 1). To learn how to create a basic web page using HTML and CSS. 2). To perform basic database operations using .NET Framework		
(Theory)		
1.	Introduction to world wide web, how the web works, Introduction to HTML5, anatomy of an HTML element, nesting elements, block versus inline elements, empty elements, attributes, Boolean attributes, anatomy of a HTML document, entity references, HTML comments, head, title, body, metadata, headings, paragraphs, lists, emphasis and importance, hyperlinks, anatomy of a link, block level links, URLs, absolute versus relative URLs, email links, description lists, quotations, abbreviations, superscript, subscript, date and time , image.	3 L
2.	Document and Website Structure, Structuring Content - semantic tags -header, navigation bar, main content, sidebar, footer, non-semantic wrappers- div and span, line breaks and horizontal rules, html table basics, span rows and columns, HTML table and advanced features and accessibility, designing form, fieldset, legend widgets, sending form data, form data validation, iframe.	4 L
3.	Introduction to CSS, how browsers affect CSS, internal and external style sheet, CSS syntax, selectors - simple selectors, attribute selectors, combinators, multiple selectors, pseudo-classes, pseudo-elements, cascade and inheritance, box model, fundamental text and font styling, values, units, colors, media queries, layout- static, liquid, adaptive and responsive, floats, positioning, flex box , grids.	14 L
4.	DOM, Introduction to JavaScript, statements, syntax, variables, functions, Event handlers, Introduction to Bootstrap Framework.	4 L
5.	Dot NET-Framework, Common Language Runtime (CLR), Common Type System Intermediate Language(MSIL), DOT NET Compilers. Advantage of the Common Language Runtime **:** Re-Use code, Multiple language support, Cross-Language Interoperability, Error-Handling.	5 L
6.	Dynamic Pages v/s Static Pages, HTTP Request/Response Model, HTTP methods get and post, Web Forms, Request and Response objects, Session management, Site navigation controls : Treeview, Menu, SiteMappath; Master pages; Web Configuration file ‘web.config’, ‘web.sitemap’ .	5 L

7.	Accepting User input : label, textbox, checkbox, radiobutton, dropdownlist, radiobuttonlist, listbox, checkbox, checkboxlist; Submitting form data: button, linkbutton, imagebutton,hyperlink Fileupload. Validation controls: RequiredField, Range, Compare, RegularExpression and ValidationSummary.	5 L
8.	Ado.net:connection object, command object, executereader, executenonquery, executescalar, Data source : datareader , dataset, sqldatasource, connected & disconnected datasources. Data controls : gridview, formview, datalist and detailsview. Web pages for database operations	5 L

Text Books :

1. Laura Lemay , Rafe Colburn , Jennifer Kyrnin, "Mastering HTML, CSS & JavaScript Web Publishing", BPB Publications

2. Alex Libby, Gaurav Gupta, Asoj Talesra , "Responsive Web Design with HTML5 and CSS3 Essentials", PACKT Publishing

3. Thomas Powell, "HTML & CSS: The Complete Reference", Fifth Edition, MCGraw Hill

4. Kogent Learning Solutuions, "ASP.NET 4.0 in Simple Steps", Dreamtech press

Reference Books :

1. Elisabeth Robson, Eric Freeman, Head First HTML with CSS & XHTML A Learner's Companion to HTML, CSS and XHTML, O'Reilly Media

2. Jon Duckett, "Web Design with HTML, CSS, JavaScript and jQuery", Wiley; Pck edition

3. Stephen Walther, "ASP.NET 4.0 Unleashed", Pearson Education

(Practicals)

List of Practicals

(at least 8 Practicals from the following)

1. a). .Create web pages using text, paragraphs, header tags, links, lists tags

   b). Create web pages using table tags, column and row span

   c). Creating tables using scope, id and header attributes

2. a). Design a form using widgets

   b). Form validations

3. a). Use of different CSS selectors, pseudo-classes and pseudo-elements
   b). Design a landing page layout
   c). Use of CSS font style
4. Form validation using JavaScript
5. Use of Bootstrap
6. Install Visual Studio
7. Create a website in ASP.NET and add web forms using standard controls to capture data. Use Validation Control to validate data in the web form
8. Use Master Pages, SiteMapPath, Menu Controls to link the webforms.
9. Use ADO.NET to register data in Practical 3 into SQLServer/MYSQL database.
10. Use Gridview, FormView, DataList, DetailsView, SQLDatasource to list data in the database.
11. Use Bootstrap to Style the web forms in the website.

Second Year B. Sc.		**Semester IV**
Computer Science -CSS106: Web Application Development using Django		
(Credits: Theory-03, Practicals-01) Theory : 45 Lectures Practicals : 30 Lectures		
Pre-requisites : 1). Should be able to write code in Python 2). Knowledge of object oriented concepts and databases		
Course Objectives: 1). To learn how to create a basic web page using HTML and CSS. 2). To perform basic database operations using Python Django Framework		
(Theory)		
1.	Introduction to world wide web, how the web works, Introduction to HTML5, anatomy of an HTML element, nesting elements, block versus inline elements, empty elements, attributes, Boolean attributes, anatomy of a HTML document, entity references, HTML comments, head, title, body, metadata, headings, paragraphs, lists, emphasis and importance, hyperlinks, anatomy of a link, block level links, URLs, absolute versus relative URLs, email links, description lists, quotations, abbreviations, superscript, subscript, date and time , image.	3 L
2.	Document and Website Structure, Structuring Content - semantic tags -header, navigation bar, main content, sidebar, footer, non-semantic wrappers- div and span, line breaks and horizontal rules, html table basics, span rows and columns, HTML table and advanced features and accessibility, designing form, fieldset, legend widgets, sending form data, form data validation, iframe.	4 L
3.	Introduction to CSS, how browsers affect CSS, internal and external style sheet, CSS syntax, selectors - simple selectors, attribute selectors, combinators, multiple selectors, pseudo-classes, pseudo-elements, cascade and inheritance, box model, fundamental text and font styling, values, units, colors, media queries, layout- static, liquid, adaptive and responsive, floats, positioning, flex box , grids.	14 L
4.	DOM, Introduction to JavaScript, statements, syntax, variables, functions, Event handlers, Introduction to Bootstrap Framework.	4 L
5.	Dynamic Pages v/s Static Pages, HTTP Request/Response Model, HTTP methods get and post, Introduction to Django, Difference between a App and a Project, What are Migrations and Why we do that?, Admin part (How to create Superuser in Python).	8 L

6.	What are Views in Django, About the 3 Core Files: models.py, urls.py, views.py, URL Routing, Render and relative import, overview of settings file in Django, How to Configure Template,Models, Models and Admin Linkup, Model form creation , Form Validation , What is Context in Django ?, Form in a View, Custom Form, URL names as Links, Adding Bootstrap to Django	12 L

Text Books

1. Laura Lemay , Rafe Colburn , Jennifer Kyrnin, “Mastering HTML, CSS & JavaScript Web Publishing”, BPB Publications
2. Alex Libby, Gaurav Gupta, Asoj Talesra , “Responsive Web Design with HTML5 and CSS3 Essentials”, PACKT Publishing
3. Thomas Powell, “HTML & CSS: The Complete Reference”, Fifth Edition, MCGraw Hill
4. Sanjeev Jaiswal , Ratan Kumar, ”Learning Django Web Development”, Packt Publishing Limited

Reference Books

1. Elisabeth Robson, Eric Freeman, Head First HTML with CSS & XHTML A Learner’s Companion to HTML, CSS and XHTML, O’Reilly Media
2. Jon Duckett, “Web Design with HTML, CSS, JavaScript and jQuery”, Wiley; Pck edition
3. Aidas Bendoraitis, “Web Development with Django Cookbook”, Packt Publishing Limited; 2nd edition.

List of Practicals

(at least 8 Practicals from the following)

1. a). Create web pages using text, paragraphs, header tags, links, lists tags

   b). Create web pages using table tags, column and row span

   c). Creating tables using scope, id and header attributes
2. a). Design a form using widgets

   b). Form validations
3. a). Use of different CSS selectors, pseudo-classes and pseudo-elements

b). Design a landing page layout c).

Use of CSS font style

4. Form validation using JavaScript
5. Use of Bootstrap
6. Installing Python3, Creating virtual environment , Installing Django
7. a). Create a Django app and create View, map URL to views b).
   Create Template objects, Render templates
8. Working with databases? models.py, urls.py, views.py, database operations
9. Django Administration Site
10. Form Processing
11. Bootstrapping Django app.

Course Code : CSC105	**Course Title :** Computer Networks	**Semester :** V
Theory Marks : 100 **Practical Marks :** 50 **Total Marks** : 150	**Theory Credits :** 04 **Practical Credits :** 02 **Total Credits** : 06	**Theory Lectures :** 60 **Practical Lectures :** 60

Course prerequisites : CSC101 Introduction to Programming using C

Course objectives:

- To provide a strong background of Network Concepts.
- To be familiar with the components required to build and design different types of networks.
- To explain the various protocols associated with the network layers

Learning Outcomes : Upon completion of the course, students should be able to:

- Describe the network models and networks based on type and topology.
- Categorize and use transmission media based on their characteristics and applications.
- Detect and correct errors using various techniques.
- Explain different protocols for data transmission at the DLL.
- Be able to setup networks and also implement subnetting.
- Be able to apply different transport and application layer protocols.

Course content:

Unit		**Topic**		
#	**Title**		**Content**	**Lectures**
I	**Data Communication**		**Introduction:** Beginnings of Networking and data communication, ARPAnet	10L
			Networks: Components and Categories, Types of Connections, Topologies, Transmission Modes	
			Switching: Circuit switching, Message switching, Packet switching,	
			Protocols and Standards: Layered Architecture, OSI model, TCP/IP model;	
			Applications of Networks	
II	**Physical Layer**		Functions of Physical layer	8L
			Data Encoding: Manchester, Differential Manchester	
			Transmission Media: Twisted pair, Coaxial Cable, Fiber Optics, Wireless Media	
			Physical layer Devices: Hub, Repeater	
III	**Data Link Layer**		Functions of Data link layer	14L
			Data Framing techniques: Character Count, Character Stuffing, Bit Stuffing	
			Error detection and correction: Parity, CRC, Hamming code	

			Elementary Data Link Protocols: Stop and wait, Sliding window protocols - Go back-N: ARQ, Selective repeat ARQ		
			MAC Sublayer, **Random Access Protocols:** ALOHA, CSMA, CSMA/CD, CSMA/CA, Collision free protocols		
			Network Standards: IEEE 802.3 (Ethernet) frame format , Categories of standard ethernet – 10BaseT, 10BaseF, Bridged ethernet, separating collision domains , Switched ethernet , Fast ethernet IEEE 802.11 Architecture, frame structure		
			Data Link layer devices: Bridges, Switches		
IV	**Network Layer**		Functions of Network layer	12L	
			Network Service types: Virtual Circuits, Datagrams		
			Routing Algorithms: Shortest path routing, Flooding, Distance Vector routing, Link State routing; Hierarchical Routing		
			Congestion Control: Algorithms & Congestion Prevention Policies		
			Internet Protocols: IP Frame Format, IP Addressing, Subnets, Internet Control Protocols: ICMP, ARP, RARP, DHCP		
			Internetworking, **Network layer device :** Routers		
V	**Transport Layer and Applicatio n Layer**		Functions of Transport layer	10L	
			Transport Services: Connectionless, Connection-oriented, Transport service primitives Berkley sockets, Gateways		
			Transport layer Protocols: User Datagram Protocol, Transmission Control Protocol; Quality of Service parameters		
			Functions of Applications layer	06L	
			Electronic Mail; Domain Name System		

Text Book:

Behrouz A. Forouzan; Data Communications and Networking , McGraw Hill Education; Fifth Edition

References:

Andrew S. Tanenbaum; Computer Networks, Pearson Education India;5th Edition

Suggested List of Practical :

1. Create scenario and study the performance of network with star topology through NS-2 simulation.
2. Implementation of framing using Bit stuffing and Character stuffing
3. Simulation of Stop and Wait Protocol using NS-2.

4. Implementation of Dijkstra algorithm for Shortest Path Routing.
5. Configuring TCP/IP on a desktop.
6. Using diagnostic Network Commands: ping, traceroute, netstat, nslookup.
7. Simulate a Mobile Adhoc network (MANET) using NS2
8. Using Network protocol analyzer tool like ethereal (wireshark) or tcpdump to analyze network traffic
9. IP address manipulation (Extract network id and Host id given netmask)
10. Simulation of Congestion Control Algorithms using NS2
11. Implementation of IP fragmentation and reassembly.
12. Simple TCP client and server application (Single server-single client) – String manipulation and arithmetic operations.
13. Simple UDP client and server application (Single server-single client) – String manipulation and arithmetic operations.

Note :
Languages/Tools: C/C++, NS-2, Wireshark/TCPDump should be used for practicals.

Course Code : CSC106	**Course Title :** Object Oriented Programming	**Semester :** V
Theory Marks : 100 **Practical Marks :** 50 **Total Marks** : 150	**Theory Credits :** 04 **Practical Credits :** 02 **Total Credits** : 06	**Theory Lectures :** 60 **Practical Lectures :** 60

Course Pre-requisite : CSC101 Introduction to programming using C

Course objectives:

- To present the object oriented method, in viewpoint of software engineering — of the methods, tools and techniques for developing quality software in production environments.
- To study how practicing software developers, in industrial as well as academic environments, can use object technology to improve the quality of the software they produce
- Introduce Java Programming Environment and Design Patterns

Learning Outcomes : Upon completion of the course students should be able to:

- Use the characteristics of an object-oriented programming language in a program.
- Use the basic object-oriented design principles in computer problem solving.
- Use the basic principles of software engineering in managing complex software project
- Write Java programs using classes and object
- Implement Design Patterns in Java Programs

Course content:

Unit		Topic		
#	**Title**		**Content**	**Lectures**
I	CRITERIA OF OBJECT ORIENTATION		• On the criteria • Method and language • Implementation and environment • Libraries	4
II	TOWARDS OBJECT TECHNOLOGY		• The ingredients of computation • Functional decomposition • Object-based decomposition • Object-oriented software construction • Issues	5
III	THE STATIC STRUCTURE: CLASSES		• Objects are not the subject • Avoiding the standard confusion • The role of classes • A uniform type system • A simple class • Basic conventions • The object-oriented style of computation • Putting everything together	6
IV	THE RUN-TIME STRUCTURE: OBJECTS		• Objects • Objects as a modelling tool • Manipulating objects and references • Creation procedures • More on references • Operations on references	6

			• Attachment: reference and value semantics • Dealing with references: benefits and dangers		
V	MEMORY MANAGEMENT		• What happens to objects? • The casual approach • Reclaiming memory: the issues • Programmer-controlled deallocation • The component-level approach • Automatic memory management • Reference counting • Garbage collection • Practical issues of garbage collection	6	
VI	INTRODUCTION TO INHERITANCE		• What is inheritance? • Overriding and Polymorphism • Typing for inheritance • Dynamic binding • Deferred features and classes • The meaning of inheritance • The role of deferred classes	6	
VII	MULTIPLE INHERITANCE		• Examples of multiple inheritance • Feature renaming • Flattening the structure • Repeated inheritance	3	
VIII	EXCEPTION HANDLING		• Basic concepts of exception handling • Handling exceptions • An exception mechanism • Exception handling in Java	3	
IX	GENERICITY		• Horizontal and vertical type generalization • The need for type parameterization • Generic classes • Arrays • Generics and collection framework in Java	9	
X	DESIGN PATTERNS : INTRODUCTION		• What is a Design Pattern? • Describing Design Patterns. • How Design Patterns solve Design Problems • How to select a Design Pattern • How to Use a Design Pattern	2	
XI	CREATIONAL PATTERNS		• Factory Method • Prototype	2	

			• Singleton		
XII	STRUCTURAL PATTERNS		• Adaptor • Composite • Decorator • Façade • Proxy	4	
XIII	BEHAVIORAL PATTERNS		• Chain of Responsibility • Command • Iterator • Observer • State • Strategy	4	

Text Books:

1. Bertrand Meyer , Object Oriented Software Construction, Prentice Hall; Second edition

2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, Design Patterns : Elements of Reusable Object-Oriented Software, Pearson

3. Khalid A. Mughal and Rolf W. Rasmussen, A Programmer's Guide to Java SCJP Certification, Addison-Wesley

Reference Books

1. Kathy Sierra, Bert Bates , Head First Java - A Brain-Friendly Guide, O'Reilly, Second Edition
2. Kathy Sierra, Elisabeth Freeman, Head First Design Patterns - A Brain-Friendly Guide, O'Reilly

Suggested list of practical **:**

Programs covering the following topics may be done **:**

1. Use of command line environment and run-time environment in Java (javac and java)
2. Creating classes
3. Constructors and overloading
4. Object composition using references
5. Use of standard libraries like Math, String, util.*
6. Inheritance
7. Overriding, polymorphism and dynamic binding
8. Abstract class, interfaces and multiple interface inheritance
9. Use of static keyword
10. Exception handling
11. Arrays
12. Collection framework – ArrayList, Maps
13. Minimum one exercise on each design pattern

Tools like Notepad, Eclipse may be used to do the practical.

Course Code : CSC107	**Course Title :** Software Engineering	**Semester :** V
Theory Marks : 100 **Practical Marks :** 50 **Total Marks** : 150	**Theory Credits :** 04 **Practical Credits :** 02 **Total Credits** : 06	**Theory Lectures :** 60 **Practical Lectures :** 60

Course prerequisites : -

Course objectives: To study various methods used for software development with a stress on Agile Software Development

Learning Outcomes : Upon completion of the course students should be able to::

- Explain Evolution and fundamentals of software engineering methods
- Apply Agile software development method – Scrum
- Apply refactoring techniques
- Perform software testing using various quality assurance methods
- Explain Source Control Tools

Course content:

Unit		Topic	
#	**Title**	**Content**	**Lectures**
I	**Introduction to Software Engineering**	Introduction to Software Engineering, Software Development phases(Requirements, Analysis, design and implementation, testing and maintenance), SDLC, Waterfall methodology, Prototyping and Iterative, Reverse engineering, reengineering	8
II	**Introduction to Source Control tools**	Introduction to Source Control tools - versioning, check-in/checkout, commit, branching, merging, synchronization	4
III	**Agile Approach**	Agile Approach: Agile Framework, Agile Manifesto, Agile Principles, Extreme Programming, Scrum	8
IV	**Software Project Management using Scrum**	Software Project Management using scrum : User stories, Estimation using story points, sprint, backlog(product and sprint), Scrum team, scrum artifacts, scrum ceremonies	20
V	**Design and Implementation using XP**	Design and implementation using XP: TDD, refactoring(code smells and refactoring techniques) , Unit testing, Pair Programming	10
VI	**Quality Assurance**	Quality assurance (Verification & Validation): Testing approaches, Types of testing, testing tools- JUnit, Selenium, Build tools, Iteration and Release planning, Introduction to Continuous Integration	10

Text Books:

1. Pankaj Jalote , Integrated Approach to Software Engineering, Narosa Publishing House
2. Chris Sims and Hillary Louise Johnson , Elements of Scrum, Dymaxicon, LLC
3. Martin Fowler, Refactoring, Addison Wesley; 2nd edition

Reference Books:

1. Ken Schwaber, Mike Beedle , Agile Software Development with Scrum, Pearson Education
2. S. Kenneth Rubin, Essential Scrum: A Practical Guide to the Most Popular Agile Process, Pearson Education
3. Kent Beck, Extreme Programming Explained: Embrace Change, Addison Wesley, 2nd Edition

Suggested List of Practical :

1. Git
2. User stories, Estimation
3. Burndown charts, Scrum board, Trello,
4. JUnit, Selenium
5. Refactoring exercises(pair programming)
6. Debugging and defect tracking using Bugzilla
7. Maven Build
8. Javadoc

The above practical should be done using a mini project using scrum and by performing refactoring exercises using pair programming. The tools Eclipse, Git, Selenium, Bugzilla, Trello are suggested.

Course Code : CSC108	**Course Title :** Mobile Application Development	**Semester :** VI
Theory Marks : 100 **Practical Marks :** 50 **Total Marks** : 150	**Theory Credits :** 04 **Practical Credits :** 02 **Total Credits** : 06	**Theory Lectures :** 60 **Practical Lectures :** 60

Course prerequisites :
1). CSC106 Object Oriented Programming
2). CSC103 Database Management Systems

Course objective : Introduce mobile application development for the Android platform using XML and Java/Kotlin. Include developing simple applications that could run on Android phones and tablets. Cover Android application terminologies, components and coding.

Learning Outcomes : Upon completion of the course students should be able to :

- Describe the anatomy of a mobile app.
- Use Android components in designing simple mobile applications.
- Identify the significance of each of the Android basic building blocks and determine when to use which component.
- Discuss the data storage options available on android platform and perform basic CRUD operations on persistent data.
- Design complete Android app by integrating the android building blocks and using firebase as backend tool.

Course content:

Unit		Topic		
#	**Title**	**#**	**Content**	**Lectures**
I	**Introduction to Mobile Apps and Android**	A	**Introduction:** Need for Mobile Apps. Different types of Mobile Apps. Android vs. Other mobile platforms Open Handset Alliance (OHA) Features of Android Android Limitations	03
		B	**Mobile Navigation:** Basic patterns, Pros and Cons Screen independent design - Resolution and density independence (px, dip, dp, sip, sp)	02
		C	**Android Pre-requisites:** Java/Kotlin Programming fundamentals Introduction to XML Introduction to Build System (Gradle)	05

		D	**Android Architecture:** Overview of Android Architecture Internals Linux Kernel, Libraries, Android Runtime, Application Framework, Dalvik VM and .apk files **Emulator – Android Virtual Device:** Definition, Features, Examples	03	
		E	**Android Basic Building blocks:** Activities, Services, Broadcast Receivers and Content	02	

			Providers **UI Components:** Views and notifications		
II	**Activities and UI**	A	**Introduction:** Activities, Views, layouts (LinearLayout and RelativeLayout and WebView) Responsive UI with ConstraintLayout Significance of application manifest file	04	
		B	**Creating User Interface (UI):** Common UI components (TextView, EditText, Button, Checkbox, RadioButton , ToggleButton, Spinner, Pickers) Activity lifecycle Understanding the exception handler	04	
		C	**Event Handling:** onClick(), onLongClick(), onFocusChange(), OnKey(), onTouch(), onCreateContextMenu(), onCreateOptionsMenu()	04	
		D	**Intents:** Intents uses, intent types (Implicit & Explicit), Passing data(Direct, Bundle & Parcelable) Implicit Intents – Intent Filters and Intent Resolution Process, Pending intents	04	
		E	**Advanced UI:** Building Layouts with an Adapter (GridView & ListView), Custom Adapters, Menus (Options menu & Context menu), Toast, Custom Toast, Dialogs, Status bar Notifications.	04	
III	**Broadcast Receivers and Services**	A	**Broadcast Receivers (BR):** Broadcast receiver registration (Static & Dynamic), Broadcast Receiver Classes, Sticky & non-sticky BR, BR Security ,Understanding Broadcast action, category and data, Sending & Receiving Broadcast	03	
		B	**Services:** Overview of services in Android, Implementing a Service, Service lifecycle, Inter Process Communication (AIDL Services).	03	
		C	**Web Services and WebView** : Consuming web services, Receiving HTTP Response (XML, JSON), Parsing JSON and XML, Using WebView	03	
IV	**Multithreading**	A	**Multithreading:** Background processing in android	02	
		B	**Threads running on UI thread:** Handlers & Runnable, AsyncTask	02	
V	**Data Storage**	A	**Introduction to data storage:** **Shared Preferences:** Introduction, Preferences types, operating modes **Android File System**:	04	

			Internal storage, External storage.		
		B	**SQLite:** Basics of SQLite Database, Data Types, SQLite Connections, SQLiteOpenHelper class	03	
		C	**SQLite Queries:** Working with cursors, Inserting, updating, and deleting contents of SQLite	03	
		D	**Firebase:** Introduction, Firebase services (Authentication, Cloud messaging, Database query)	02	

Reference Books :

1. Dawn Griffiths and David Griffiths, Head First Android Development: A Brain-Friendly Guide, Shroff/O'Reilly; Second edition, 2017.
2. John Horton, Android Programming for Beginners, Packt Publishing Limited , 2015.
3. Erik Hellman, Android Programming: Pushing the Limits (MISL-WILEY) , Wiley,2013
4. Iyanu Adelekan, Kotlin Programming by Example, Packt Publishing Limited,2018.
5. Valentino Lee, Heather Schneider, and Robbie Schell, Mobile Applications: Architecture, Design, and Development, Prentice Hall, 2004.
6. Rajiv Ramnath, Roger Crawfis, and Paolo Sivilotti, Android SDK 3 for Dummies, Wiley, 2011.

Web References

1. https://developer.android.com/
2. http://www.tutorialspoint.com/android/
3. http://www.appinventor.org/
4. http://www.smashingmagazine.com/guidelines-for-mobile-web-development/
5. https://www.smashingmagazine.com/2017/05/basic-patterns-mobile-navigation/

Suggested List of Practical :

1). Setup Android Studio Environment

- Install or update Android Studio to its latest version.
- Ensure that your Android app:
  - Targets API level 16 (Jelly Bean) or later
  - Uses Gradle 4.1 or later
- Create Android Studio Environment,
- Explore Android Studio IDE
- Set up a device or emulator for running your app (Android studio's Emulator, Genymotion, Koplayer, Memu)
- Sign into Firebase using your Google account.
- Connect your Android app to Firebase

Testing and Debugging Android Application (Use of Dalvik Debug Monitor Server (DDMS), Use of Step Filters, Breakpoints, Suspend and Resume, use of LogCat (Verbose, Debug, Info, Warn, Error, Assert), Use of Perspectives

2). Create Simple Calculator Application

Layout design with constraint layout, Implement app, Debug and find errors, Installation of .apk into

your android mobile

3). Create Tic tac toe Game

Layout design with TableLayout , Add colors, Buttons call event, Find winner, Play with device.

4). Create Zoo app

- ListView layout design, Load listView with Data, Load different views in ListView, ListView events, Add or Remove item to listView

5). Create Restaurant App

Design GridView Layout, Load gridView with list of foods, Show Food details

6). Web services - Find City sunrise time app

HTTP calls, JSON and XML, UI layout design, HTTP calls and JSON read

7). Sqlite database - My notes

Design Add notes layout, Use Menu bar and Intent, Styles, Add notes to Sqlite database, List notes from Sqlite database, Delete notes from Sqlite database, Update notes in Sqlite database

8). Complete Alarm App

- Layout design, Broadcast Receiver and Service concept, Broadcast Receiver and Set alarm time

SharedPreferences and start app with OS

9). Use Firebase Realtime Database, to build a mobile system

- User login with phone number, Menus for contact and main activity, Dummy contact list data, Pick contacts from phone. Save my trackers in Shared preferences, Firebase signIn anonymously, Save user info into Firebase, Save my trackers in Realtime- database, People who I find using dummy data, People who I find using Firebase data, Load user's contacts, Send phone location to the server, Find missing phone location
- Services Vs Broadcast receiver
- Service, Run App in background

Note :

Languages/Tools: Java/Kotlin, XML, Android Studio, AVD (Android studio's Emulator, Genymotion, Koplayer, Memu), Firebase may be used for practical.

Course Code : CSC110	**Course Title :** Internet of Things	**Semester :** VI
Theory Marks : 100 **Practical Marks :** 50 **Total Marks** : 150	**Theory Credits :** 04 **Practical Credits :** 02 **Total Credits** : 06	**Theory Lectures :** 60 **Practical Lectures :** 60

Course prerequisites : - Basic programming knowledge

Course objective :

- To Introduce concepts for internet of things and the different devices involved in IOT.
- To introduce cloud concepts and its use in IOT
- Gain hands on experience of working with different sensors/actuators and their use in IOT projects.
- To gain knowledge of Arduino, NodeMcu, Raspberry pi Boards and to develop IOT projects by integrating these boards with a cloud platform.

Learning Outcomes : Upon completion of the course students should be able to :

- Explain the requirements and components of an IOT system.
- Develop different IOT projects using cloud technology
- Develop IOT Projects using the Arduino, NodeMcu, Raspberry pi Boards and a cloud platform such as Nodered or similar.

Course content:

Unit		Topic		
#	**Title**	**#**	**Content**	**Lectures**
I	**IOT Concepts**	A	**Introduction** Definition, modern day IoT applications, Baseline technologies-M2M,WoT, IOT categories- industrial and consumer, IOT components	03
		B	**Sensors and Actuators** sensors, transducers, sensor features, resolution, analog sensors, digital sensors, scalar sensors, vector sensors, sensor types. Actuators-types-hydraulic, pneumatic, electrical, thermal/mechanical ,motors-DC, Servo, Stepper, relays, motor drivers for interfacing	06
		C	**IOT Networks** IoTWF Standardized Architecture, Connectivity Protocols-MQTT,SMQTT; communication protocols-IEEE 802.15.4,802.11,LORA wireless protocol ,ZigBee	06
II	**IOT Boards**	A	**Arduino** Introduction to Arduino Programming-features of arduino, Arduino IDE, sketch, sketch structure, supported data types, Arduino function libraries, operators, control statements, arrays, String functions, Interrupts, sensor interface with Arduino, DHT sensor library, types of motor actuators, Arduino servo library	10

		B	**Raspberry Pi and comparative study** Introduction to Raspberry Pi – specifications, GPIOs, Features of EsP8266 ,comparative studies of Arduino	06	

			uno, raspberry pi, nodemcu boards and their applications		
III	**Cloud Technology**	A	**Introduction to cloud computing** definition, characteristics, components, service models-IaaS, Pass, SaaS, Deployment models-public, private, hybrid, open source and commercial clouds-examples, facilities offered	10	
		B	**Cloud computing case studies** Microsoft Azure-features, Azure as PaaS, Azure as Iaas; OPenStack-components and features, Firebase cloud service features	06	
		C	**Visual tool for wiring IOT** NodeRed, its features, installing on Raspberry pi	04	
		D	**Wireless sensor networks** definition, limitations; Sensor cloud-definition, difference with WSN, Actors in sensor cloud, architecture	05	
		E	**Fog computing** Introduction, why use fog computing, when to use fog computing, architecture of fog, fog nodes, working of fog, applications of fog	04	

Reference Books :

1. Arshdeep Bagha, Vijay Madisetti , Internet of Things: A Hands-On Approach, Orient Blackswan Private Limited
2. Adrian Mcewen , Designing The Internet of Things, Wiley
3. Hanes David,Salguiero Gonzalo , IoT Fundamentals: Networking Technologies, Protocols and Use Cases for the Internet of Things , Pearson Education

Suggested List of Practical :

1. Blink an LED . Traffic lights using Arduino board.
2. Night security light using PIR motion sensor and photo resistor.
3. Arduino weather station with temperature, humidity, pressure date and time.
4. Controlling a server motor using arduino.
5. Setting up Raspberry pi and blinking LED
6. Capturing an image using Raspberry Pi
7. DHT22 interfaced with Raspberry Pi to record the temperature.
8. Setting up server on Raspberry Pi and sending the recorded temperature to the server.
9. Installing NOdeRed, creating and testing a simple flow in NodeRed.
10. Controlling an LED with NodeRed.
11. Use of Digital Smoke and gas sensor to detect gas/smoke with ESP8266, MQTT and NodeRed.
12. Controlling lamps and outlets using Arduino and MQTT

Note :
Tools like Arduino IDE, python editor may be used

Course Code : CSC109	**Course Title :** Full Stack Web Development	**Semester :** VI
Theory Marks : 100	**Theory Credits :** 04	**Theory Lectures :** 60
Practical Marks : 50 **Total Marks** : 150	**Practical Credits :** 02 **Total Credits** : 06	**Practical Lectures :** 60

Course prerequisites : - Working knowledge of HTML,CSS, JavaScript

Course objective:

- To know the core concepts of Node js and React for server side and client side coding .
- To gain insight and understand the working of MVC architecture with MERN
- To introduce the no-sql database - MongoDb

Learning Outcomes : Upon completion of the course students should be able to::

- Explain the significance of each of the MERN components.
- Develop a CRUD application using MongoDb.
- Develop applications using NODEjs, React to understand the different aspects of these technologies.
- Design and implement a full-fledged application using all the components of the MERN Stack

Course content:

Unit		Topic		
#	**Title**	**#**	**Content**	**Lectures**
I	**JavaScript**	A	**JavaScript basics:** Introduction, Syntax and Statements, Comments, Operators, Variables, Z `Assignment, Loops, If and Switch conditions, break & Continue, Data Types: Number & Number Methods, Strings and String Methods, Functions, Callbacks, Arrays, Array Methods, Looping through an array (Array Iteration)	03
		B	**JavaScript advanced features** Let and Const, Let inside loops, String Templates For of Loops, map, reduce, filter, Arrow Functions Class, Class properties and methods, object, this operator, spread function, Class Constructor, Class Inheritance, Modules import and export, Form validation using validation API	06
		C	**AJAX** Ajax - request object creation, forwarding the request, accepting response object and display on webpage, JSON syntax, XmlHttpRequest Object	02

II	**Node Js**	A	**Introduction** Advantages of Node JS , Node.js Process Model, Working in REPL, Node JS Console.	02	
		B	**Node JS Modules** Functions, Buffer, Module, Module Types : Core Modules, Local Modules, Module.Exports	03	

		C	**Node Package Manager** NPM, Installing packages Locally, Adding dependency in package.json, Installing packages globally, Updating packages.	02	
		D	**Web Server** Creating Web Server, Handling HTTP Requests, Sending Requests.	03	
		E	**File System** Fs.readFile, Writing a File, Writing a file asynchronously, Opening a file, Deleting, Other IO Operations.	03	
		F	**Events** EventEmitter Class, Returning event emitter, Inheriting events	03	
III	**React**	A	**React elements and JSX** What is react? advantages and disadvantages Overview of JSX, creating elements with JSX,JSX components, properties in JSX, condition statements in JSX, Rendering an Element into the DOM, Naming Conventions	05	
		B	**Components & Component Life Cycle** Overview of Components, Props, State, component composability, Life Cycle Methods, Reusable Components	06	
		C	**Forms** Submitting the form data to server using react component and updating state, Validating Props, Call back events.	06	
IV	**Express Js**	A	**Introduction** Introduction to Express, MVC pattern, initial node server setup, adding data to the server(ready data from mockaroo)	02	
		B	**Routing**	04	

			create a basic route, add a static route for file server, routing with express : routing parameters, routing handler, routing common methods, routing chaining,		
		C	**HTTP Interaction:** Handling Form Data, Handling Query Parameters, Cookies and Sessions	03	
		D	**RESTful Services** Creating and Consuming RESTful Services, Using Templates	03	
V	**MongoDb**		Introduction to MongoDb, Document-oriented database, key features, databases and collections , CRUD operations, Text search operations	04	

Reference Books :

1. Basarat Ali Syed , Beginning Nodejs, Appress
2. Vasan Subramanian , Pro MERN Stack **Full Stack Web App Development with Mongo, Express, React, and Node**, Appress, 1st Edition
3. Eddy Wison,Iriarte Koroliova ,MERN Quick Start Guide: Build web applications with MongoDB, Express.js, React, and Node , Packt

Web References

1. https://docs.mongodb.com
2. https://medium.com/poka-techblog/
3. https://javascript.info/
4. https://reactjs.org/

Suggested List of Practical :

1. JavaScript
   a) Demonstration of const, let, string templates, callbacks, arrow functions, class, class-properties, methods.
   b) Handling asynchronous request using AJAX and JSON with a simple server script that just returns JSON data.

2. Nodejs - Installation and Nodejs Core
   a) Installing Nodejs
   b) Use of global object
   c) Argument variables with processargv
   d) Standard input and standard output

3. Nodejs Modules

a) Core Modules
b) Collecting information with Readline
c) Handling events with EventEmitter
d) Exporting custom modules
e) Creating child process with exec/spawn

4. The File system

a)Listing directory files
b) Reading files
c) writing and appending files
d)Directory creation
e)Readble file streams
f)Writable file streams

5. The Http Module

a) Making a request
b)Building a web server
c)serving files
d) serving JSON data
e) Collecting POST data

6. The Node Package manager

a)Installing node NPM
b) Initializing a package-json file
c) Adding node packages
d) Managing global directory
e)Updating a package
f)Removing a package
g)File servers with httpster

7. Introduction to React Elements

a) Installing create-react-app
b) Generate a project
c) Create react elements
d) Refactor elements using JSX

8. React components

a)Create a react component
b)Add component properties
c) Creating a component(ex Book) with data
d)Adding custom methods
e) creating function components.

9. Props and states

a)Compose components
b)Display child components
c)Introducing state
d)Using setstate
e)pass state as props

f)Conditional rendering

10. Additional react features

    a) Component life cycle

    b)Fetching and rendering JSON data

    c)Using forms with react.

11.Mongodb

a) installation

b)collection and basic operations(find, create, update ,delete, drop)

c)Reading and writing to MongoDb database using APIs

12. Developing a simple CRUD application using the MERN stack.

Note :

The Tools visual Studio code/sublime may be used for practical

Discipline Specific
Electives

Course Code : CSD101	**Course Title :** Human Computer Interaction	**Semester :** V
Theory Marks : 75	**Theory Credits :** 03	**Theory Lectures :** 45
Practical Marks : 25 **Total Marks** : 100	**Practical Credits :** 01 **Total Credits** : 04	**Practical Lectures :** 30

Course objectives:

- To introduce the foundations of Human Computer Interaction, design technologies and user interface design and development.
- Learn the foundations of Human Computer Interaction
- Be familiar with the design technologies for individuals and persons with disabilities
- Learn the guidelines for user interface design and development
- Be aware of mobile HCI

Course Outcomes : Upon completion of the course students should be able to::

- Develop meaningful user interface
- Assess the importance of user feedback
- Design effective HCI for individuals and persons with disabilities
- Develop persona, conduct interview
- Develop storyboard and design prototype
- Design GUI, Web UI and Reports.
- Perform Heuristic Evaluation of the design

Course content:

Unit		Topic		
#	**Title**		**Content**	**Lectures**
I	**FOUNDATIONS OF HCI**		The Human: I/O channels, Memory, Reasoning and problem solving; The computer: Devices, Memory, processing and networks; Interaction: Models, frameworks, Ergonomics, styles, elements, interactivity, Paradigms	8
II	**DESIGN – RULES AND TECHNIQUES**		Interactive Design basics: process, scenarios, navigation, screen design, Iteration and prototyping. Usability engineering, Prototyping in practice, design rationale. Design rules: principles, standards, guidelines, rules. Evaluation Techniques, Universal Design.	8
III	**MODELS AND THEORIES**		Cognitive models, Socio-Organizational issues and stake holder requirements; Communication and collaboration models-Hypertext, Multimedia and WWW	8

IV	**MOBILE HCI**		Mobile Ecosystem: Platforms, Application frameworks, Types of Mobile Applications: Widgets, Applications, Games; Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.	8	
V	**WEB INTERFACE DESIGN**		Designing Web Interfaces: Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow	8	
VI	**CONTEMPORARY INTERFACE DESIGN TECHNOLOGY**		Future Domains, IHCI and Case Studies	5	

Reference Books :

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale; Human Computer Interaction; Pearson Education, 2004 (UNIT I,II and III), 3rd Edition.

2. Brian Fling; Mobile Design and Development , OReilly Media Inc., 2009 (UNIT –IV)

Bill Scott and Theresa Neil ; Designing Web Interfaces; OReilly, 2009 (UNIT V), First Edition

Suggested list of practical :

1. Paper Prototyping using templates
2. Story boarding
3. Conducting survey interview and summarizing the result
4. Persona- conducting contextual interview and developing persona
5. GUI design- form design, menu design, help, error messages
6. Web UI design- pages, navigation, controls, (Ajax)
7. Report designs

Heuristic evaluation

Course Code : CSD102	**Course Title :** Data Mining	**Semester :** V
Theory Marks : 75 **Practical Marks :** 25 **Total Marks** : 100	**Theory Credits :** 03 **Practical Credits :** 01 **Total Credits** : 04	**Theory Lectures :** 45 **Practical Lectures :** 30

Course objectives:

- To get an understanding of the general properties of data in large databases
- Understand a variety of real-world applications that require mining
- To introduce the basic concepts of Data Warehouse and Data Mining techniques.
- Examine the types of the data to be mined and apply pre-processing methods on raw data using data mining software.
- Become familiarized with association analysis, classification and cluster analysis of data objects.
- To discover interesting patterns, analyze and estimate the accuracy of popular data mining algorithms using different data sets.
- Get introduced to the challenges in mining complex data types.

To develop skills of using data mining software for solving practical data mining problems.

Learning Outcomes : Upon completion of the course students should be able to:

- Design a DatawarehouseSchema
- Use Classification and prediction methods to solve problems
- Identify suitable clustering methods for different applications

Course content:

Unit		Topic		
#	**Title**		**Content**	**Lectures**
I	**Data Mining Overview**		Evolution of Database Technology, What is Data Mining, Scope of Data Mining, Task of Data mining, Which Kind of Applications are Targeted-Business Intelligence, Web Search Engines, Common Data Mining Application Domains, Benefits of Data Mining, Data Mining and Society	3L
II	**Data Pre-Processing**		Data Objects and Attribute Types, Data Pre-processing – Data Quality: a Reason to Pre-process the Data, Major Task in Data Pre-processing-Data Cleaning-Missing Data; Noisy Data; Inconsistent Data, Need of Data Integration-Issues in Data Integration, Data Transformation, Need of Data Reduction, Data Visualization	4L

III	**Data warehousing and OLAP**		Introduction to Data Warehouse, Understanding a Data Warehouse, Data Warehouse Schema- Star, Snowflake, Fact Constellations, Data Warehouse Modeling: OLAP and Data Cube-What is OLAP, what is Data Cube, Data Cube as a Multidimensional Data Model, Dimensions: The Role of Concept Hierarchies, OLAP in Data Warehouse, OLAP Vs OLTP, Types of OLAP, Data Usage in Data Warehouse, Data Warehousing, A Three Tier Data Warehouse Architecture, Data Warehouse Design Process, Data Warehousing to Data Mining, Data Warehouse Applications	7L	
IV	**Basics of Data Mining:**		Data Mining and Knowledge Discovery, What kind of Data can be Mined, Technologies used in Data Mining- Statistics; Database and Data	9L	

			Warehouse Systems; Information Retrieval; Machine Learning; Pattern Recognition, Data Mining System Architecture, Data Mining Techniques, Issues in Data Mining- Mining Methodology and User Interaction Issues; Performance Issues; Diverse Data Type Issues		
V	**Association Analysis**		Introduction to Association Analysis, Frequent Patterns, Market Basket Analysis, Association Rule Mining-Problem Definition, Important Concepts; The Apriori Algorithm: Finding Frequent Itemsets Using Candidate Generation; Pseudocode for Apriori; Example of Apriori for Generating Frequent Itemsets ; Example of Apriori for Generating Association Rules, Mining Multilevel Association Rules, Mining Multidimensional Association Rules, Other Applications of Association Rule Mining	9L	
VI	**Classification and Prediction**		Introduction, Classification and Prediction Techniques, How Does Classification work, Building the Classifier; Using Classifier for Classification, General Approach to Classification, Classification and Prediction Issues. Classifier Accuracy-Confusion Matrix: Accuracy; Recall; Precision; F-Measure, Type-I, Type-II errors.	5L	
VII	**Cluster Analysis**		Introduction to Cluster Analysis, What is Clustering, Clustering Applications, Requirements for Clustering Algorithms, Major Clustering Methods- Partitioning Methods, Hierarchical Methods, Density Based Methods	5L	
VIII	**Trends in Data Mining**		Introduction, Mining Complex Data Types-Temporal Data Mining, Streaming Data Mining, Spatial Data Mining, Text Mining and Multimedia Data Mining, Web Mining-Categories of Web Mining	3L	

Text Book :

1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques," 1st Edition Indian Reprint 2001, Harcourt India Private Limited.
2. Margaret Dunham, "Data Mining: Introductory and Advanced Topics," 1st Edition, 2003, Prentice Hall (Pearson Publication).
3. Arun K Pujari: Data Mining Techniques, 2nd Edition, Universities Press, 2009.

Reference Books :

1. Pang-Ning Tan, Michael Steinbach, Vipin Kumar: Introduction to Data Mining, Pearson Education, 2005.
2. Gupta G. K., Introduction to Data Mining with Case Studies, Prentice Hall India Learning Private Limited; Third edition (2014)

Suggested list of practical:

1. Create employee.arff dataset with attributes gender, age, salary, performance in the following format. Also create employee.csv dataset. View both the files.

```
@relation employee
@attribute gender{male,female}
@attribute age numeric @attribute
confirmed {yes,no}
@attribute salary{10000,15000,20000,25000,30000,35000} @attribute
performance{poor,average,good}
@data male,25,yes,10000,poor
male,25,no,15000,poor
female,25,yes,10000,poor
female,25,yes,15000,poor
male,28,no,15000,poor
female,28,no,10000,poor
male,30,yes,20000,average
female,30,no,20000,average
female,30,no,25000,average
male,30,no,25000,average
male,35, yes,30000,good
female,40,yes,35000,good
male,40,yes,30000,good
male,40,yes,35000,good
female,40,yes,35000,good
```

2. Apply preprocess on employee.arff and employee.csv dataset.

3. Carry out filter operation on employee dataset to do the following-1)Add attributes qualification of nominal type and experience of numeric type 2) Remove attribute confirmed
3) Normalize the dataset. Perform preprocess on the modified dataset.

4. Create studentbuyspc.arff dataset in the following format. Also create studentbuyspc.csv dataset. Perform preprocess on the datasets. (Add 20 more record instances of your choice and get the results).

```
@relation studentbuyspc @attribute
age {<30,30-40,>40}
@attribute income {low, medium, high} @attribute
student {yes, no}
```

```
@attribute credit-rating {fair, excellent}
@attribute buyspc {yes, no}
@data
<30, high, no, fair, no
<30, high, no, excellent, no
30-40, high, no, fair,  yes
>40, medium, no, fair,  yes
>40, low, yes, fair, yes
>40, low, yes, excellent, no
30-40, low, yes, excellent, yes
<30, medium, no, fair, no
<30, low, yes, fair, no
>40, medium, yes, fair,  yes
<30, medium, yes, excellent, yes
30-40, medium, no, excellent, yes
30-40, high, yes, fair, yes
>40, medium, no, excellent, no
```

5. Create PhoneBuyDecision.arff dataset in the following format. Perform preprocess on the dataset. Identify noisy and missing data. (Add 10 more record instances of your choice and get results). Visualize the results.

```
@relation SmartPhoneBuyingDecision
@attribute age {Youth,middle,senior}
@attribute income {high,medium,low}
@attribute student {no,yes}
@attribute savingaccount {no,yes}
@attribute buyssmartphone {iphone6s,SamsungS7}
@data
Youth,high,no,no,iphone6s
Youth,high,no,yes,iphone6s
middle,high,no,SamsungS7
senior,medium,no,no,SamsungS7
senior,low,yes,no,SamsungS7
senior,low,yes,yes,iphone6s
middle,low,yes,yes,SamsungS
Youth,medium,no,no,iphone6s
Yout,low,yes,no,SamsungS7
senior,medium,yes,no,SamsungS7
Youth,medium,yes,yes,SamsungS7
midd,medium,no,yes,SamsungS7
middle,high,yes,no,SamsungS7
senior,medium,no,yes,SamsungS7
middle,high,yes,no,SamsungS7
senior,medium,no,yes,iphone6s
middle,low,yes,yes,SamsungS7
Youth,med,no,no,iphone6
Youth,high,no,no,iphone6s
senior,low,yes,no,SamsungS7
senior,low,yes,iphone6s
Youth,low,yes,no,SamsungS7
middle,high,no,no,SamsungS7
Youth,medium,yes,yes,SamsungS
senior,medium,no,SamsungS7
seni,medium,no,no,SamsungS7
middle,medium,no,yes,SamsungS7
```

6. Create the following five different datasets with 25 or more record instances in .arff and.csv file formats. Perform preprocess on these datasets. Analyze the results.

a) Dataset1: Patient

patient_id	A unique patient identification string
Sex	male/female
patient_type	child/adult
Sickness	allergy/acidity/migraine
treatment_type	allopathy/ayurveda/homeopathy
treated_for_years	<1/1-2/>2
treatment_effective	yes/no

b) Dataset2: Recruitment

Registraion_id	A unique registration identification string
current_employment	nil/temporary/contract
years_of_experience	Numeric
academic_background	graduate/masters
communication_skill	good/average/poor
technical_skill	good/average/poor
Recruited	yes/no

c) Dataset3: Applicant

applicant_id	A unique student identification string
Sex	male/female
Address	panjim/ mapusa/ margao/vasco
Community	general/sc/st/obc
course_applied	bcom/ba/bsc
twelth_percentage	Numeric
transport_needed	true/false
Admitted	yes/no

d) Dataset4: Project

project_id	A unique project identification string
Title	title of project (nominal)
Department	computer/electronics/chemistry/physics/maths
Expenditure	Numeric
Duration	number of years (numeric)
Authority	UGC/DST/AICTE/INSA
coordinator	Project Coordinator appointed or not (yes/no)
start_year	year of start of project (numeric)
Status	ongoing/withdrawn/completed

e) Dataset5: Bank

Id	a unique customer identification number
Age	age of customer in years (numeric)
Sex	MALE / FEMALE
Region	city/rural/urban/town
Income	income of customer (numeric)
Married	is the customer married (YES/NO)
Children	number of children (numeric)
Car	does the customer own a car (YES/NO)

land property	customer has a land property (YES/NO)
flat_or _house	customer own a flat or house (YES/NO)
save_acct	customer has a saving account (YES/NO)
current_acct	customer has current account (YES/NO)
loan_sanctioned	customer got sanctioned with personal loan (YES/NO)

7. Consider a real life data mining system of Stock Market/Airline/Retail Industry/Financial Organisation/Telecommunication/Social Media or any other of your choice. Collect the data, Create the dataset and perform preprocess on the dataset. Visualize the results.

8. Use studentbuyspc.arff dataset created with the attributes age ,income, student, credit-rating, buyspc. Perform classify (using J48 classifier (*C4.5 algorithm)*) on the dataset and carry out performance evaluation of the classifier.

9. Create twodcluster.arff dataset with the following data. Perform Cluster (using SimpleKmeans) on the dataset. Visualize cluster assignments.

ID	X	Y
1	1.0	1.0
2	1.5	2.0
3	3.0	4.0
4	5.0	7.0
5	3.5	5.0
6	4.5	5.0
7	3.5	4.5

10. Create customer.arff dataset in the following format. Perform Preprocess, Classify and Cluster on the dataset.

```
@relation customer
@attribute gender {male,female}
@attribute age {youth,middle,senior}
@attribute income numeric
@attribute class {A,B}
@data
male,youth,50000,A
female,youth,40000,A
male,youth,10000,B
male,middle,40000,A
female,middle,12000,B
male,senior,45000,A
female,middle,45000,A
female,senior,13000,B
male,senior,13000,B
female,youth,15000,B
male,youth,15000,B
female,middle,45000,A
male,middle,10000,B
male,senior,12000,B
female,senior,50000,A
```

11. create shopping.arff dataset in the following format. Perform Association Rule Mining with Apriori (Associate) and visualize the results.

```
@relation shopping
@attribute  milk {0,1}
@attribute bread {0,1}
@attribute butter {0,1}
@attribute beer {0,1}
@attribute honey {0,1}
@data
1,1,0,0,1
0,1,0,1,0
0,1,1,0,0
1,1,0,1,0
1,0,1,0,0
0,1,1,0,0
1,0,1,0,0
1,1,1,0,1
1,1,1,0,0
```

12. Convert the following shopping data to the necessary format and carry out Association Rule Mining with Apriori on the dataset. (Add 10 more record instances of your choice and get the results)

```
1 bread,milk,biscuit,cornflakes
2 bread,tea,bournvita
3 jam,maggi,bread,milk
4 maggi,tea,biscuit
5 bread,tea,bournvita
6 maggi,tea,cornflakes
7 maggi,bread,tea,biscuit
8 jam,maggi,bread,tea
9 bread,milk
10 coffee,cock,biscuit,cornflakes
11 coffee,cock,biscuit,cornflakes
12 coffee,suger,bournvita
13 bread,coffee,cock
14 bread,suger,biscuit
15 coffee,suger,cornflakes
16 bread,suger,bournvita
17 bread,coffee,suger
18 bread,coffee,suger
19 tea,milk,coffee,cornflakes
```

13. Create weather.arff dataset using the following relation. Perform preprocess, classify, cluster and associate on the dataset. Convert temperature and humidity attributes to numeric type, make necessary changes to the respective data. Visualize the results

Relation: weather.symbolic

No.	outlook Nominal	temperature Nominal	humidity Nominal	windy Nominal	**play** Nominal
1	sunny	hot	high	FALSE	no
2	sunny	hot	high	TRUE	no
3	overcast	hot	high	FALSE	yes
4	rainy	mild	high	FALSE	yes
5	rainy	cool	normal	FALSE	yes
6	rainy	cool	normal	TRUE	no
7	overcast	cool	normal	TRUE	yes
8	sunny	mild	high	FALSE	no
9	sunny	cool	normal	FALSE	yes
10	rainy	mild	normal	FALSE	yes
11	sunny	mild	normal	TRUE	yes
12	overcast	mild	high	TRUE	yes
13	overcast	hot	normal	FALSE	yes
14	rainy	mild	high	TRUE	no

14. Use five created datasets: 1.Patient 2.Recruitment 3.Applicant 4.Project 5.Bank . Perform preprocess, classify, cluster and associate on the datasets. Analyze the results.

15. Consider the following details of a Movie. Make your assumptions and create a dataset movie.arff. Apply preprocess, classify, cluster and associate on the datasets. Analyze the results
Year;Length;Title;Subject;Actor;Actress;Director;Popularity;Awards

16. Identify two data sets from UCI machine learning repository or https://sites.google.com/site/labitis462/lab-tutorials or the default datasets available with the software installation or create datasets of your choice. Perform preprocess, classify, cluster and associate on these dataset.

Note :

1. Practical are to be done using open source software tool like WEKA/python or any other machine learning software.
2. Questions are framed as per the format of WEKA. Make Necessary changes to use the datasets with other tools

Course Code : CSD103	**Course Title :** Natural Language Processing	**Semester :** V
Theory Marks : 75 **Practical Marks :** 25 **Total Marks** : 100	**Theory Credits :** 03 **Practical Credits :** 01 **Total Credits** : 04	**Theory Lectures :** 45 **Practical Lectures :** 30

Course prerequisites : Programming in Python

Course objectives:

- To learn the fundamental concepts of Natural Language Processing(NLP) and its applications in day to day life.
- To learn Application of NLP using NLTK.

Learning Outcomes :

- Students will be able to recognize importance of NLP tasks in their day-to-day work and contribute to the development of resources and tools for NLP.
- Students will be able to contribute to the development of resources and tools for NLP using NLTK.

Course content:

Unit		Topic		
#	Title	#	Content	Lectures
I	Introduction to NLP	A	Language, Thought and Understanding, History of NLP, stages of NLP, Ambiguity, Models and Algorithms	2
		B	Noisy Channel: Argmax Based Computation, Noisy Channel Application to NLP.	4
II	Regular Expressions and Ngram	A	Regular Expressions, Basic Regular Expression Patterns, Disjunction, Grouping, and Precedence	2
		B	Advanced Operators, Regular Expression substitution and counting Words, Simple N-gram.	2
III	Finite-State Automata	A	Using an FSA for Recognition, Formal Languages	2
		B	Non-Deterministic FSAs, Using an NFSA to Accept Strings, Recognition as Search.	2
IV	Morphology	A	English Morphology, Inflectional Morphology, Derivational Morphology,	2
		B	Finite-State Morphological, Parsing, The Lexicon and Morphotactics, Morphological Parsing with Finite-State Transduces, N-grams and word counting in corpora.	4
V	Probabilistic Parsing	A	Parsing Algorithms, Evidence for Deeper Structure; Top Down Parsing Algorithms, Noun Structure; Top Down Parsing Algorithms, Non-noun Structure and Parsing Algorithms	6
		B	Probabilistic parsing; sequence labelling, Part of Speech Tagging for Indian languages. Accuracy Measure.	4
VI	HMM and Maximum Entropy Models	A	Markov chain, HMM Forward Algorithm, Viterbi Algorithm	5
		B	HMM training: Forward- Backward Algorithm. And Maximum Entropy Models.	5
VII	Wordnet and Word Sense		Wordnet, Metonymy and Word Sense	5

	Disambiguation		Disambiguation, Overlap Based Method and Supervised Based Method.		

Text Book:

1. Jurafsky, Dan and Martin, James, Speech and Language Processing, Second Edition, Prentice Hall, 2008

References

A. NPTEL Course on Natural Language Processing https://nptel.ac.in/courses/106101007/

B. Cousera course on Natural Language Processing https://www.coursera.org/learn/languageprocessing

C. Books
   a. Allen, James, Natural Language Understanding, Second Edition, Benjamin/Cumming, 1995. 2. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993
   b. Manning, Christopher and Heinrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.
   c. Natural Language Processing with Python--- Analyzing Text with the Natural Language Toolkit http://www.nltk.org/book_1ed/

Suggested list of practical :

1. Downloading and installation of NLTK tool.
2. Case study on WordNet (Download corpus of various languages).
3. To perform Tokenization of words and sentences using NLTK tool.
4. To study POS tagging and shallow parsing (chunking).
5. To study and implement Stemming with python NLTK.
6. To study and implement Lemmatization with python NLTK.
7. To create a Bag of Words based on minimum four documents in a single folder (feature extraction).
8. To find Synonyms for words in WordNet (IndoWordNet).
9. To construct n-gram (unigram, bigram, trigram) model for a given input (collocation extraction).
10. To study regular expression tagger.

Mini Projects –

a. Addition of New Synsets to the IndoWordnet
b. Creation of Domain Specific POS tagged Text Corpus
c. Creation of annotated Speech Corpus of minimum 20 minutes duration

Course Code : CSD104	**Course Title :** Embedded Systems	**Semester :** V
Theory Marks : 75 **Practical Marks :** 25 **Total Marks** : 100	**Theory Credits :** 03 **Practical Credits :** 01 **Total Credits** : 04	**Theory Lectures :** 45 **Practical Lectures :** 30

Course prerequisites :

Course objectives:

- Conceptualize the basics of Embedded systems
- Understand fundamentals of Real Time Operating Systems

Learning Outcomes :

- Explain the function and use of embedded system hardware and Interfacing I/O devices.
- Identify various sensors, actuators and their use

Course content:

Unit		Topic		
#	Title		Content	Lectures
I	**Introduction**		Introduction to embedded systems, Microprocessors and Microcontrollers, Components of Embedded system & its classification, characteristics of embedded system.	5L
II	**Interrupts**		Microprocessor Architecture, Interrupt Basics, shared Data problem, Interrupt latency	8L
III	**Survey of Software Architecture**		Round Robin, Round Robin with interrupt, Function-Queue-Scheduling Architecture, Real time OS Architecture	8L
IV	**Introduction to RTOS System**		Task and Task states, Task and Data, Semaphores and shared Data	6L
V	**More OS services**		Message Queues, Mailboxes and pipes, Timer functions, Events, Memory Management, Interrupt routines in RTOS Environment	8L
VI	**Embedded software Development Tools**		Host and Target machines, Linkers/Locators for Embedded Systems, Getting Embedded software into the Target system	10L

Text Book:

1). David E Simon, “An Embedded Software Primer”, Pearson India, 1st Edition

References

1. Tony Givargis Frank Vahid ; Embedded System Design: A Unified Hardware / Software Introduction, Wiley; Student edition

2. D. Patranabis, " Sensors and Transducers", PHI learning Private Limited

Suggested list of practical :

1. Interfacing sensors
2. Interfacing output devices
3. Interfacing input devices
4. Interfacing actuators
5. Programming with Raspberry Pi
6. Blink an LED, Traffic lights using Arduino Board
7. Monitoring Data over Cloud
8. Building Web app to control devices
9. A mini Project

Note :

Programs to be executed on some of the Embedded boards like Arduino, Intel Edison, Raspberry Pi, Bolt, etc that covers the above tasks.

Theory Marks : 75 **Practical Marks :** 25 **Total Marks** : 100	**Theory Credits :** 03 **Practical Credits :** 01 **Total Credits** : 04	**Theory Lectures :** 45 **Practical Lectures :** 30

Course Code : CSD105 **Course Title :** Network Security **Semester :** V

Course objectives:

- To learn the principles and practices of Cryptography and Network Security.
- To enable the students understand the various methods of encryption, decryption and authentication.

Learning Outcomes :

- Explain the need and concepts of security.
- Apply encryption techniques to secure data in transit across data networks.

Course content:

Unit		Topic		
#	Title	#	Content	Lectures
I	Concepts of Security and Classical Encryption Techniques	A	**Introduction:** The need for security, Security approaches, Security attacks, Security Services, Security Mechanisms	10L
		B	**A Model for Network Security:** Symmetric and asymmetric models	
		C	**Encryption techniques:** Substitution techniques – Caesar, Mono alphabetic, Polyalphabetic , Playfair , Vernam cipher Transposition techniques – Rail fence	
		D	**Steganography:** Difference between steganography and cryptography Techniques – Text steganography, Image steganography Applications, Limitations	
II	Symmetric and Asymmetric Key Algorithms	A	**Algorithm types and Modes:** Block Cipher Operation, Electronic Code Book, Cipher Block Chaining, Block Cipher Principles,	10L
		B	Symmetric Key Cryptography	
		C	Diffie Hellman Key Exchange Algorithm, The Data Encryption Standard.	
		D	**Asymmetric Key Cryptography:** Overview, RSA algorithm Comparison between symmetric and asymmetric key cryptography, Digital Signatures	
III	Hash Functions and Message	A	Message Digest, MD5, SHA-1 and SHA-512	10L

	Authentication Codes	B	Message Authentication Requirements		
		C	Message Authentication Functions, MAC, HMAC		
		D	Applications of Cryptographic Hash Functions		
IV	**Digital Certificates**	A	Public Key Infrastructure	9L	
		B	**Digital Certificates:** Technical details of Digital Certificates, Certification Authority, Digital Certificate Creation and verification		
		C	Certificate Hierarchies and Self-signed Digital Certificates.		
V	**Firewall and Virtual Private Network**	A	**Introduction to network security techniques:** IP Security	6L	
		B	Firewalls		
		C	Virtual Private Networks.		

References:

1. Kahate Atul, "Cryptography and Network Security", Tata McGraw-Hill.
2. Charlie Kauffman,Radia Perlman, Mike Spciner, "Network Security", Pearson Education
3. Behrouz A Forouzan, "Cryptography and Network security", McGraw Hill
4. Stallings William, "Cryptography and Network Security: Principles and Practices", 5th edition, Prentice Hall

Supplementary Reading

1). Alfred J. Menezes, Paul C. van Oorschot, "Handbook of Applied Cryptography", Jaypee Medical

Web Reference

1. https://www.edureka.co/blog/steganography-tutorial

Suggested list of practical :

1. Implementation of Caesar Cipher
2. Implementation of Vigenere Cipher
3. Implementation of Playfair Cipher
4. Implementation of Rail Fence Technique.
5. Implementation of Vernam Cipher
6. Perform Steganography using simple DoS commands and tools such as OpenStego
7. Use openSSl/JCrypt tool (or any other equivalent) and demonstrate asymmetric, symmetric cryptography, hashing and digital/PKI signatures / certificates.
8. Use of password cracking tools (ophcrack, John the Ripper) .Verify the strength of passwords using these tools.

9. Firewall and VPN setup

Note :
Languages/Tools: C/C++, openSSl/Jcrypt, OpenStego, ophcrack/ John the Ripper to be used for practical

Course Code : CSD106	**Course Title :** Multimedia Techniques	**Semester :** VI
Theory Marks : 75 **Practical Marks :** 25 **Total Marks** : 100	**Theory Credits :** 03 **Practical Credits :** 01 **Total Credits** : 04	**Theory Lectures :** 45 **Practical Lectures :** 30

Course prerequisites :

Course objectives: To make the students aware of

- Color Models and color harmony,
- Raster and Vector Graphics formats & basic Graphic editing,
- Font types, selection of fonts
- Audio formats, codecs, basic audio editing, filters
- Video formats, codecs, basic video editing, filters and transitions
- Data compression.

Learning Outcomes :

- Explain Multimedia Concepts
- Develop their Creativity and publish a self-contained multimedia Application using multimedia authoring tool in various application areas.

Course content:

Unit		Topic		
#	Title		Content	Lectures
I	Introduction		Introduction to Multimedia, Social & Ethical considerations, Digital Representations, Standards	3
II	Color Theory		Color Basics, Color Systems, additive and subtractive colors, HSL model, Color Wheel, Complementary Colors, After Images, Color Combinations, Color & Contrast, Color Psychology, Itten's Contrasts, Proportion & Intensity, Contrast & Dominance, Shades & Tints, Color Studies; Color Gamut, ICC profiles, Gamma Correction.	10
III	Computer Graphics		Difference between Raster and Vector Graphics, Raster graphics : resolution, image compression, file formats, manipulation, Geometrical transformations; Vector graphics – fundamentals, file formats, shapes, transforms and filters	8
IV	Text and Layout		character set, fonts, layout & Text in graphics	6

V	**Sound**		Sampling, quantization, Sound Design, Audio Codec & file formats, processing sound, sound editing and effects, compression	7	
VI	**Animation**		Types of Animation, Keyframe, Sprite , Perception of vision, Human Color Perception, animated gifs, interpolating motion	5	
VII	**Video**		Aspect Ratio, Frame Size, Frame Rate, Regions, Video Codec & Formats, Processing, Delivery	6	

Reference Books:

1. Nigel Chapman, Jenny Chapman; "Digital Multimedia"; Wiley India Edition, 2nd Edition
2. Roger Parker; "One-Minute Designer"; Hungry Minds Inc,U.S.; 2nd edition
3. Ranjan Parekh, "Principles of Multimedia", McGraw Hill Education; 2 edition
4. Tay Vaughan, "Multimedia Making It Work"; Mc Graw Hill, Eighth Edition

Suggested list of practical :

1. Image compositing : Remove background and combine images to create a work of art
2. Learn to create images for Print, Web and Video
3. Design a Logo for a company
4. Design a Brochure for given Product and details. Learn about different file formats
5. Design a poster with given information and learn about image compression
6. Edit the sound file and Learn about Effects and Filters of sound.
7. Record your voice and learn about Audio Compression
8. Learn Audio mixing and streaming of audio content
9. Learn about Video editing – Prepare video with rough cut.
10. Prepare video content with title and special effects.
11. Record video content and learn about video compressions.
12. Prepare Video content for vimeo / youtube.

Note :

Practical can be done using GIMP, Inkscape, Scribus, Blender, Audacity, Lightworks / Kdenlive

Course Code : CSD107	**Course Title :** Introduction to Data Analytics	**Semester :** VI
Theory Marks : 75 **Practical Marks :** 25 **Total Marks** : 100	**Theory Credits :** 03 **Practical Credits :** 01 **Total Credits** : 04	**Theory Lectures :** 45 **Practical Lectures :** 30

Course prerequisites: Students are expected to have basic knowledge of algorithms and reasonable programming experience and some familiarity with basic linear algebra and basic probability and statistics.

Course objectives: Become familiar with methods of Data Science and their practical usefulness

Learning Outcomes : Upon completion of the course students should be able to :

- Describe what Data Science is and the skill needed to be a data analyst.
- Explain in basic terms what statistical inference means. Identify probability distributions commonly used as foundations for statistical modeling. Fit a model to data.
- Use Python to carry out basic statistical modeling and analysis.

Course content:

Unit		Topic	
#	**Title**	**Content**	**Lectures**
I	**Introduction to Data Science**	Data Science, Big Data, significance of data science, Datafication, Current landscape of perspectives, Skill sets needed **,** The Data Science Process	4
II	**Statistical Inference**	Populations and samples, statistical modelling, probability distributions, fitting a model	6
III	**Exploratory Data Analysis and the Data Science Process**	Basic tools(plots, graphs and summary statistics) of Exploratory Data Analysis, Philosophy of EDA	6
IV	**Feature Generation and Feature Selection (Extracting Meaning From Data)**	Motivating application: user (customer) retention, Feature Generation (brainstorming, role of domain expertise, and place for imagination) , Feature Selection algorithms	5
V	**Basic Machine Learning Algorithms**	Classification and Clustering algorithms, Linear Regression, Logistic regression, k-Nearest Neighbors (k-NN), k-means , Decision Trees, Random Forests	10
VI	**Mining Social-Network Graphs**	Social networks as graphs, Clustering of graphs, Direct discovery of communities in graphs, Partitioning of graphs, Neighborhood properties in graphs	6

VII	**Data Visualization**		Basic principles, ideas and tools for data visualization, Examples of inspiring (industry) projects,	4	
VIII	**Data Science and Ethical Issues**		Discussions on privacy, security, ethics, A look back at Data Science, Next-generation data scientists	4	

Text Books:

1. Cathy O'Neil and Rachel Schutt.; "Doing Data Science, Straight Talk From The Frontline", O'Reilly, 2014.

Reference Books :

1. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman, Mining of Massive Datasets v2.1, Cambridge University Press, 2014 (free online)
2. Kevin P. Murphy, Machine Learning: A Probabilistic Perspective, 2013.
3. Foster Provost and Tom Fawcett, Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking, 2013.
4. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Elements of Statistical Learning, Second Edition, 2009 (free online)
5. Avrim Blum, John Hopcroft and Ravindran Kannan. Foundations of Data Science.
6. Mohammed J. Zaki and Wagner Miera Jr, Data Mining and Analysis: Fundamental Concepts and Algorithms, Cambridge University Press, 2014.

Suggested list of practical :

1. Predict the class of a flower based on the available attributes for Iris data set.

2. Dream Housing Finance company deals in all home loans. They have presence across all urban, semi urban and rural areas. Customer first apply for home loan after that company validates the customer eligibility for loan. Company wants to automate the loan eligibility process (real time) based on customer detail provided while filling online application form. These details are Gender, Marital Status, Education, Number of Dependents, Income, Loan Amount, Credit History and others. To automate this process, they have given a problem to identify the customers segments, those are eligible for loan amount so that they can specifically target these customers.

3. Refer to the Wine Quality data set on the following link:
https://archive.ics.uci.edu/ml/machine-learning-databases/wine-quality/
Predict the quality of wine.

Note : All programs to be implemented using Python

Skill Enhancement Courses

Course Code : CSS107	**Course Title : Agile Software Development**	**Semester :** V
Theory Marks : 75 **Practical Marks :** 25 **Total Marks** : 100	**Theory Credits :** 03 **Practical Credits :** 01 **Total Credits** : 04	**Theory Lectures :** 45 **Practical Lectures :** 30

Course objectives: To understand what is the software development and it's various stages like analysis, designing, coding, testing, documenting with a stress on Agile Software Development.

Learning Outcomes : Upon completion of the course students should be able to::

- Explain Evolution and fundamentals of software engineering methods
- Apply Agile software development method – Scrum, XP, TDD
- Explain and draw UML diagrams
- Perform software testing using various quality assurance methods
- Perform various software engineering steps using Agile methodologies
- Apply refactoring techniques
- Explain Source Control Tools

Course content:

Unit		Topic	
#	**Title**	**Content**	**Lectures**
I	**Introduction to Agile Software Development**	Introduction to Agile Software Development: Understanding how traditional software development works and it's problems; Role of Agile practices in the world of software development and Tools used	5
II	**Agile Project Planning and Management using Scrum**	Agile Project Planning And Management using Scrum: Requirement Analysis, Estimation techniques, Iteration planning, Introduction to development practices, user stories, sprint, backlog, velocity, burndown chart, story points	10
III	**Introduction to UML**	introduction to UML- class diagram, sequence diagram, use case diagram	5
IV	**Extreme Programming and Test Driven Development**	XP & TDD : Test Driven Development & Pair Programming, Introduction to QA Practices: Fail Fast & Automated functional testing, Introduction to Continuous Integration	10

V	**Coding and Testing Practices**		Coding and testing practices: Practicing TDD and pair programming as alternative to traditional documentation; Unit testing using Junit, test case, test suite, bad smells & Refactoring.	10	
VI	**Introduction to Source Control Tools**		Introduction to Source Control tools - versioning, check-in/checkout, commit, branching, merging	5	

Text Books:

1. Chris Sims and Hillary Louise Johnson , "Elements of Scrum", Dymaxicon, LLC
2. Martin Fowler, "Refactoring", Addison Wesley; 2nd edition
3. Martin Fowler , "UML Distilled", Addison Wesley
4. . Kent Beck, Extreme Programming Explained: Embrace Change, Addison Wesley, 2nd Edition

Reference Book:

1. Ken Schwaber, Mike Beedle , "Agile Software Development with Scrum", Pearson Education

Suggested Practical list :

1. Git
2. User stories, Estimation
3. Burndown charts, Scrum board, Trello, Bugzilla
4. JUnit, Selenium
5. Refactoring
6. Debugging
7. Maven Build
8. Javadoc

Note :

Practical may be done using the tools: Eclipse, Git, Selenium, Bugzilla, Trello

Course Code : CSS108	**Course Title :** Network Administration	**Semester :** V
Theory Marks : 75 **Practical Marks :** 25 **Total Marks** : 100	**Theory Credits :** 03 **Practical Credits :** 01 **Total Credits** : 04	**Theory Lectures :** 45 **Practical Lectures :** 30

Course objectives: Provide knowledge of networking as well as related equipment and terminologies.

Learning Outcomes : Upon completion of the course, students should be able to:

- Install, configure and manage computer networks.
- Administer switching and routing devices.
- Install and configure TCP/IP for network and Internet connectivity.

Course content:

Unit		Topic		
#	Title	#	Content	Lectures
I	Introduction to Computer Networks	A	**Introduction:** Advantages of Networking, Peer-to-Peer and Client/Server Network.	8L
		B	**Network Topologies:** Bus, ring, star, mesh, hybrid	
		C	**Type of Networks:** PAN, LAN, MAN, WAN, Internet and Internet,	
		D	**Data Communication modes:** Simplex, Half-Duplex and Full-Duplex transmission	
		E	**Wired and wireless networking:** Ethernet, Wi-Fi, Bluetooth, Mobile Networking,	
II	Wired Media	A	**Cabling:** Unshielded twisted-pair (UTP), shielded twisted-pair (STP), Fiber Optic and coaxial cable	10L
		B	**Connectors:** RJ-45, RJ-11, BNC, Straight Tip (ST);, Subscriber Connector (SC), Local Connector (LC). Understanding color codes of twisted pair cable. 568A and 568B convention. Crimping and punching practices	
		C	**Wired testing equipment's:** Multimeter, cable testers, loopback plug	
III	Wireless Media	A	**Bluetooth:** Features, radio communication, typical purpose	10L
		B	**Near-field communication (NFC):** Features, radio communication, typical purpose	
		C	**WiFi:** Features, radio communication, typical purpose Key types of WiFi networking security – WEP, WPA	
		D	**Wireless Standards:** 802.11a, 802.11b/g/n	

			Network adapters, Wireless access points, wireless extension points	
		E	**Securing a wireless network:** Common wireless security threats - Rogue Access points, Denial of Service, Misconfigured Access points, Wireless Phishing, Eavesdroppers Security methods – passwords, SSID, WEP/WPA, MAC address filtering, IP filtering	
IV	**Network Components**	A	**Networking devices:** Repeaters, Transceivers, Bridges, Hubs, Switches	08
		B	**Internetworking devices:** Routers, gateways, Firewall	
		C	**IP addressing:** IP versions, IP V4 classes, static and dynamic IP addresses, subnetting and supernetting	
		D	**Types of Routing protocols:** RIP, IGRP	
V	**Network Application and Security**	A	**Protocols:** Simple Mail Transfer Protocol (SMTP), Hyper Text Transfer Protocol (HTTP/HTTPS).	09
		B	Concept of Dynamic Host Control Protocol (DHCP).	
		C	**Domain Name System (DNS):**	
		D	**Introduction to network security:** Digital signature, Public Key Infrastructure, Digital certificates	

Reference Books :

1. Networking, All-in-one desk reference –by Doug Lowe –Wiley India Publication 2009.
2. Wireless & Mobile Networks, by Sunil Kumar S Manvi, Mahaballeshwara S. Kakkasageri, Wiley India Publication 2011.

Suggested Practical list :

1. Identify various Network device like : (a) Switch (Normal and Managed), (b) Router(Normal and wireless), (c) Rack, Patch Panel, i/o box, (d) Access Point etc.
2. Crimping - straight and cross CAT 6 cables. Punching practice in IO Box and patch panel. Fabricate a long cable, Test the fabricated cable using a cable tester
3. Connecting systems to the Switches, Checking Status LED on Switches, Checking Patch Panel
4. Use Ping, Path Ping and Tracert
5. Connect computers with Network with Drop cable and using WiFi configuration.
6. Configure WEP & WAP, configure tethering,
7. Check MAC address, IP Addressing technique (IPv4/IPv6) Subnet Calculation, Static IP Addressing, Dynamic IP Addressing
8. Configure IP & MAC Filters
9. Setup Bluetooth Network, Enable Discovery of Bluetooth Devices, Pairing of Bluetooth devices, Security settings for Bluetooth Devices
10. Use openSSl/JCrypt tool to demonstrate hashing and digital/PKI signatures & certificates

11. Configuring DHCP, Sharing Resource & Internet connection - Sharing Resource and advance sharing setting. Installing Proxy Server. Exposure and using Internet.

Note :
Languages/Tools/equipment's: Cat 6 (or equivalent) cable, Crimping/punching tool, I/O box, Rack, Patch panels, 8/16 port Switch, WIFI enabled/supported devices, JCrypt/openSSL

Course Code : CSS109	**Course Title :** PHP Programming	**Semester :** VI
Theory Marks : 75 **Practical Marks :** 25 **Total Marks** : 100	**Theory Credits :** 03 **Practical Credits :** 01 **Total Credits** : 04	**Theory Lectures :** 45 **Practical Lectures :** 30

Course objectives: To give an understanding of web software development using PHP

Learning Outcomes : Upon completion of the course, students should be able to:

- Create websites using PHP/MYSQL.

Course content:

Unit		Topic	
#	**Title**	**Content**	**Lectures**
I	**Web Technologies**	Introduction to Web technology, Web pages and Browsing, Dynamically generated Web Pages, HTTP-Basic request response paradigm, format and important headers , Session Management using Cookies and hidden fields.	03L
II	**PHP basics**	Basic syntax, comments, data types, Type juggling. Variables: Basics, Predefined variables and scope, Constants: define, const, Magic constants, Expressions, Operators, Control structures, Function, Need of Function , declaration and calling of a function , PHP Function with arguments, Default Arguments in Function, Function argument with call by value, call by reference, Scope of Function Global and Local, callbacks.	10L
III	**String Manipulation and Regular Expression:**	Creating and accessing String , Searching & Replacing String; Formatting, joining and splitting String , String Related Library functions ; Use and advantage of regular expression over inbuilt function; Use of preg_match(), preg_replace(), preg_split() functions in regular expression.	04L
IV	**PHP Arrays**	Indexed, Associative, Multidimensional, Creating index based and Associative array, Accessing array , Looping with Index based array, with associative array using each() and foreach(), Library functions for arrays.	04L
V	**Form Processing**	PHP Form Processing, GET and POST form methods, Dealing with multi value fields, Redirecting a form after submission, PHP Superglobals,: scope, $GLOBALS, $_SERVER, $_REQUEST, $_POST, $_GET, $_FILES, $_COOKIE, $_SESSION , Form validations, $_SERVER["PHP_SELF"],htmlspecialchars() function, PHP Form security, validating form data, sanitising form data .	08L
VI	**PHP**	Date and Time functions, include, require,	06L

	Advanced		require_once, File Upload : Steps involved, $_FILES; Cookie variables : creation, retrieval, modification, deletion; Session variables: starting sessions, creating, deleting ; Cookies v/s Sessions, usage of superglobals $_COOKIE and $_SESSION.	
VII	**Database Programming**		PHP data objects, Connecting to MySQL, Running Simple Select Statements, Fetch Modes, Getting the Last Insert Id, Running Simple INSERT, UPDATE, or DELETE statements, Running Statements With Parameters, Named Placeholders, Prepared Queries.	06L
VIII	**Security**		Introduction, General considerations, Filesystem Security, Database Security, SQL Injections, Error Reporting, Hiding PHP.	04L

Reference Books :

1. Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India), 2007.
2. Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify-Reuse)", Wiley India Private Limited, 2008.
3. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5", 3rd Edition Paperback, O'reilly, 2014.
4. Luke Welling, Laura Thompson, PHP and MySQL Web Development", 4th Edition, Addition Paperback, Addison-Wesley Professsional,2008.
5. David Sklar, Adam Trachtenberg, "PHP Cookbook: Solutions & Examples for PHP Programmers", 2014.

Suggested Practical list :

a) Install and configure Apache, PHP and MySQL
b) Session management using cookies, sessions and hidden fields
c) Database CRUD operations (using PDO's)
d) File Uploading (with file type restrictions).
e) Any 15 from the following :

1. Create a PHP page using functions for comparing three integers and print the largest number.
2. Write a function to calculate the factorial of a number (non-negative integer). The function accept the number as an argument.
3. WAP to check whether the given number is prime or not.
4. Create a PHP page which accepts string from user. After submission that page displays the reverse of provided string.
5. Write a PHP function that checks if a string is all lower case.
6. Write a PHP script that checks whether a passed string is palindrome or not? (A palindrome is word, phrase, or sequence that reads the same backward as forward, e.g., madam or nurses run)
7. WAP to sort an array.
8. Write a PHP script that removes the whitespaces from a string.
   Sample string : 'The quick " " brown fox'
   Expected Output : Thequick""brownfox
9. Write a PHP script that finds out the sum of first n odd numbers.
10. Create a login page having user name and password. On clicking submit, a welcome message should be displayed if the user is already registered (i.e.name is present in the database) otherwise

error message should be displayed.

11. Write a PHP script that checks if a string contains another string.
12. Create a simple 'birthday countdown' script, the script will count the number of days between current day and birth day.
13. Create a script to construct the following pattern, using nested for loop.

    *
    * *
    * * *
    * * * *
    * * * * *
14. Write a simple PHP program to check that emails are valid.
15. WAP to print first n even numbers.
16. $color = array('white', 'green', 'red")
    Write a PHP script which will display the colors in the following way :
    Output :
    white, green, red,
    • green
    • red
    • white
17. Using switch case and dropdown list display a “Hello” message depending on the language selected in drop down list.
18. Write a PHP program to print Fibonacci series using recursion.
19. Write a PHP script to replace the first 'the' of the following string with 'That'.
    Sample : 'the quick brown fox jumps over the lazy dog.'
    Expected Result : That quick brown fox jumps over the lazy dog.

Table: The General Electives for BA, BSc. and B.Com can be chosen from the following list

Course Code	Title of paper	Credits(T+P)
CSG101	Computer Fundamentals and Emerging Technologies	3+1
CSG102	Cyber Space & Cyber Security	3+1
CSG103	IT Fundamentals	3+1
CSG104	Multimedia and Web Design	3+1
CSG105	Computer Applications – I	3+1
CSG106	Computer Applications – II	3+1
CSG107	Computer Systems - Desktop Publishing	3+1
CSG108	Multimedia Technology	3+1
CSG109	Open Source Technology	3+1
CSG110	Client Side Web Development	3+1

Generic Electives

Computer Science -CSG101 : Computer Fundamentals and Emerging Technologies

Effective from : 2017-18

(Credits: Theory-03, Practical-01) Theory : 45 Lectures

Practical : 30 Lectures

Course Objectives: To provide an understanding of Fundamental Technology Concepts and Emerging Technologies in Computer Field. Includes practical skills in data capture, text editing with report formatting, effective presentation tools, efficient search techniques and online collaboration tools.

Unit I Lectures:15, Practical Lab:1 Sessions Marks(Theory-30, Practicals-1)

Computer Fundamentals (Theory)

Introduction: Introduction to computer system, uses, types.

Data Representation: Number system and Coding Schemes(ASCII and UNICODE).

Human Computer Interface: Relationship between Hardware and Software, Types of software, Operating system as user interface, utility programs.

Role of Computers in: Business, Manufacturing, Mobile Computing, Public Sector, Media, Defense Services.

Lab 1: Computer Fundamentals (Practical)

a. *Features of MS Windows based OS and any of the Linux flavor, Setting up users and User rights in a computer, Adding a printer, Software Installation*
b. *Troubleshooting basic computer connections.*

Unit II Lectures: 15, Practical Lab: 10 Sessions Marks (Theory-10, Practicals-18)

Content/Data Management Tools (Theory)

User Generated Content: Blogs and Wikis.

Online Data Capture Tools: Types of data capture form templates (Personal, Work and Education). Question Formats for data capture (short answer, paragraph, multiple choice, check- box, drop-down, linear-scale, multiple choice grid). Data form design (Add new question, add section, add title/description/image/video). Data form distribution techniques (Send via email, publish on social media, send as link). Response management (Print responses, Export to spreadsheet, View analysis, Include analysis in word processing reports)

Text Formatting using Word Processing tools: Use of Templates, Working with document: Editing text, Find and replace text, Formatting, spell check, Autocorrect, Autotext; Bullets and numbering, Tabs, Paragraph Formatting, Indent, Page Formatting, Header and footer, section break, footnotes, bibliography and references. Tables: Inserting, filling and formatting a table; Inserting Pictures and Video; Managing Mail Merge: including linking with Database; Printing documents Creating Business Documents using the above facilities.

Data Presentation using Presentation tools: Slides, Fonts, Drawing, Editing; Inserting: Tables, Images, texts, Symbols, Media; Design; Transition; Animation; and Slide-show. Creating Business Presentations using above facilities

Lab 2.1 : Creating Content for the Web (Practicals)

a. *Create a blog using popular blogging tools like WordPress/ BlogSpot.*
b. *Edit Wikipedia articles.*

Lab 2.2 : Data Capture using Google Forms (Practicals)

a. *Create data forms to capture data for Event Registration, Event Feedback, Customer feedback/satisfaction on a product or service and Order Request.*

Lab 2.3 : Report Formating using Word Processing (Practicals)

a. *Draft an official letter for job interview invitation/ job appointment/ invitation to an event, use mail merge to input the recipients list linking with database.*
b. *Given a project report in PDF format transfer to word processor software and format to include title page, specified Paragraph and Page Formating (page size, orientation, line spacing, font type and font size, Indent, bullets, paragraph formatting) details, Acknowledgement page, Table of contents page, List of figures page, List of Tables page, bibliography, references, distinct headers for each chapter, page numbering in roman for initial pages and normal from first chapter. The document should be checked for spelling errors and corrected appropriately.*
c. *Design a certificate in landscape orientation with a border around the document.*
d. *Design a Garage Sale sign.*

Lab 2.4 : Content Presentation using Presentation Software (Practicals)

a. *Preparing presentation in areas such as Impact of Social Media on Youth, Emerging trends in Mobile Technology include appropriate slide animation, slide transitions, sound recording, slide timings, customer feedback video.*
b. *Export the presentation as video or save as slide show.*
c. *Prepare handouts for audience.*

Unit III Lectures: 5, Practical Lab: 3 Sessions Marks(Theory -20, Practical -5)

Overview of Emerging Technologies

Cloud Computing: Meaning, Features, & Service models – Infrastructure as a service, Advantages and disadvantages, Mobile Computing: Meaning, Business Applications of Mobile computing, Virtual reality & Augmented Reality : Meaning and applications , IOT - Internet of Things: Meaning & Application

Lab 3: Web Applications (Practicals)

a. *Scheduling tasks in Google Calendar*
b. *Create/Upload documents / spreadsheets and presentations online.*
c. *Share and Collaborate in real time*
d. *Safely store and organize your work of Google Drive or OneDrive*

Unit IV Lectures: 10, Practical Lab: 1 Sessions Marks (Theory-15, Practical -1)

Computing Trends in Internet, Education and Research:

Internet-role and importance, Web Server and Web clients like web browser or web app, IP addressing : Public Vs Private, Static Vs Dynamic, world wide web and related protocols, e-Library, Google Scholar.

Lab 4: Internet Applications (Practicals)

a. *Surfing the Internet, Using Email and Search Engines*
b. *Advanced web search and translation services, Web search, image search, Search only for pages that contain (ALL the search terms contain the exact phrase you type, contain at least one of the words you type, do NOT contain any of the words you type, written in a certain language, created in a certain file format like ppt, pdf, rtf, doc, xls)*
c. *Advanced search operators: Include search ("+" search), synonym search, OR search, Domain search, Numrange search, other advanced search features (Google, Local language, Technology Search, Date, Occurrences, Domains, Safe search),*

Reference Books:

1. Introduction to Information Technology by ITL Education Solutions Limited, second edition.
2. ' O' Level made simple "introduction to ICT resources" by Satish Jain, Shashank Jain, Shashi Singh & M. Geetha Iyer, BPB publication.
3. Computer Fundamentals fourth edition by Pradeep K. Sinha and Priti Sinha BPB publications
4. Information Technology The breaking wave by Dennis Curtin Tata McGraw-hill edition
5. Computer Fundamentals by A. Goel, Pearson Education, 2010.
6. Introduction to Information Technology by P. Aksoy and L. DeNardis, Cengage Learning, 2006

Computer Science -CSG102 : Cyber Space and Cyber Security

Effective from : 2017-18

(Credits: Theory-03, Practical-01) Theory : 45 Lectures

Practical : 30 Lectures

Course Objectives: To introduce computer networking, e-commerce and understand principles of cyber security, online threats and cyber laws and prepare students to adopt safe practices.

Unit I Lectures: 6, Practical Lab: 2 Sessions Marks (Theory -15, Practicals -2)

Basics of Computer Networking

Networking basics, Need for computer networks, Types of networks-LAN, MAN, WAN, Network Components – H/W, Software, Communication channels, Network Devices, Network topologies.

Lab1

- *Basic Networking Setup of PC, Network commands like ipconfig, ping, traceroute, nslookup / dig etc, Setup of Home Router / Wifi Hotspot,*
- *Understanding of Firewall and Basic Firewall Setup, File and Printer Sharing, connecting to share*
- *Setup of Email Clients like Outlook, FTP Clients and Upload / Download.*
- *Finding out public address, connection speeds etc.*

Unit II Lectures: 10, Practical Lab: 04 Sessions Marks (Theory-15, Practicals-16)

E-Commerce

Definition, Hardware requirements, E-commerce and Trade Cycle, Electronic Markets, Electronic Data Interchange and Internet Commerce, Benefits and Risk, Types of E-commerce :Business to Business E-Commerce, Business to Consumer E-Commerce. Consumer to Consumer, Electronic Payment Systems: Smart Cards – Credit Cards – Wallets, Risks, E-Retail, Concept and Examples, E-Banking, Features and services , M-Commerce, Products and services

Lab 2

E-commerce

- *Attempt to purchase a product online from any E-Commerce Site. Proceed till payment gateway. Check digital certificates (such as ebay.in and amazon.com)*
- *Write a review of an E-Commerce Site visited include: Site description, Site Design, ease in navigation , process for purchasing items, security, privacy, compare with competitors, customer service, best features of site etc.*
- *An E-commerce site case study: Include Target market/audience: who uses this service?*

  Revenue model: where does the money come from? Competitive environment: who else is competing in this market, or who might enter the market and threaten this company's position? Competitive advantage analysis: how is your case company attempting to gain an advantage: competing on cost? Differentiation? How are they promoting their products in the marketplace? ,How have they been doing - financial results if available?

Unit III Lectures: 15, Practical Lab: 02 Sessions Marks (Theory-25, Practicals-2)

Emerging threats in Cyber Space

Introduction to cyber space, Malware threats- Definition and types(Virus/ worms, Trojan, Rootkits, Spyware, Keyloggers). Social Engineering, Cyber Crimes – Definition, Types (DOS, Intellectual

Property crimes, Unauthorized access to computer system or networks, Theft of information contained in electronic form, Cyber Stalking, Identity Theft, Forgery, E-mail Spoofing, E-mail bombing, Online gambling, Sale of illegal articles, Child pornography, Cyber Defamation, Salami attack, Phishing, Pharming, Data Diddling, Virus/ worm attack, logic bombs, Web jacking, Theft of computer system, physically damaging a computer system, Cyber warfare, Cyber terrorism.)

Lab 3

- *Installation and Configuration of any free Antivirus Package eg. AVG/Avast etc., Using Antivirus Package for Threat Detection*
- *Browser security and Safety such as Understanding SSL and Certificates, checking URL of site for Phishing attempts*
- *Email Headers and Tracking, Identification of Phishing Emails*

Unit IV Lectures: 7, Practical Lab 03 Sessions Marks (Theory-10, Practicals-2)

Online Privacy and Cyber Safety

Online Privacy – Introduction, Significance, Privacy Policy, Sensitive Personal Information, Social media – Usage, Safety. Online shopping – Introduction, Safety measures (Encryption of data authentication , SSL, Digital signatures, Digital Certificates) Online payments – Introduction, Types, Safe practices.

Lab 4

- *Keeping passwords cyber secure-Choosing strong password,*
- *Privacy settings on Facebook, Social Media Safety*
- *Payment Systems Security concerns and Safe Practices*
- *Online Banking Security features, OpenPGP Tools.*

Unit V Lectures: 7, Practical Lab 04 Sessions Marks (Theory-10, Practicals-3)

Cyber Laws and Cyber Forensics

Cyber Laws: Evolution and Need for cyber law, The legal perspectives – Indian perspective, Global perspective, Information Technology Act(ITA) 2000, Provisions related to E-commerce, Provisions for cyber-crimes, Information Technology (Amendment)(ITAA) Act 2008, Adjudicating officer, CERT-IN- its role and powers.

Reporting Cyber Crimes, Cyber Forensics: Introduction, Evidence collection, Data Recovery, Cloning of Devices, Forensic Investigation phases – Acquisition and preservation, Authentication, Analysis, Documenting Evidence, Presentation of Evidence, Media sanitization.

Lab 5

- *Use of Investigation tools such as Winhex for forensic investigation*
- *Data Recovery using winhex*
- *Use of Free data recovery tools like Recuva*
- *Mapping a given list of cyber-crimes to appropriate ITAA Act 2008 offence listed in http://www.naavi.org/ita_2008/index*

Reference Books and web references

1. Rick Lehtinen and G. T. Gangemi, Computer Security Basics, O'Reillly Media, Inc.; 2nd Edition, 2006
2. Wall, David, (2007). Cyber Crime: The Transformation of Crime in the Information Age. Polity Publishing

3. Michael cross, Scene of the Cyber Crime, Syngress Publishing, Elsevier Publishing, 2nd Edition, ISBN 13: 978-1-59749-276-8
4. Chander, Harish, Cyber Laws and IT Protection, ISBN: 978-81-203-4570-6
5. Nina Godbole, SunitBelapure, "Cyber Security – Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiely India Pvt.Ltd.,ISBN - 978-81-265-2179-1
6. Frontiers of Electronic Commerce Ravi Kalakota & Andrew B Whinston, Pearson Education.
7. Cyber Laws, http://deity.gov.in/content/cyber-laws
8. www.cert.org
9. Frontiers of Electronic Commerce Ravi Kalakota& Andrew B Whinston, Pearson Education.

Computer Science -CSG103 : IT Fundamentals

Effective from : 2017-18

(Credits: Theory-03, Practical-01) Theory : 45 Lectures

Practical : 30 Lectures

Introduction: Introduction to logical organization of computer**,** input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, monitor, printer, plotter, primary memory, secondary memory, auxiliary memory.	**15L**
User Interface: Operating system as user interface, system tools, utility programs	**5L**
Database: Introduction to database, relational data model, Entity types, entity set, attribute and key	**5L**
Networks: Definition of network, classification of network, LAN, MAN, WAN, distinction among the networks, Guided Media: Twisted pair, Coaxial cable, and Optical fiber. Unguided media: Microwave, Radio frequency propagation, Satellite, LAN Topologies: Ring, bus, star, mesh and tree topologies.	**10L**
IInternet Applications: Internet as a global network, Search Engine, Online education, Internet utilities – email, online banking, reservations etc.	**6L**

Use of Computers in Education and Research: Data analysis, Heterogeneous storage, e-Library, Google Scholar, Domain specific packages such as SPSS, Mathematica etc. (4L)

Reference Books:

1. *A. Goel*, Computer Fundamentals, Pearson Education, 2010.
2. *P. Aksoy, L. DeNardis*, Introduction to Information Technology, Cengage Learning, 2006
3. *P. K.Sinha, P. Sinha*, Fundamentals of Computers, BPB Publishers, 2007

Practical: 30 lectures

Practical exercises based on Open Office/ MS Office tools using document preparation, spreadsheet handling packages and presentation software.

Word processor

1. Prepare **a grocery list** having four columns (Serial number, The name of the product, quantity and price) for the month of April, 06.
   - Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
   - The headings of the columns should be in 12-point and bold.
   - The rest of the document should be in 10-point Times New Roman.
   - Leave a gap of 12-points after the title.
2. Create a **telephone directory**.
   - The heading should be 16-point Arial Font in bold • The rest of the document should use 10-point font size
   - Other headings should use 10-point Courier New Font.
   - The footer should show the page number as well as the date last updated.
3. Design a **time-tableform** for your college.
   - The first line should mention the name of the college in 16-point Arial Font and should be bold.
   - The second line should give the course name/teacher's name and the department in 14-point Arial.
   - Leave a gap of 12-points.
   - The rest of the document should use 10-point Times New Roman font.
   - The footer should contain your specifications as the designer and date of creation. 4. BPB Publications plans to release a new book designed as per your syllabus. Design the **first page of the book** as per the given specifications.
   - The title of the book should appear in bold using 20-point Arial font.
   - The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
   - At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
   - The details of the offices of the publisher (only location) should appear in the footer.
5. Create the following one page documents.
   (a) Compose a note inviting friends to a get-together at your house, Including a list of things to bring with them.
   (b) Design a certificate in landscape orientation with a border around the document.

6. Create the following documents:
   (a). A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.

   (b). Use a newsletter format to promote upcoming projects or events in your classroom or college.

7. Convert following text to a table, using comma as delimiter

Type the following as shown (do not bold). **Color, Style, Item**

Blue, A980, Van
Red, X023, Car
Green, YL724,
Truck Name, Age,
Sex Bob, 23, M
Linda, 46, FTom, 29, M

8. Enter the following data into a table given on the next page.

Salesperson	*Dolls*	*Trucks*	*Puzzles*
Kulbhushan	1327	1423	1193
Vidya	1421	3863	2934
Parmaod	5214	3247	5467
Gurmeet	2190	1278	1928
Afsar	1201	2528	1203
Atwater, Kelly	4098	3079	2067

Add a column Region (values: S, N, N,S,S,S) between the Salesperson and Dolls columns to the given table Sort your table data by Region and within Region by Salesperson in ascending order:

9. In this exercise, you will add a new row to your table, place the word "Total" at the bottom of the Salesperson column, and sum the Dolls, Trucks, and Puzzles columns.

10. Wrapping of text around the image.

11. Following features of menu option must be covered FILE Complete menu

EDIT Complete menu

VIEW Complete

menu INSERT Complete

menu FORMAT

Complete menu

TABLE Complete menu WINDOW
Complete menu HELP Complete menu
TOOLS All options except Online collaboration, Tools on Macro, Templates
Spreadsheet

1. Enter the Following data in Excel Sheet

REGIONAL SALES PROJECTION

State	Qtr1	Qtr2	Qtr3	QTR4	Total	Rate	Amount
Delhi	2020	2400	2100	3000		15	
Punjab	1100	1300	1500	1400		20	
U.P.	3000	3200	2600	2800		17	
Harayana	1800	2000	2200	2700		15	
Rajasthan	2100	2000	1800	2200		20	
TOTAL							
AVERAGE							

(a) Apply Formatting as follow: Title in TIMES NEW ROMAN

Font Size - 14

Remaining text - ARIAL, Font Size -10

State names and Qtr. Heading Bold, Italic with Gray Fill

Color. Numbers in two decimal places.

Qtr. Heading in center

Alignment. Apply Border to

whole data.

(b) Calculate State and Qtr. Total (c) Calculate Average for each quarter

(d) Calculate Amount = Rate * Total.

2. Given the following worksheet

	A	B	C	D
1	Roll No.	Name	Marks	Grade
2	1001	Sachin	99	
3	1002	Sehwag	65	
4	1003	Rahul	41	
5	1004	Sourav	89	
6	1005	Har Bhajan	56	

Calculate the grade of these students on the basis of following guidelines:

If Marks	Then Grade
>= 80	A+
>= 60 < 80	A
>= 50 < 60	B
< 50	F

3. Given the following worksheet

	A	B	C	D	E	F	G
1	**Salesman**		**Sales in (Rs.)**				
2	No.	Qtr1	Qtr2	Qtr3	Qtr4	Total	Commission
3	S001	5000	8500	12000	9000		
4	S002	7000	4000	7500	11000		

5	S003	4000	9000	6500	8200
6	S004	5500	6900	4500	10500
7	S005	7400	8500	9200	8300
8	S006	5300	7600	9800	6100

Calculate the commission earned by the salesmen on the basis of following Candidates:

If Total Sales	**Commission**
< 20000	0% of sales
> 20000 and < 25000	4% of sales
> 25000 and < 30000	5.5% of sales
> 30000 and < 35000	8% of sales
>= 35000	11% of sales

The total sales is sum of sales of all the four quarters.

4. A company XYZ Ltd. pays a monthly salary to its employees which consists of basic salary, allowances & deductions. The details of allowances and deductions are as follows :

Allowances

- HRA Dependent on Basic
  30% of Basic if Basic <=1000

  25% of Basic if Basic>1000 &

  Basic<=3000 20% of Basic if Basic

  >3000

- DA Fixed for all employees, 30% of Basic
- Conveyance Allowance Rs. 50/- if Basic is <=1000 Rs. 75/- if Basic >1000 & Basic<=2000 Rs. 100 if Basic >2000

- Entertainment Allowance NIL if Basic is <=1000 Rs. 100/- if Basic > 1000 **Deductions**

- Provident Fund 6% of Basic
- Group Insurance Premium Rs. 40/- if Basic is <=1500
  Rs. 60/- if Basic > 1500 & Basic<=3000 Rs. 80/- if Basic >3000

Calculate the following :

Gross Salary = Basic + HRA + DA + Conveyance + Entertainment

Total deduction = Provident Fund + Group Insurance Premium Net Salary = Gross Salary – Total Deduction

5. Create Payment Table for a fixed Principal amount, variable rate of interests and time in the format below :

No. of Instalments	5%	6%	7%	8%	9%
3	XX	XX	XX	XX	XX
4	XX	XX	XX	XX	XX

5	XX	XX	XX	XX	XX
6	XX	XX	XX	XX	XX

6. Use an array formula to calculate Simple Interest for given principal amounts given the rate of Interest and time

Rate of Interest 8%

Time 5 Years

Principal	Simple Interest		
1000	?	18000	?
5200	?		

7. The following table gives an year wise sale figure of five salesmen in Rs.

Salesman	2000	2001	2002	2003
S1	10000	12000	20000	50000
S2	15000	18000	50000	60000
S3	20000	22000	70000	70000
S4	30000	30000	100000	80000
S5	40000	45000	125000	90000

(a) Calculate total sale year wise.
(b) Calculate the net sale made by each salesman
(c) Calculate the maximum sale made by the salesman
(d) Calculate the commission for each salesman under the condition.
  (i) If total sales >4,00,000 give 5% commission on total sale made by the salesman.
  (ii) Otherwise give 2% commission.
(e) Draw a bar graph representing the sale made by each salesman.
(f) Draw a pie graph representing the sale made by salesman in 2000.

8. Enter the following data in Excel Sheet

PERSONAL BUDGET FOR FIRST QUARTER

Monthly Income (Net) : 1,475

EXPENSES	**JAN**	**FEB**	**MARCH**	**QUARTER TOTAL**	**QUARTER AVERAGE**
Rent	600.00	600.00	600.00		
Telephone	48.25	43.50	60.00		
Utilities	67.27	110.00	70.00		
Credit Card	200.00	110.00	70.00		
Oil	100.00	150.00	90.00		
AV to Insurance	150.00				
Cable TV	40.75	40.75	40.75		
Monthly Total					

(a) Calculate Quarter total and Quarter average.
(b) Calculate Monthly total.
(c) Surplus = Monthly income - Monthly total.
(d) What would be total surplus if monthly income is 1500.

(e) How much does telephone expense for March differ from quarter average.
(f) Create a 3D column graph for telephone and utilities.
(g) Create a pie chart for monthly expenses.

9. Enter the following data in Excel Sheet

TOTAL REVENUE EARNED FOR SAM'S BOOKSTALL

Publisher name 1997 1998 1999 2000 total

A Rs. 1,000.00 Rs. 1100.00 Rs. 1,300.00 Rs. 800.00
B Rs. 1,500.00 Rs. 700.00 Rs. 1,000.00 Rs. 2,000.00 C Rs.
700.00 Rs. 900.00 Rs. 1,500.00 Rs. 600.00
D Rs. 1,200.00 Rs. 500.00 Rs. 200.00 Rs. 1,100.00 E Rs

800.00 Rs. 1,000.00 Rs. 3,000.00 Rs. 560.00 (a)
Compute the total revenue earned.

(b) Plot the line chart to compare the revenue of all publisher for 4 years.
(b) Chart Title should be 'Total Revenue of sam's Bookstall (1997-2000)'
(c) Give appropriate categories and value axis title.

10. Generate 25 random numbers between 0 & 100 and find their sum, average and

count. How many no. are in range 50-60

11. Create at least 5 presentations on various topics such as College festival, Countryside, College tour etc.

Computer Science -CSG104 : Multimedia and Web Design

Effective from : 2017-18

(Credits: Theory-03, Practical-01) Theory : 45 Lectures

Practical : 30 Lectures

Multimedia : Definition, Components, uses, applications **6L**

Multimedia Input/Output Devices: scanner, camera, microphone, speaker, monitors, printers. **6L**

Multimedia Storage Devices: CD ROMs, DVDs, Blue ray disk. **5L**

8L

Multimedia Tools: Sound editor, video editor, animator, authoring tools. **6L**

Web Designing: Concept of website, website as a communication resource. Internet, intranet and extranet,. **7L**

HTML: Introduction to hypertext markup language (html) document type definition, creating web pages, graphical elements, lists, hyperlinks, tables, web forms, inserting images, frames, use of CSS **(7 L)**

Reference Books:

1. Scott Mitchell , Create your own website , SAMS Publication , 2008
2. Tay Vaughan, Multimedia : Making it work, Tata McGraw Hill, Seventh edition, 2006
3. J. Jeffcoate, Multimedia in Practice, Pearson Education, First Edition, 2007

Practical:

Practical exercises based on Open Office tools using presentation software, web design and development tools, image editing tools (Gimp) and animation tools such as Blender

1. Create an HTML document with the following formatting options:
   I. Bold
   II. Italics
   III. Underline
   IV. Headings (Using H1 to H6 heading styles) V. Font (Type, Size and Color)
   VI. Background (Colored background/Image in background) VII. Paragraph
   VIII. Line Break
   IX. Horizontal Rule
   X. Pre tag

2. Create an HTML document which consists of:
   I. Ordered List
   II. Unordered List
   III. Nested List
   IV. Image

Optional

Implement the followings using Blender -

1. Create an animation using the tools panel and the properties panel to draw the following – Line, pe , oval, circle, rectangle , square, pencil , brush , lasso tool
2. Create an animation using text tool to set the font , size , color etc.
3. Create an animation using**Free transform tool** that should use
   followings- Move Objects Skew
   Objects

   Stretch
   Objects
   Rotate
   Objects

   Stretch Objects while maintaining

   proportion Rotate Objects after relocating

   the center dot

4. Create an animation using layers having following features- Insert layer, Delete layer, guide layer, Mask layer.
5. 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

6. Create an animation for bus car race in which both starts from the same point and car wins the race.
7. Create an animation in which text Hello gets converted into GoodBye (using motion/shape tweening).
8. Create an animation having five images having fade-in fade-out effect.
9. Create an scene to show the sunrise (using multiple layers and motion tweening)

FYBCOM **Semester 1**

Computer Science -CSG105 : Computer Applications – I

Effective from : 2017-18

(Credits: Theory-03, Practical-01) Theory : 45 Lectures

Practical : 30 Lectures

Course Objectives : To provide an understanding of essential Information Technology Concepts and Emerging Technologies. Includes practical skills in data capture, analysis and presentation, report formatting, efficient search techniques and online collaboration tools.

Unit I Information Technology Basics

(Lectures: 15, Practical Lab 2 Marks Th-30, Pr-1)

Information : Prerequisites of Information, Need for Information Technology and its advantages; Information Technology : Definition and components; Data : Definition, Types, Data Representation, Number system and Coding Schemes(ASCII and UNICODE); Parts of a Computer: CPU, Memory, Input/ Output Devices, Auxiliary Memory; Software – Definition, Relationship between Hardware and Software, Categories of Software, OS - definition & functions, Role of Information Technology in : Business, Mobile Computing, Health Services, Public Sector, Media, Defence Services, Education and Publication.

Lab1

OS basic

Installation of Operating System (Demonstration only) , Demonstrate features of any MS Windows based OS or any of the Linux flavor , Identification of Directories , Setting up computer, Add a printer, Check device drivers, Installation software, Users and administrative rights for installation , Unicode, Enable computer to support regional language, add Keyboard, Use onscreen keyboard, install phonetic keyboard, type the national anthem using Unicode, Use online translators and transliteration services

Unit II Introduction to Data Handling, Processing and Analysis

(Lectures: 10, Practical Lab 06 Marks Th-10, Pr-10)

Word processing concepts: Use of Templates, Working with word document: Editing text, Find

and replace text, Formatting, spell check, Autocorrect, Autotext, Bullets and numbering, Tabs, Paragraph Formatting, Indent, Page Formatting, Header and footer, Tables: Inserting, filling and formatting a table; Inserting Pictures and Video; Mail Merge: including linking with Database; Printing documents Creating Business Documents using the above facilities.

Spreadsheet concepts: Managing worksheets; Formatting, Entering data, Editing, and Printing a worksheet; Handling operators in formula, Project involving multiple spreadsheets, Organizing Charts and graphs, Generally used Spreadsheet functions: Mathematical, Statistical, Financial, Logical, Date and Time, Lookup and reference, Database, and Text functions

Unit II Presentation Software

(Lectures: 05, Practical Lab 02 Marks Th-05, Pr-06)

Basics of presentations: Slides, Fonts, Drawing, Editing; Inserting: Tables, Images, texts, Symbols, Media; Design; Transition; Animation; and Slideshow. Creating Business Presentations using above facilities

Lab 2.1

Data capture using Google Forms

Create data forms to capture data for Event Registration, Event Feedback, Customer feedback/satisfaction on a product or service and Order Request.

Lab2.2

Report Formating using Word Processing

Draft an official letter for job interview invitation/ job appointment/ invitation to an business trade show event, use mail merge to input the recipients list linking with database.

Given a project report in PDF format transfer to word processor software and format to include title page, specified Paragraph and Page Formating (page size, orientation, line spacing, font type and font size, Indent, bullets, paragraph formatting) details, Acknowledgement page, Table of contents page, List of figures page, List of Tables page, bibliography, references, distinct headers for each chapter, page numbering in roman for initial pages and normal from first chapter. The document should be checked for spelling errors and corrected appropriately.

Create/ Upload a document in a collaboration software like Google docs. Share and collaborate in real time, Safely store and organize your work, Control who can see your documents

Lab2.3

Spreadsheet

Working with worksheets -Entering data, Formatting, Editing, and Printing a worksheet,

Formulas and Functions, Handling operators in formula, Generally used Spreadsheet functions - Mathematical, Statistical, Financial, Logical, Date and Time, Lookup and reference, Database, and Text functions, Inserting Charts and graphs, Data Sorting and Filtering

Introduction to some more useful functions such as the IF, nested IF, VLOOKUP and HLOOKUP, construction of Pivot Tables to organize data, Creating spreadsheet in the area of:
Loan and Lease statement; Ratio Analysis; Payroll statements; Capital Budgeting; Depreciation Accounting; Graphical representation of data; Frequency distribution and its statistical parameters; Correlation and Regression

Lab 2.4

Data Presentation using Presentation Software

Preparing presentation in areas such as Customer satisfaction/ feedback, product analysis, job satisfaction using the data obtained through data capture tool, including appropriate slide animation, sound recording, slide timings, customer feedback video. Export the presentation as video or save as slide show. Prepare handouts for audience.

Working with Multimedia tools: Image manipulation- use any image editing tool such as (GIMP, Inkspace) to design the cover page of Book; Audio manipulation – use any two Mp3 tracks of your choice to create a unique two minute composition that is significantly different from either of the original tracks; video manipulation- make a movie on a given topic with the help of Windows Movie Maker.

Unit IV Internet Applications and Emerging Technologies

(Lectures: 15, Practical Lab 5 Marks Th-30, Pr-8).

Internet – role and importance, Web Browser, IP Addressing – Public Vs Private, Static Vs Dynamic; WWW & related protocols; Internet Applications.
Cloud Computing: Meaning, Features, & Service models – Infrastructure as a service, Advantages and disadvantages, Mobile Computing: Meaning, Business Applications of Mobile computing, Virtual reality & Augmented Reality: Meaning and applications, IOT - Internet of Things: Meaning & Application

Lab 3

Surfing the Internet, Use of Email and Search Engines
Advanced web search and translation services, Web search, image search, Search only for pages that contain (ALL the search terms contain the exact phrase you type, contain at least one of the words you type, do NOT contain any of the words you type, written in a certain language, created in a certain file format like ppt, pdf, rtf, doc, xls), Advanced search operators: Include search ("+" search), synonym search, OR search, Domain search, Numrange search, other

advanced search features (Google, Local language, Technology Search, Date, Occurrences, Domains, Safe search), Multiuser ; Google docs: Create documents, spreadsheets and presentations online, Share and collaborate in real time, Safely store and organize your work, Control who can see your documents

Reference Books:

1. Introduction to Information Technology by ITL Education Solutions Limited, second edition.

2. 'O' Level made simple "Introduction to ICT resources" by Satish Jain, Shashank Jain,

Shashi Singh & M. Geetha Iyer, BPB publication.

3. Computer fundamentals fourth edition by Pradeep K. Sinha and Priti Sinha BPB publications

4. Information Technology The breaking wave by Dennis Curtin Tata McGraw-hill edition

5. Cloud Computing by Anandamurugan, T.Priyaa et al.

6. Internet of Things: A Hands-On Approach byArsheep Bahga

Web references

1. www.moodle.org,

2. www.wikipedia.org

FYBCOM **Semester II**

Computer Science -CSG106 : Computer Applications – II

Effective from : 2017-18

(Credits: Theory-03, Practical-01) Theory : 45 Lectures

Practical : 30 Lectures

Course Objectives: To understand computer networking concepts, e-commerce technology and business applications; understand principles of cyber security, online threats and cyber laws and prepare students to adopt safe practices.

Unit I Basics of Computer Networking

(Lectures: 6, Practical Lab 2 Marks Th-15, Pr-2).

Networking basics, Need for computer networks, Types of networks-LAN, MAN, WAN, Network Components – H/W, Software, Communication channels, Network Devices, Network topologies.

Lab1

Basic Networking Setup of PC, Network commands like ipconfig, ping, traceroute, nslookup / dig etc, Setup of Home Router / Wifi Hotspot, Understanding of Firewall and Basic Firewall Setup, File and Printer Sharing, connecting to share, Setup of Email Clients like Outlook, FTP Clients and Upload / Download. Finding out public address, connection speeds etc.

Unit II E-Commerce

(Lectures: 10, Practical Lab 07 Marks Th-15, Pr-15)

Definition, E-commerce and Trade Cycle, Electronic Markets, Electronic Data Interchange and Internet Commerce, Types of E-commerce :Business to Business E-Commerce, Business to Consumer E-Commerce. Consumer to Consumer, Electronic Payment Systems: Smart Cards – Credit Cards – Wallets, Risks, E-Retail, Concept and Examples, E-Banking, Features and services, M-Commerce, Products and services

Lab2

E-commerce

- *Attempt to purchase a product online from any E-Commerce Site. Proceed till payment gateway. Check digital certificates (such as ebay.in and amazon.com)*

• *Write a review of an E-Commerce Site visited include: Site description, Site Design, ease in navigation , process for purchasing items, security, privacy, customer service, best features of site etc..*
• *An E-commerce site case study: Include*
Target market/audience: who uses this service?
Revenue model: where does the money come from?
How are they promoting their products in the marketplace? ,

Unit III Emerging threats in Cyber Space
(Lectures: 15, Practical Lab 02 Marks Th-25, Pr-2).

Introduction to cyber space, Malware threats- Definition and types (Virus/ worms, Trojan, Rootkits, Spyware, Keyloggers). Social Engineering, Cyber Crimes – Definition, Types (DOS, Intellectual Property Rights and related crimes, Unauthorized access to computer system or networks, Theft of information contained in electronic form, Cyber Stalking, Identity Theft, Email Spoofing, E-mail bombing, Online gambling, Sale of illegal articles, Cyber Defamation,
Salami attack, Phishing, Pharming, Data Diddling, logic bombs, Web jacking, Theft of computer system, physically damaging a computer system, Cyber warfare, Cyber terrorism.)

Lab3
Installation and Configuration of any free Antivirus Package eg. AVG/Avast etc., Using Antivirus Package for Threat Detection, Browser security and Safety such as Understanding SSL and Certificates, checking URL of site for Phishing attempts, Email Headers and Tracking, Identification of Phishing Emails

Unit IV Cyber Safety, IT Act and Cyber forensic
(Lectures: 14, Practical Lab 04 Marks Th-20, Pr-6)

Online Privacy – Introduction, Significance, Privacy Policy, Sensitive Personal Information, Social media – Usage, Safety. Online shopping – Introduction, Safety measures (Encryption of data authentication , SSL, Digital signatures, Digital Certificates), Online payments – Introduction, Types, Safe practices.

Cyber Laws: Evolution and Need for cyber law, The legal perspectives – Indian perspective, Global perspective, Information Technology Act(ITA) 2000, Provisions related to E-commerce, Provisions for cyber-crimes, Information Technology (Amendment)(ITAA) Act 2008, Adjudicating officer, CERT-IN- its role and powers.

Reporting Cyber Crimes, Cyber Forensics: Introduction, Evidence collection, Data Recovery, Cloning of Devices, Forensic Investigation phases – Acquisition and preservation,

Authentication, Analysis, Documenting Evidence, Presentation of Evidence, Media sanitization.

Lab4.1

Keeping passwords cyber secure-Choosing strong passwords, Privacy settings on Facebook, Social Media Safety, Payment Systems Security concerns and Safe Practices, Online Banking Security features, OpenPGP Tools.

Lab4.2

Use of Investigation tools such as Winhex for forensic investigation, Data Recovery using winhex, Use of Free data recovery tools like Recuva, Mapping a given list of cyber-crimes to appropriate ITAA Act 2008 offence listed in http://www.naavi.org/ita_2008/index

Reference Books and web references

1. Rick Lehtinen and G. T. Gangemi, Computer Security Basics, O'Reillly Media, Inc.;

2nd Edition, 2006

2. Wall, David, (2007). Cyber Crime: The Transformation of Crime in the Information

Age. Polity Publishing

3. Michael cross, Scene of the Cyber Crime, Syngress Publishing, Elsevier Publishing,

2nd Edition, ISBN 13: 978-1-59749-276-8

4. Chander, Harish, Cyber Laws and IT Protection, ISBN: 978-81-203-4570-6

5. Nina Godbole, SunitBelapure, "Cyber Security – Understanding Cyber

Crimes,Computer Forensics and Legal Perspectives", Wiely India Pvt.Ltd.,ISBN - 978-

81-265-2179-1

6. Frontiers of Electronic Commerce Ravi Kalakota& Andrew B Whinston,

Pearson Education.

7. BruiceSchneier, "Applied Cryptography-Protocols, Algorithms and Source code in C",

2nd Edition, Wiely India Pvt Ltd, ISBN 978-81-265-1368-0

8. Cyber Laws, http://deity.gov.in/content/cyber-laws

9. www.cert.org

Computer Science -CSG107 : Desktop Publishing

Effective from : 2017-18

(Credits: Theory-03, Practical-01) Theory : 45 Lectures

Practical : 30 Lectures

Course Prerequisites: Basic working knowledge of computers and Internet.

Course Objectives: To develop specific skills and competencies needed by those who use computer hardware and software in publication houses. These skills include knowledge of the DTP page layout program, from basic page setup to use of specialized techniques such as graphic effects, understanding graphic formats and conventions that give publications a quality look.

Course Structure:

Marks: 100 (Theory: 75 mark + Practical:

25marks) Contact Hours: Theory Lectures: 45

+

Practical Laboratory Session: 15 of 2 hours each

Course Credits: 4 Credits (3 Credits for Theory + 1 Credit for Practical)

Course Content:

THEORY

UNIT I .....10 Marks (8 Lectures)

Introduction to DTP
What desktop publishing means; the traditional publishing process; the desktop publishing process; essentials of desktop publishing (input devices, output devices and software); Introduction to open source and proprietary software used in DTP (Scribus, Adobe In-Design, Adobe Photoshop, Google Picassa, Corel Draw, GIMP, Inkscape).

UNIT II…..... 20 Marks (12 Lectures)

Basics of Page Layout
Basics of page layout; page layout in pictures (running head, initial cap, folio, body type, margins, spread, banner or nameplate, deck, format, grid, display type, headline type, pull quote, gutter, eyebrow, rule, box, caption, etc.); measurement units like inch, pica and points; features of good typography; anatomy of typefaces-typestyles. Serif and sans serif

fonts.

UNIT III.....27 Marks (16 Lectures)

Graphics

Computer graphics: classification- raster and vector graphics; how paint and image - editing programs work(brighten, darken, increase/decrease contrast, sharpen, diffuse, emboss, change color balance, etc.); how illustration programs work; how three dimensional graphics programs work.

Color

Additive and subtractive colors; color spaces-hue, saturation, brightness; the color wheel; colour gamuts; printed color management systems-components: reference color, device profiles, color- matching engine.

Hardware

Types of scanners - flatbed, transparency and drum scanners; graphic input devices (graphics tablets, digital cameras); storage devices (blu-ray, dvd and flash drives); printers (inkjet and laser)

UNIT IV.....18 Marks (9 Lectures)

Prepress and final printing

How printing presses work; how color separations work; how trapping works; how imposition works; how proofing works- proofing devices; direct-to-plate imaging; web and digital publishing

References

1. Pfiffner Pamela, Frazer Bruce, (1994), **How Desktop Publishing Works**, Ziff-Davis Press
2. Bennet, (1998), **Illustrated world of Desktop Publishing,** Dreamland Publications-New Delhi

PRACTICALS

Introduction and installation of DTP Software (1 Lab Session)

- Installation of Page-layout software like Adobe InDesign or Scribus(Open Source Software for DTP).
- Installation of Image Editing and Graphics Manipulation Software like Photoshop or GIMP or Irfanview or Corel Draw. Familiarizing with main menu features

Page-Layout Software 15 Marks (9 Lab Sessions)

- Creating a Document and a Page Background (Page Size, Margins, Background)
- Working with frames (Creating text/image frames, moving frames, resizing frames, rotating frames, line and colour of frames, text flow around frame)

- Working with Text (using story editor, inline graphics, importing text from file; Colour and effects on text, optical margins)
- Working with Images (lock, edit image, resize, properties)
- Working with styles(drop cap, character style)
- Working with Shapes & Polygons
- Working with Lines & Line Styles
- Working with Fill: Colors, Gradients and Patterns
- Working with Master Pages(Creating Master Pages, The Page Palette, Applying Master Pages)
- Automatic page numbering
- PDF Exporting from Scribus

Image Editing and Graphics Manipulation Software 10 Marks (5 Lab Sessions)

- Image size alteration
- Cropping an image
- Removal of unwanted elements using clone tool
- Selective color change
- Image orientation (verical and horizontal flips, rotations)
- Enhancing images(contrast and brightness changes)
- Selecting and merging of images
- Creating transparent images
- Special effects on image
- Change color depth (greyscale images)

References:

http://wiki.scribus.net/canvas/Help:TOC

Generic Electives Syllabus

(Numbers on right indicate number of lectures of 1 hour duration)

Computer Science -CSG108 : Multimedia Technology		
(Credits: Theory-03, Practicals-01) Theory : 45 Lectures Practicals : 30 Lectures		
Pre-requisites: Basic working knowledge of Computers and Internet.		
Course Objectives: To make the students aware of ▪ Color Models and color harmony, ▪ Raster and Vector Graphics formats & basic Graphic editing, ▪ Font types, selection of fonts ▪ Audio formats, codecs, basic audio editing, filters ▪ Video formats, codecs, basic video editing, filters and transitions ▪ Data compression.		
(Theory)		
1.	Introduction to Multimedia, Social & Ethical considerations, Digital Representations Standards	3L
2.	Color Theory - Color Basics, Color Systems, Color Wheel, Complementary Colors, After Images, Color Combinations, Color & Contrast, Itten's Contrasts, Proportion & Intensity, Contrast & Dominance, Shades & Tints, Color Studies; Color Gamut, ICC profiles, Gamma Correction.	7 L
3.	Introduction to Computer Graphics: Difference between Raster and Vector Graphics, Raster graphics : resolution, image compression, file formats, manipulation, Geometrical transformations; Vector graphics – fundamentals, file formats, shapes, transforms and filters	8 L
4.	Text and Layout: character set, fonts, layout & Text in graphics	6 L
5.	Sound: Sound Design, Audio Codec & file formats, processing sound, compression	10 L
6.	Animation: Types of Animation, Keyframe, Sprite , Perception of vision, Human Color Perception	4 L
7.	Video: Aspect Ratio, Frame Size, Frame Rate, Regions, Video Codec & Formats, Processing, Delivery	7 L

References :

1. Nigel Chapman, Jenny Chapman; Digital Multimedia; Wiley India Edition, 2nd Edition
2. Roger Parker; One-Minute Designer; Hungry Minds Inc,U.S.; 2nd edition
3. Ranjan Parekh, " Principles of Multimedia", McGraw Hill Education; 2 edition
4. Tay Vaughan, "Multimedia Making It Work"; Mc Graw Hill, Eighth Edition

(Practicals)

List of Practicals :
(at least 8 Practicals from the following)

1. Image compositing : Remove background and combine images to create a work of art
2. Learn to create images for Print, Web and Video
3. Design a Logo for a company
4. Design a Brochure for given Product and details. Learn about different file formats
5. Design a poster with given information and learn about image compression
6. Edit the sound file and Learn about Effects and Filters of sound.
7. Record your voice and learn about Audio Compression
8. Learn Audio mixing and streaming of audio content
9. Learn about Video editing – Prepare video with rough cut.
10. Prepare video content with title and special effects.
11. Record video content and learn about video compressions.
12. Prepare Video content for vimeo / youtube.

Note : Practical can be done using GIMP, Inkscape, Scribus, Blender, Audacity, Lightworks / Kdenlive

Computer Science -CSG109 : Open Source Technology		
(Credits: Theory-03, Practicals-01) Theory : 45 Lectures Practicals : 30 Lectures		
Pre-requisites : Basic familiarity with using computers and using the web.		
Course Objectives: 1. To make the students aware of 2. FOSS [Free and Open Source Software, 3. Linux installation and management basics, 4. Open source software and installation 5. Existing open source projects		
(Theory)		
1.	Open Source, Free Software, Free Software vs. Open Source software, Public Domain Software, FOSS does not mean no cost.	3 L
2.	Four degrees of freedom , FOSS Licenses: GPL, AGPL, LGPL,FDL ...; FOSS examples.	3 L
3.	Introduction to Linux: How is it built, Distributions, desktops, file system basics	8 L
4.	User management and file permissions	6 L
5.	Software installation and updation : GUI, Command line; tips for picking software	10 L
6.	Introduction to Libre Office, Bluefish, GIMP / Pinta, Stellarium, OpenShot Video editor and others.	10 L
7.	Joining the existing Open Source Project	5 L

Text book:

1. Dayanand Ambawade, Deven Shah, “Linux Labs and Open Source Technologies”, Deamtech Press, 2014.

2. Daniel James, “Crafting Digital Meida, Audacity, Blender, Drupal, GIMP and other Open Source Tools”, Appress

Web Références :

1. http://spoken-tutorial.org
2. http://www.tldp.org/LDP/lame/LAME/linux-admin-made-easy/
3. https://www.gnu.org/philosophy/
4. https://opensourceforu.com/2017/02/linuxsusadmin/
5. https://www.linux.com/learn/understanding-linux-file-permissions

6. https://opensource.org/licenses
7. https://opensource.org/licenses/alphabetical

(Practicals)

Suggested list of Practicals :(at least 8 Practicals from the following)

1. Create a bootable device (USB preferred) using an Linux ISO image and trying the OS from the device
2. Installing Linux on a PC and creating users (GUI)
3. Installing desktops and desktop customization.
4. man, cat, less, grep, who, whoami, ls, ps, sudo, chmod, chown
5. Searching and Installing software using software center, synaptic package manager, command line
6. Assigning file permissions and sharing files to users.
7. Advanced user management (GUI)
8. Libre Office
9. Bluefish
10. Stellarium
11. OpenShot
12. GIMP / Pinta

Note : Practicals can be done using Ubuntu

Computer Science -CSG110 : Client Side Web Development		
(Credits: Theory-03, Practicals-01) Theory : 45 Lectures Practicals : 30 Lectures		
Pre-requisites : Basic familiarity with using computers and using the web.		
Course Objectives: To learn how to create a basic web page using HTML and CSS.		
(Theory)		
1.	Introduction to world wide web, how the web works, Introduction to HTML5, anatomy of an HTML element, nesting elements, block versus inline elements, empty elements, attributes, Boolean attributes, anatomy of a HTML document, entity references, HTML comments, head, title, body, metadata, headings, paragraphs, lists, emphasis and importance, hyperlinks, anatomy of a link, block level links, URLs, absolute versus relative URLs, email links, description lists, quotations, abbreviations, superscript, subscript, date and time, image.	8 L
2.	Document and Website Structure, Structuring Content- semantic tags -header, navigation bar, main content, sidebar, footer, non-semantic wrappers- div and span, line breaks and horizontal rules, html table basics, span rows and columns, HTML table and advanced features and accessibility, designing form, fieldset, legend widgets, sending form data, form data validation, iframe.	14 L
3.	Introduction to CSS, how browsers affect CSS, internal and external style sheet, CSS syntax, selectors - simple selectors, attribute selectors, combinators, multiple selectors, pseudo-classes, pseudo-elements, cascade and inheritance, box model, fundamental text and font styling, values, units, colors, media queries, layout- static, liquid, adaptive and responsive, floats, positioning, flex box , grids.	20 L
4.	Introduction to Bootstrap Framework .	3 L

Text Books :

1. Laura Lemay , Rafe Colburn , Jennifer Kyrnin, “Mastering HTML, CSS & JavaScript Web Publishing”, BPB Publications

2. Alex Libby, Gaurav Gupta, Asoj Talesra , “Responsive Web Design with HTML5 and CSS3 Essentials”, PACKT Publishing

3. Thomas Powell, “HTML & CSS: The Complete Reference”, Fifth Edition, MCGraw Hill

Reference Books :

1. Elisabeth Robson, Eric Freeman, Head First HTML with CSS & XHTML A Learner's Companion to HTML, CSS and XHTML, O'Reilly Media
2. Jon Duckett, "Web Design with HTML, CSS, JavaScript and jQuery", Wiley; Pck edition

(Practicals)

List of practical assignments (Use any popular IDE) : (at least 8 practicals should be completed)

1) Create web pages using text, paragraphs, header tags, links, lists tags
2) Create web pages using table tags, column and row span
3) Creating tables using scope, id and header attributes
4) Design a form using widgets
5) Form validations
6) Use of different CSS selectors, pseudo-classes and pseudo-elements
7) Design a landing page layout
8) Use of CSS font style
9) Form validation using JavaScript
10) Use of Bootstrap

Table: Skill Based Papers

Srl. No	Semester	Course Code	Title of paper	Credits (T+P)
1	III	CSS101	Computer Applications for Business- I	2+2
2	IV	CSS102	Computer Applications for Business- II	2+2

Skill Enhancement Courses

SYBCOM *Semester III*

CSS101 Computer Application for Business-I (Core Course - Applied Component)

(Credits: Theory-02, Practicals-02) Theory : 30 Lectures Practical's : 60 Lectures Marks: 50T + 50P = 100

Objectives:

- To provide advanced computer skills and knowledge for commerce students
- To enhance the students' understanding of usefulness of information technology tools for business operations
- To become familiar with the processes needed to develop, report, and analyze business data
- To learn how to use and apply Excel and Excel add-ins to solve business problems

Theory:

Unit I: Concepts of Data Processing and analysis 5 Lectures (10 Marks)

a. Data Processing – Steps involved in data processing, advantages of computers in data processing , file management concepts- standard methods of organizing data, file management system, file types: transaction & master, file organization techniques – sequential, direct, indexed sequential
b. Data analysis and forecasting - importance of data analysis in business, Data forecasting – its need , benefits of data forecasting , use of forecast formula, statistical and financial functions.
c. Data Integration: concept and how it works

Unit II: Creating Business Spreadsheet 5 Lectures (10 Marks)

a. Spreadsheet concepts, Managing worksheets; Formatting, Entering data, Editing, and Printing a worksheet; Handling operators in formula, Project involving multiple spreadsheets, Organizing Charts and graphs
b. Generally used Spreadsheet functions: Mathematical, Statistical, Financial, Logical, Date and Time, Lookup and reference, Database, and Text functions
c. Creating spreadsheet in the area of: Loan and Lease statement; Ratio Analysis; Payroll statements; Capital Budgeting; Depreciation Accounting; Graphical representation of data; Frequency distribution and its statistical parameters; Correlation and Regression
d. Meaning and Advantages of macros

Unit III:

Database Management System 10 Lectures (10 Marks)

a. Database Designs for Accounting and Business Applications: Reality- Expressing the

Application; Creating Initial design in Entity Relationship(ER) Model; Transforming ER Model to Relational data model concepts; Implementing RDM design using an appropriate DBMS.

b. SQL and Retrieval of Information: Basic Queries in SQL; Embedded Queries in SQL; Insert, Delete and Update statements in SQL
c. DBMS Software: Environment; Tables; Forms; Queries; Reports; Modules;
d. Applying DBMS in the areas of Accounting, Inventory, HRM and its accounting, Managing the data records of Employees, Suppliers and Customers.

Unit IV: Overview of Business Analytics 10 Lectures (10 Marks)

a. Introduction to Analytics: Business analytics – meaning and basic concepts. (Refer Reference 6)
b. Visualization/ Data Issues: Organization/sources of data, Importance of data quality , Dealing with missing or incomplete data , Data Classification (Refer Reference 7)
c. Introduction to Data Mining: Meaning, basic concepts, data mining process

REFERENCE

1. Computer Fundamentals by Pradeep K. Sinha and Priti Sinha
2. www.howstuffworks .com
3. Database systems – Bipin Desai
4. Excel manual and latest reference books
5. Access manual and latest reference books
6. Davenport article - "Competing on Analytics" , LaValle et al. article - "Analytics: The New Path to Value"
7. Davenport and Harris article - "The Dark Side of Customer Analytics"

List of practical:

1. Advanced Spreadsheet (MS-Excel or any similar open source software) (20 Mks)
    a. Result representation of data using spreadsheet
    b. What-if analysis, Logical tests(nested if functions), Goal seek,
    c. Representing results graphically
    d. Filtering, advanced filters, sorting and conditional formatting data
    e. Data validation techniques, Hyperlinks,
    f. Pivot table, Scenarios
    g. Summing through the sheets,
    h. Getting external data files into Excel
    i. Macros - creation, editing and deletion of macros
    j. Assignments to be given on the following topics: to prepare and analyse Loan and Lease statement; Ratio Analysis; Payroll statements; Capital Budgeting; Depreciation Accounting; Graphical representation of data; Frequency distribution and its statistical parameters; Correlation and Regression

2. Database Management System (Ms- Access or any similar open source software) (10 Mks)
   a. Creation of tables, forms, reports, queries using two tables

3. Business Analytics(Using Spreadsheet or Statistical Package such as Gretel/SPSS)(10 mks)

   a. Assignments to analyse data available from IndiaStat.com such as Analysis of demographic data, environment data, public expenditure
   b. Analyse data from annual reports of Companies and banks **Note:**

Note:
There shall be a practical examination of 50 Marks at the end of each semester (Practical-40 Marks and Work Book- 10 Marks) and duration of Examination shall be 4 Hrs.

SYBCO **Semester IV**

CSS102 Computer Application for Business-II

(Credits: Theory-02, Practicals-02) Theory : 30 Lectures Practical's : 60
Marks: 50T + 50P = 100

Objectives:

- To familiarise the student with various applications of Information and Communication technologies in business
- To enable the student to become familiar with the mechanism for conducting business transactions through electronic means
- To provide skills and knowledge to create a maintain a website for business

Theory:

Unit I: Internet technology 6 Lectures (10 Marks)

a. Introduction to computer networks : Introduction- need, advantages, disadvantages, types of networks, types of transmission media, Internetworking devices-bridges, routers, gateways, IP addressing: why IP address, basic format of IP address- IPV4, IPV6, Protocols - HTTP, HTTPS, FTP, DNS, Email
b. Applications on Internet: search engines ,browsers, blogs, social networking - types and applications

Unit II: Ecommerce theory 12 Lectures (15 Marks)

a. Introduction to E-Commerce: Scope, Definitions, Trade Cycles
b. The Value Chain, Supply Chain, Porter's Value Chain
c. Electronic data Interchange (EDI): Introduction, definition and benefits, technology standards, Communication, implementation, agreements, EDI and business.
d. E-Commerce models- categorizing major E-commerce business models(B2B,B2C,C2C), introduction , key elements a business model
e. E-payment System: Models and methods of e–payments (Debit Card, Credit Card, Smart Cards, e-money), digital signatures (procedure, working), payment gateways, risks involved in e-payments.
f. E-Commerce applications in various industries: banking, insurance, payment of utility bills, online marketing, e-tailing (popularity, benefits, problems and features), online services (financial, travel and career), auctions, online learning, publishing and entertainment, Online shopping (amazon, snapdeal, alibaba, flipkart, etc.)

Unit III: ERP 6 Lectures(6 Marks)

a. Introduction: Traditional information model, Introduction to an enterprise, What is an ERP?, Reasons for growth of ERP market, Advantages and Disadvantages of ERP
b. Introduction to business modules: finance, manufacturing, Human resource, materials management, sales and distribution, Limitations of ERP,
c. ERP and e-Commerce

Unit IV : Security and Encryption (6 Lectures) (9 marks)

a. Need and concepts, the e-commerce security environment- dimension, definition and scope of e- security
b. Security threats in the E-commerce environment - security intrusions and breaches, attacking methods like hacking, sniffing, cyber-vandalism etc.
c. Technology solutions- Encryption security channels of communication, protecting networks and protecting servers and clients

REFERENCE

1. Web technology- Kahate
2. Introduction to Information Technology – ITL Education Solutions Limited, Pearson Education
3. E-Commerce: Strategy, Technologies and Applications By David Whitely, Tata McGraw Hill Edition. I
4. Kalakota and Whinston, Frontiers of Electronic commerce, Pearson Education Asia.
5. S Sadagopan, "ERP a Management Prospective" Tata McGraw Hill Publishing Company Limited, New Delhi 1999

6. Alexis Leon , “ERP Demystified”, Tata McGraw Hill Publishing Company Limited, New Delhi 2000
7. Kenneth C. Laudon and Carlo Guercio Traver, *E-Commerce*, Pearson Education
8. Bharat Bhaskar, *Electronic Commerce: Framework, Technology and Application, 4th Ed.*, McGraw Hill Education
9. PT Joseph, *E-Commerce: An Indian Perspective*, PHI Learning
10. KK Bajaj and Debjani Nag, *E-commerce*, McGraw Hill Education
11. TN Chhabra, *E-Commerce*, Dhanpat Rai & Co.
12. Sushila Madan, *E-Commerce*, Taxmann
13. TN Chhabra, Hem Chand Jain, and Aruna Jain, An Introduction to HTML, Dhanpat Rai & Co .

List of practical:

1. Designing, building and launching e-commerce website: (15 Practical sessions; 25 marks) A systematic approach involving decisions regarding selection of hardware, software, outsourcing vs. in house development of a website, updating website, uploading content on the website using FTP tools

2. Mini-Project in ERP Implementation (15 Practical Sessions; 25 marks) Case study – Studying ERP implementation in any business firm

Report preparation and submission – report shall include ERP introduction, life cycle as followed by the Business firm under study – pre-evaluation screening, package evaluation, project planning phase, gap analysis, reengineering, configuration, implementation team training, testing, going live, end user training, post implementation.

Note:

1. There shall be a practical examination of 50 Marks at the end of each semester (Practical- 40 Marks and Work Book- 10 Marks) and duration of Examination shall be 4 Hrs.