

SYLLABUS FOR B.SC. COMPUTER SCIENCE (GENERAL & HONOURS) DEGREE PROGRAMME UNDER CBCS w.e.f. 2017-18

Program structure of Bachelor of Science (Computer Science) : General (2017-18)

Semester	Core Course (CC)	Ability enhancement compulsory course (AECC)	Skill enhancement course (SEC)	Elective : Discipline Specific (DSE)	Elective Generic (GE)
I	DSC 1A (Programming Fundamentals Using C Solving Using Computer) DSC 2A DSC 3A	English / MIL Communication/ Environmental Studies *			
II	DSC 1B (Data Structures) DSC 2B DSC 3B	English / MIL Communication/ Environmental Studies *			
III	DSC 1C (Database Management Systems) DSC 2C DSC 3C				GE1
IV	DSC 1D (Software Engineering) DSC 2D DSC 3D				GE2
V			SEC1	DSE 1A Computer Networks DSE 2A DSE 3A	
VI			SEC2	DSE 1B[§] Operating Systems DSE 2B[§] DSE 3B[§]	

DSC – Discipline Specific Core (1- Subject ; 2- Subject 2; 3 – Subject 3)

DSE – Discipline Specific Elective (1- Subject ; 2- Subject 2; 3 – Subject 3)

Alphabets A, B, C & D refer to courses of Subjects 1,2 and 3 in various semesters.

GE – Generic elective , SEC – Skill Enhancement Course.

§DSP – in Lieu of one of the DSEs, a compulsory discipline Specific Project (DSP) has to be taken up.

*** A Student has to offer language in one semester and environmental studies in the other semester , However colleges may offer language and Environmental studies in both the semester for different batches of students**

Discipline Specific Core Subject : General

DSC1A: Programming fundamentals using C

DSC2B: Data Structures

DSC3C: Database Management Systems

DSC4D: Software Engineering

Discipline Specific Elective Subject : General

DSE1A: Computer Networks

DSE 1B: Operating System

Or

Any two from below listed :

1. Multimedia and Applications
2. Information Security
3. Programming in Java
4. Programming in Python
5. Modern Development Frameworks
6. Theory of computation
7. Cloud Computing
8. Computer Graphics
9. Artificial Intelligence
10. Embedded Systems
11. Data Mining
12. Big Data Analytics
13. Human Computer Interface
14. Network Programming
15. Design and Analysis of Algorithms
16. Game Programming.
17. Digital Forensics
18. Introduction to Data Sciences
19. Android Programming

Generic Elective Papers (GE)

(Credit: 04 each)

1. Computer Fundamentals
2. Introduction to Database Systems
3. Introduction to Programming
4. Computer Networks and Internet Technologies
5. Multimedia and Applications
6. Programming in Python
7. Programming in Visual Basic / Gambas

8. Management Information System.

9. Information Security and Cyber Laws

10. Web and E-Commerce Technologies

List of Skill enhancement course (SEC): General (Credits – 4)

1. Office Automation Tools
2. HTML Programming
3. MySQL (SQL/PL-SQL)
4. Multimedia and Applications
5. PHP Programming
6. Programming in Visual Basic/GAMBAS
7. System Administration and Maintenance
8. Programming in SCILAB
9. Software Testing Concepts
10. XML Programming
- 10.** R Programming

General guidelines:

- i. One credit of theory is calculated as 15 clock hours of teaching.
- ii. One credit practical/field work component will be equivalent to 15 practical classes of 2 hours duration each totaling 30 hours or equivalent of it.

Each Course will have a credit of 6 and 150 marks (THEORY : $25 \times 4 = 100$, PRACTICAL : $25 \times 2 = 50$. Distribution of Theory and Practical As follows. Theory = 100 marks with 4 credits of 25 mark each. (ISA – 20 MARK AND SSE =80 MARK) Practical = 50 Marks with 2 credit of 25 mark .

- iii. BoS has modified the UGC prescribed syllabi and some new subjects with syllabi are added.
- iv. The related theory and practical components will form independent courses consisting of both theory and practical's.
- v. Project will be independent and optional in lieu of a Discipline Specific Elective (DSE).
- vi. Additional discipline specific electives , Generic Electives and Skill enhancement courses will be added later in the coming years to give enough choice to students. The Syllabi of DSE, GE and SEC will furnish later.
- vii. A table at the beginning of the modified syllabus reflect the type of course (eg. DSC, DSE, GE, AECC etc.) against the title.
- viii. Batch Size for Practical: AS PER UGC Batch 1 (1-15), Batch 2 (16-30)

Credits for B.Sc. (Computer Science) – General

Semester	Subjects	Credits	Total
1	DSC 1A	6 x 1	6
	DSC 2A	6 x 1	6
	DSC 3A	6 x 1	6
	AECC*	4 x 1	4
	Total		22
2	DSC 1B	6 x 1	6
	DSC 2B	6 x 1	6
	DSC 3B	6 x 1	6
	AECC*	4 x 1	4
	Total		22
3	DSC 1C	6 x 1	6
	DSC 2C	6 x 1	6
	DSC 3C	6 x 1	6
	GE1	4 x 1	4
	Total		22
4	DSC 1D	6 x 1	6
	DSC 2D	6 x 1	6
	DSC 3D	6 x 1	6
	GE2	4 x 1	4
	Total		22
5	DSE 1A	6 x 1	6
	DSE 2A	6 x 1	6
	DSE 3A	6 x 1	6
	SEC1	4 x 1	4
	Total		22
5	DSE 1B [§]	6 x 1	6
	DSE 2B [§]	6 x 1	6
	DSE 3B [§]	6 x 1	6
	SEC1	4 x 1	4
	Total		22
TOTAL			132

[§]DSP – in Lieu of one of the DSEs, a compulsory discipline Specific Project (DSP) has to be taken up.

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Program structure of Bachelor of Science (Computer Science) : Honours (2017-18)

Semester	Core Course (CC)	Ability enhancement compulsory course (AECC)	Skill enhancement course (SEC)	Elective : Discipline Specific (DSE)	Elective Generic (GE)
I	DSC 1 (Programming fundamentals using C) DSC 2 (Computer Fundamentals) DSC 3 (Computer Architecture)	English / MIL Communication/ Environmental Studies *			GE1
II	DSC 4 (Data Structures) DSC 5 (Operating System) DSC 6 (Multimedia and Applications)	English / MIL Communication/ Environmental Studies *			GE2
III	DSC 7 (Database Management Systems) DSC 8 (Programming in Java) DSC 9 (internet Technology)		SEC1		GE3
IV	DSC 10 (Software Engineering) DSC 11 Programming in Python DSC 12 (Data Mining & Warehousing)		SEC2		GE4
V	DSC 13 Computer Networks		SEC3	DSE 1 DSE 2	
VI	DSC 14 Information Security		SEC4	DSE 3 DSE 4^{\$}	

**DSC – Discipline Specific Core , DSE – Discipline Specific Elective
GE – Generic Elective , SEC – Skill Enhancement Course**

§DSP – in Lieu of one of the DSEs, a compulsory discipline Specific Project (DSP) has to be taken up.

* A Student has to offer language in one semester and environmental studies in the other semester , However colleges may offer language and Environmental studies in both the semester for different batches of students

Discipline Specific Core Subject :

DSC1: Programming fundamentals using C

DSC2: Computer Fundamentals

DSC3: Computer System Architecture

DSC4: Data Structures

DSC5: Operating System

DSC6: Multimedia and Applications

DSC7: Database Management Systems

DSC8: Programming in Java

DSC9: internet Technology

DSC10: Software Engineering

DSC11: Programming in Python

DSC12: Data Mining & Warehousing

DSC13: Computer Networks

DSC14: Information Security

Discipline Specific Elective Papers: (Credit: 06 each) (4 papers to be selected) – DSE 1 – 4 At semester V and VI

1. Network Programming
2. Microprocessor
3. Computational Linguistics
4. Digital Image Processing
5. Introduction to Data Sciences
6. Cloud Computing
7. Big Data Analytics
8. Computer Graphics
9. Artificial Intelligence
10. Embedded Systems
11. Human Computer Interface
12. Network Programming
13. Design and Analysis of Algorithms
14. Simulation and Modeling

15. Digital Forensics
16. Game Programming.
17. PHP OOPs MVC Programming
18. Modern Development Frameworks
19. Design and Analysis of Algorithms

Generic Elective Papers (GE) (Credit: 04 each)

1. Computer Fundamentals
2. Introduction to Database Systems
3. Introduction to Programming
4. Computer Networks and Internet Technologies
5. Multimedia and Applications
6. Programming in Python
7. Programming in Visual Basic / Gambas
- 8. Information Security and Cyber Laws**
9. Web and E-Commerce Technologies
- 10. Management Information System**

Skill Enhancement Courses : 4 credits

1. Android Programming
2. Programming in MATLAB
3. HTML Programming
4. XML Programming
5. Oracle (SQL/PL-SQL)
6. Programming in Python
7. PHP Programming
8. UNIX/LINUX Programming
9. R Programming
10. Software Testing

General guidelines:

- i. One credit of theory is calculated as 15 clock hours of teaching.
- ii. One credit practical/field work component will be equivalent to 15 practical classes of 2 hours duration each totaling 30 hours or equivalent of it.

Each Course will have a credit of 6 and 150 marks (THEORY : 25x4=100, PRACTICAL : 25X 2=50).

Distribution of Theory and Practical As follows. Theory = 100 marks with 4 credits of 25 mark each. (ISA – 20 MARK AND SSE =80 MARK) Practical = 50 Marks with 2 credit of 25 mark .

iii. **BoS has modified the UGC prescribed syllabi and some new subjects with syllabi are added.**

iv. The related theory and practical components will form independent courses consisting of both theory and practical's.

v. Project will be independent and optional in lieu of a Discipline Specific Elective (DSE).

vi. Additional discipline specific electives , Generic Electives and Skill enhancement courses will be added later in the coming years to give enough choice to students. The Syllabi of DSE, GE and SEC will furnish later.

vii. A table at the beginning of the modified syllabus reflect the type of course (eg. DSC, DSE, GE, AECC etc.) against the title.

viii. Batch Size for Practical: AS PER UGC Batch 1 (1-15), Batch 2 (16-30)

Semester	Subjects	Credits	Total
I	DSC 1	6 x 1	6
	DSC 2	6 x 1	6
	DSC 3	6 x 1	6
	AECC*	4 x 1	4
	GE - 1	4 x 1	4
	Total		26
II	DSC 4	6 x 1	6
	DSC 5	6 x 1	6
	DSC 6	6 x 1	6
	AECC*	4 x 1	4
	GE – 2	4 x 1	4
	Total		26
III	DSC 7	6 x 1	6
	DSC 8	6 x 1	6
	DSC 9	6 x 1	6
	GE 3	4 x 1	4
	SEC 1	4 x 1	4
	Total		26
IV	DSC 10	6 x 1	6
	DSC 11	6 x 1	6
	DSC 12	6 x 1	6
	GE 4	4 x 1	4
	SEC 2	4 x 1	4
	Total		26
V	DSC 13	6 x 1	6
	DSE 1	6 x 1	6
	DSC 2	6 x 1	6
	SEC 3	4 x 1	4
	Total		22
VI	DSC 14	6 x 1	6
	DSE 3	6 x 1	6
	DSC 4 [§]	6 x 1	6
	SEC 4	4 x 1	4
	Total		22
TOTAL			148

Important:

1. The size of the practical group for practical papers is recommended to be 10-15 students.
2. The size of tutorial group for papers without practical is recommended to be 8-10 students.

3. Additional discipline specific electives , Generic Electives and Skill enhancement courses will be added later in the coming years to give enough choice to students. The Syllabi of DSE, GE and SEC will furnish later.

B.Sc. In Computer Science : From 2017-2018 onward : (General and Honors)

Semester I : Paper I

DSC1 : Programming Fundamentals Using C

DSC-1A : Programming Fundamentals Using C (GENERAL)

Total Marks: 150 (4 credits for theory and 2 credits for practical)

Theory: 100

Practical: 50

Internal Assessment for theory : 20 marks ISA and 80 marks SEE

Workload :

Theory : 4 Lectures per week of 1 hours duration

**Practical : 2 Practical sessions of 2 hours duration per week per batch .
(correspond to total 4 lectures per week)**

Theory : 60 Lectures

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.

DSC1P : Programming Fundamentals Using C (Lab)

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:
- 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

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 stores 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
```

Semester I : Paper II
DSC2 : Computer System Architecture

Theory: 60 Lectures

1. Introduction (8 lectures)

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

2. Data Representation and Basic Computer Arithmetic (10 lectures)

Number systems, complements, fixed and floating point representation, character representation, addition, subtraction, magnitude comparison, multiplication and division algorithms for integers

3. Basic Computer Organization and Design (13 lectures)

Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt, Interconnection Structures, Bus Interconnection design of basic computer.

4. Central Processing Unit (15 lectures)

Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control. Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming, RISC, CISC architectures, pipelining and parallel architecture.

5. Memory Organization (6 lectures)

Cache memory, Associative memory, mapping.

6. Input-Output Organization (8 lectures)

Input / Output: External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels.

Reference Books :

1. M. Mano, "Computer System Architecture", Pearson Education 1992
2. A. J. Dos Reis, "Assembly Language and Computer Architecture using C++ and JAVA", Course Technology, 2004
3. W. Stallings, "Computer Organization and Architecture Designing for Performance", 8th Edition, Prentice Hall of India, 2009
4. M.M. Mano , "Digital Design", Pearson Education Asia, 2013
5. Carl Hamacher, "Computer Organization", Fifth edition, McGraw Hill, 2012.

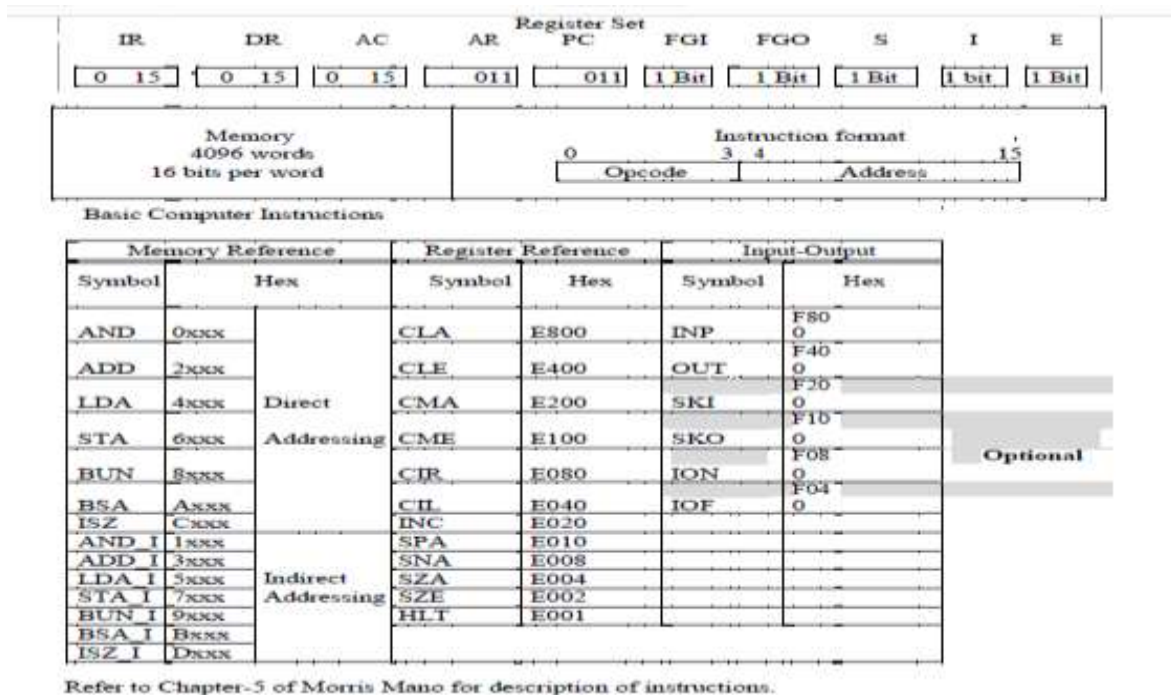
DSC2P : Computer System Architecture (lab)

Practical's : 60 Lectures

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.

- Find the sum of $1 + 2 + 3 + \dots + n$
- Display the multiplication table of a number
- Store and retrieve numbers from memory
- Sort the numbers stored in the memory

2. Create a machine based on the following architecture:



3. Create the micro operations and associate with instructions as given in the chapter (except interrupts). Design the register set, memory and the instruction set. Use this machine for the assignments of this section.

4. Create a Fetch routine of the instruction cycle.

5. Simulate the machine to determine the contents of AC, E, PC, AR and IR registers in hexadecimal after the execution of each of following register reference instructions:

- | | | |
|--------|--------|--------|
| a. CLA | e. CIR | i. SNA |
| b. CLE | f. CIL | j. SZA |
| c. CMA | g. INC | k. SZE |
| d. CME | h. SPA | l. HLT |

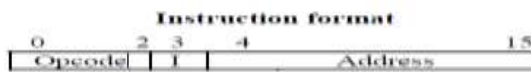
6. Simulate the machine for the following memory-reference instructions with I= 0 and address part = 082. The instruction to be stored at address 022 in RAM. Initialize the memory word at address 082 with the operand B8F2 and AC with A937. Determine the contents of AC, DR, PC, AR and IR in hexadecimal after the execution.

- a. ADD
- b. AND
- c. LDA
- d. STA
- e. BUN
- f. BSA
- g. ISZ

7. Simulate the machine for the memory-reference instructions referred in above question with

I= 1 and address part = 082. The instruction to be stored at address 026 in RAM. Initialize the memory word at address 082 with the value 298. Initialize the memory word at address 298 with operand B8F2 and AC with A937. Determine the contents of AC, DR, PC, AR and IR in hexadecimal after the execution.

8. Modify the machine created in Practical 1 according to the following instruction format:



- a. The instruction format contains a 3-bit opcode, a 1-bit addressing mode and a 12-bit address. There are only two addressing modes, I = 0 (direct addressing) and I = 1 (indirect addressing).
- b. Create a new register I of 1 bit.
- c. Create two new microinstructions as follows :
 - i. Check the opcode of instruction to determine type of instruction (Memory Reference/Register Reference/Input-Output) and then jump accordingly.
 - ii. Check the I bit to determine the addressing mode and then jump accordingly.

Semester I : Paper III
DSC3 : Computer Fundamentals

Total Marks: 150 (4 credits for theory and 2 credits for practical)

Theory: 100

Practical: 50

Internal Assessment for theory : 20 marks ISA and 80 marks SEE

Workload :

Theory : 4 Lectures per week of 1 hours duration

**Practical : 2 Practical sessions of 2 hours duration per week per batch .
(correspond to total 4 lectures per week)**

Theory : 60 Lectures

Introduction: Introduction to computer system, uses, types.	4 Lectures
Data Representation: Number systems and character representation, binary arithmetic	10 Lectures
Human Computer Interface: Types of software, Operating system as user interface, utility programs	6 Lectures
Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter	7 Lectures
Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks	6 Lectures
Computer Organisation and Architecture: C.P.U., registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors.	10 Lectures
Computer Networks: Introduction to computer network, data communication, components of data communication, data transmission mode, data communication measurement, LAN, MAN, WAN, wireless LAN, internet, intranet, extranet	5 Lectures
Overview of Emerging Technologies: Bluetooth, cloud computing, big data, data mining, mobile computing and embedded systems	8 Lectures
Use of Computers in Education and Research: Data analysis, Heterogeneous storage, e-Library, Google Scholar, Domain specific packages such as SPSS, Mathematica etc.	4 Lectures

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

DSC3P : Computer Fundamentals (Lab)

Practical's : 60 Lectures

The practical assignment must include connecting parts of a computer and assembling it to an extent, media formatting and installation of some software.

Practical exercises based on Open Office tools using document preparation and spreadsheet handling packages.

Text Editor

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.

- c. Design a Garage Sale sign.
 - d. Make a sign outlining your rules for your bedroom at home, using a numbered list.
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, F

Tom, 29, M

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

Salesperson	Dolls	Trucks	Puzzles
Kennedy, Sally	1327	1423	1193
White, Pete	1421	3863	2934
Pillar, James	5214	3247	5467
York, George	2190	1278	1928
Banks, Jennifer	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:

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. Create your resume by incorporating most of the options learned till now.
12. 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	Qtr	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:
 - i. Title in TIMES NEW ROMAN
 - ii. Font Size - 14
 - iii. Remaining text - ARIAL, Font Size -10
 - iv. State names and Qtr. Heading Bold, Italic with Gray Fill Color.
 - v. Numbers in two decimal places.
 - vi. Qtr. Heading in center Alignment.
 - vii. 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+
$\geq 60 < 80$	A
$\geq 50 < 60$	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 \leq 1000

25% of Basic if Basic $>$ 1000 & Basic \leq 3000

20% of Basic if Basic $>$ 3000

- DA Fixed for all employees, 30% of Basic
- Conveyance Allowance Rs. 50/- if Basic is \leq 1000
Rs. 75/- if Basic $>$ 1000 & Basic \leq 2000
Rs. 100 if Basic $>$ 2000
- Entertainment Allowance NIL if Basic is \leq 1000
Rs. 100/- if Basic $>$ 1000

Deductions

- Provident Fund 6% of Basic
- Group Insurance Premium Rs. 40/- if Basic is \leq 1500
Rs. 60/- if Basic $>$ 1500 & Basic \leq 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 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

- Calculate total sale year wise.
- Calculate the net sale made by each salesman
- Calculate the maximum sale made by the salesman
- Calculate the commission for each salesman under the condition.
 - If total sales >4,00,000 give 5% commission on total sale made by the salesman.
 - Otherwise give 2% commission.
- Draw a bar graph representing the sale made by each salesman.
- 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					

- Calculate Quarter total and Quarter average.
- Calculate Monthly total.
- Surplus = Monthly income - Monthly total.
- What would be total surplus if monthly income is 1500.
- How much does telephone expense for March differ from quarter average.
- Create a 3D column graph for telephone and utilities.
- 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

Semester II : Paper IV

DSC4 : Data Structures

DSC-1B : Data Structures (GENERAL)

Total Marks: 150 (4 credits for theory and 2 credits for practical)

Theory: 100

Practical: 50

Internal Assessment for theory : 20 marks ISA and 80 marks SEE

Workload :

Theory : 4 Lectures per week of 1 hours duration

Practical : 2 Practical sessions of 2 hours duration per week per batch .

(correspond to total 4 lectures per week)

Theory : 60 Lectures

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

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

Queues (6 Lectures)

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

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)

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).

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.

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 *ouTlines*, Tata McGraw-Hill, 2011

DSC4P : Data Structures (Lab)

Practical's : 60 lectures

Suggested list of Practicals:

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.

Semester II : Paper V

DSC5 : Operating Systems

DSE-1B : Operating Systems (GENERAL)

Total Marks: 150 (4 credits for theory and 2 credits for practical)

Theory: 100

Practical: 50

Internal Assessment for theory : 20 marks ISA and 80 marks SEE

Workload :

Theory : 4 Lectures per week of 1 hours duration

Practical : 2 Practical sessions of 2 hours duration per week per batch .

(correspond to total 4 lectures per week)

Theory: 60 Lectures

1.Introduction (10 Lectures)

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.

2.Operating System Organization (6 Lectures)

Processor and user modes, kernels, system calls and system programs.

3.Process Management (20 Lectures)

System view of the process and resources, process abstraction, process hierarchy, threads, threading issues, thread libraries; Process Scheduling, non-pre-emptive and pre-emptive scheduling algorithms; concurrent and processes, critical section, semaphores, methods for inter-process communication; deadlocks.

4.Memory Management (10 Lectures)

Physical and virtual address space; memory allocation strategies -fixed and variable partitions, paging, segmentation, virtual memory

5.File and I/O Management (10 Lectures)

Directory structure, file operations, file allocation methods, device management.

6.Protection and Security (4 Lectures)

Policy mechanism, Authentication, Internal access Authorization.

Reference Books :

1. A Silberschatz, P.B. Galvin, G. Gagne, "Operating Systems Concepts", 8th Edition, John Wiley Publications 2008.

2. A.S. Tanenbaum, "Modern Operating Systems", 3rd Edition, Pearson Education 2007.

3. G. Nutt, "Operating Systems: A Modern Perspective", 2nd Edition Pearson Education 1997.

4. W. Stallings, "Operating Systems, Internals & Design Principles ", 5th Edition, Prentice Hall of India. 2008.

5. M. Milenkovic, "Operating Systems- Concepts and design", Tata McGraw Hill 1992.

DSC5P : Operating Systems (Lab)

Practicals: 60 Lectures

Suggested list of practical's :

1. 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
2. Study of Basic commands of Linux.
3. Study of Advance commands of Linux.
4. 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.

5. 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

6. Shell programming using filters (including grep, egrep, fgrep)
7. Write a shell script to validate the entered date. (eg. Date format is : dd-mm-yyyy)
8. Write a shell script to check entered string is palindrome or not

C programs

1. WRITE A PROGRAM (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.

2. WRITE A PROGRAM to report behaviour of Linux kernel including kernel version, CPU type and model. (CPU information)
3. WRITE A PROGRAM to report behaviour of Linux kernel including information on configured memory, amount of free and used memory. (memory information)
4. WRITE A PROGRAM to print file details including owner access permissions, file access time, where file name is given as argument.
5. WRITE A PROGRAM to copy files using system calls.
6. Write program to implement FCFS scheduling algorithm.
7. Write program to implement Round Robin scheduling algorithm.
8. Write program to implement SJF scheduling algorithm.
9. Write program to implement non-preemptive priority based scheduling algorithm.
10. Write program to implement preemptive priority based scheduling algorithm.
11. Write program to implement SRJF scheduling algorithm.
12. Write program to calculate sum of n numbers using *thread* library.
13. Write a program to implement first-fit, best-fit and worst-fit allocation strategies.

Semester II , Paper 6

DSC6: Multimedia and Applications

Total Marks: 150 (4 credits for theory and 2 credits for practical)

Theory: 100

Practical: 50

Internal Assessment for theory : 20 marks ISA and 80 marks SEE

Workload :

Theory : 4 Lectures per week of 1 hours duration

**Practical : 2 Practical sessions of 2 hours duration per week per batch .
(correspond to total 4 lectures per week)**

Theory: 60 lectures

Multimedia : (5 Lectures)

Introduction to multimedia, components, uses of multimedia, multimedia applications, virtual reality.

Text : (6 Lectures)

Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia & Hypertext.

Images: (10 Lectures)

Still Images – bitmaps, vector drawing, 3D drawing & rendering, image file formats, image compression, Geometrical transformations

Color: (8 Lectures)

Natural light & colors, computerized colors, color palettes, different Color models – RGB, CYMK, Transformations among color model

Sound: (6 Lectures)

Digital Audio, MIDI Audio, MIDI v/s Digital Audio, Audio File Formats.

Video: (12 Lectures)

How video works, analog video, digital video, video file formats, streamed video, video codecs, video shooting and editin.

Animation: (8 Lectures)

Principle of animations, animation techniques, animation file formats, 3D Graphics.

Making Multimedia : (5Lectures)

Stages of a multimedia project, Requirements to make good multimedia, Multimedia software and Authoring tools.

References :

1. Tay Vaughan, Multimedia : Making it Work (With CD) (English) 8th Edition (Paperback),

Tata Mc-Graw Hill

2. Ze-Nian Li, Mark S. Drew, Fundamentals of Multimedia, Phi Learning Pvt. Ltd.
3. Ralf Steinmetz, Klara Nahrstedtm, Multimedia: Computing, Communications Applications, Pearson India.
4. Thakrar Kiran, Andleigh Prabhat K, Multimedia Systems Design. PHI Learning
5. Nigel Chapman, Jenny Chapman; Digital Multimedia; Wiley India Edition, 2nd Edition
6. Keyes, Multimedia Handbook, TMH,2000.
7. Elizabeth Robson & Eric Freeman, Head First HTML and CSS, O'reilly

DSC6P: Multimedia and Applications (Lab)

Practical: 60 lectures

Practical exercises based on concepts listed in theory using Alice/ Blender/ Flash/ Windows Movie Maker / GIMP/ PhotoShop/ Animation Tools/ Image Editors/ Video Editors

1. Design a Brochure for a given product and details, learn about different Image file formats.
2. Design a poster with given information and learn about Image compression.
3. Learn to prepare images for Print, Web and Video.
4. Edit the sound file and Learn about Effects and Filters of sound.
1. 5. Record Your voice and learn about Audio Compression.
6. Record an Audio Program and Learn about streaming an audio content.
7. Learn about Video editing – Prepare video with rough cut.
8. Prepare video content with title and special effects.
9. Record video content and learn about video compressions.
10. Prepare Video content for streaming.
11. Prepare an interactive presentation using flash(or similar software). Some of the following animation assignments can be done :
 - a. Create an animation using the tools panel and the properties panel to draw the following – Line, oval, circle, rectangle , square, pencil , brush , lasso tool
 - b. Create an animation using text tool to set the font , size , color etc.
 - c. Create an animation using Free transform tool that should use followings-
 1. Move Objects
 2. Skew Objects
 3. Stretch Objects
 4. Rotate Objects
 5. Stretch Objects while maintaining proportion
 6. Rotate Objects after relocating the center dot
 - d. Create an animation using layers having following features-Insert layer, Delete layer, guide layer, Mask layer.
 - e. Modify the document (changing background color etc.)using the following tools
 - i. Eraser tool Hand tool Ink bottle tool Zoom tool
 - ii. Paint Bucket tool Eyedropper tool

- f. Create an animation for bus car race in which both starts from the same point and car wins the race.
- g. Create an animation in which text Hello gets converted into GoodBye (using motion/shape tweening).
- h. Create an animation having five images having fade-in fade-out effect.
- i. Create an scene to show the sunrise (using multiple layers and motion tweening)
- j. Create an animation to show the ripple effect.
- k. Create an animation (using Shape tweening and shape hints) for transforming one shape into another.
- l. Create an animation for bouncing ball (you may use motion guide layer).

12. HTML website with multimedia content, Flash animations.

Semester III : Paper VII
DSC7 : Database Management Systems

DSC- 1C : Database Management Systems (GENERAL)

Total Marks: 150 (4 credits for theory and 2 credits for practical)

Theory: 100

Practical: 50

Internal Assessment for theory : 20 marks ISA and 80 marks SEE

Workload :

Theory : 4 Lectures per week of 1 hours duration

Practical : 2 Practical sessions of 2 hours duration per week per batch .

(correspond to total 4 lectures per week)

Theory: 60 Lectures

1). Introduction (6 Lectures)

Characteristics of database approach, data models, database system architecture and data independence.

2). Entity Relationship(ER) Modeling (8 Lectures)

Entity types, relationships, constraints.

3). Relation data model (19 Lectures)

Relational model concepts, relational constraints, relational algebra, SQL queries

4). Database design (15 Lectures)

Mapping ER/EER model to relational database, functional dependencies, Lossless decomposition, Normal forms(up to BCNF).

5). Transaction Processing (4 Lectures)

ACID properties, concurrency control

6). File Structure and Indexing (8 Lectures)

Operations on files, File of Unordered and ordered records, overview of File organizations, Indexing structures for files(Primary index, secondary index, clustering index), Multilevel indexing using B and B⁺ trees.

Reference Books:

1). R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems "6th Edition, Pearson Education, 2010

2). R. Ramakrishanan, J. Gehrke, "Database Management Systems" 3rd Edition, McGraw-Hill, 2002.

3). A. Silberschatz, H.F. Korth, S. Sudarshan, "Database System Concepts " 6th Edition, McGraw Hill, 2010.

4). R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education,2013.

DSC7P : Database Management Systems (Lab)

Practical's : 60 Lectures

Practical's should be done using a DBMS software like Oracle, SQL Server, MYSQL and open source software.

1. Gathering information, Analyzing data, ER Diagram, Reduction to Tables, Normalisation.
2. Creation/modification of database tables using DDL statements and GUI tools of the DBMS software.
3. SQL queries
4. SQL Joins, Views
5. User management, granting/revoking privileges, roles.
6. Report generation

Note : 3 example sets covering all concepts should be done for topics under Serial No 1(ERDs),2(Design), 3 (SQL).

A sample example of a design and SQL queries is

EMPLOYEE Schema

Field	Type	NULL	KEY	DEFAULT
Eno	Char(3)	NO	PRI	NIL
Ename	Varchar(50)	NO		NIL
Job_type	Varchar(50)	NO		NIL
Manager	Char(3)	Yes	FK	NIL
Hire_date	Date	NO		NIL
Dno	Integer	YES	FK	NIL
Commission	Decimal(10,2)	YES		NIL
Salary	Decimal(7,2)	NO		NIL

DEPARTMENT Schema

Field	Type	NULL	KEY	DEFAULT
Dno	Integer	No	PRI	NULL
Dname	Varchar(50)	Yes		NULL
Location	Varchar(50)	Yes		New Delhi

Query List

1. Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.

2. Query to display unique Jobs from the Employee Table.
3. Query to display the Employee Name concatenated by a Job separated by a comma.
4. Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.
5. Query to display the Employee Name and Salary of all the employees earning more than \$2850.
6. Query to display Employee Name and Department Number for the Employee No= 7900.
7. Query to display Employee Name and Salary for all employees whose salary is not in the range of \$1500 and \$2850.
8. Query to display Employee Name and Department No. of all the employees in Dept 10 and Dept 30 in the alphabetical order by name.
9. Query to display Name and Hire Date of every Employee who was hired in 1981.
10. Query to display Name and Job of all employees who don't have a current Manager.
11. Query to display the Name, Salary and Commission for all the employees who earn commission.
12. Sort the data in descending order of Salary and Commission.
13. Query to display Name of all the employees where the third letter of their name is A.
14. Query to display Name of all employees either have two R's or have two A's in their name and are either in Dept No = 30 or their Manger's Employee No = 7788.
15. Query to display Name, Salary and Commission for all employees whose Commission Amount is 14 greater than their Salary increased by 5%.
16. Query to display the Current Date.
17. Query to display Name, Hire Date and Salary Review Date which is the 1st Monday after six months of employment.
18. Query to display Name and calculate the number of months between today and the date each employee was hired.
19. Query to display the following for each employee <E-Name> earns < Salary> monthly but wants < 3 * Current Salary >. Label the Column as Dream Salary.
20. Query to display Name with the 1st letter capitalized and all other letter lower case and length of their name of all the employees whose name starts with J, 'A' and M.
21. Query to display Name, Hire Date and Day of the week on which the employee started.
22. Query to display Name, Department Name and Department No for all the employees.
23. Query to display Unique Listing of all Jobs that are in Department # 30.
24. Query to display Name, Dept Name of all employees who have an A in their name.
25. Query to display Name, Job, Department No. And Department Name for all the employees working at the Dallas location.
26. Query to display Name and Employee no. Along with their Manger's Name and the Manager's employee no; along with the Employees' Name who do not have a Manager.
27. Query to display Name, Dept No. And Salary of any employee whose department No. and salary matches both the department no. And the salary of any employee who earns a commission.
28. Query to display Name and Salaries represented by asterisks, where each asterisk (*) signifies \$100.
29. Query to display the Highest, Lowest, Sum and Average Salaries of all the employees
30. Query to display the number of employees performing the same Job type functions.
31. Query to display the no. of managers without listing their names.
32. Query to display the Department Name, Location Name, No. of Employees and the average salary for all employees in that department.
33. Query to display Name and Hire Date for all employees in the same dept. as Blake.
34. Query to display the Employee No. And Name for all employees who earn more than the average salary.

35. Query to display Employee Number and Name for all employees who work in a department with any employee whose name contains a 'T'.
36. Query to display the names and salaries of all employees who report to King.
37. Query to display the department no, name and job for all employees in the Sales department.
38. Queries to insert, delete, update records.

Semester III : Paper VIII

DSC8 : Programming in Java

Total Marks: 150 (4 credits for theory and 2 credits for practical)

Theory: 100

Practical: 50

Internal Assessment for theory : 20 marks ISA and 80 marks SEE

Workload :

Theory : 4 Lectures per week of 1 hours duration

Practical : 2 Practical sessions of 2 hours duration per week per batch .

(correspond to total 4 lectures per week)

Theory: 60 Lectures

1. Introduction to Object Oriented Programming Paradigm : (5 Lectures)

Should we think of Data or Objects? problems with procedure oriented programming, other ways of simulating the world scenarios, Case study of a Savings bank account. Introduction to Object Oriented Programming, Reusability and Extensibility, abstract data type, Encapsulation, data abstraction and data hiding. 1

2. Introduction to Java: (4 Lectures)

Java Architecture and Features, Variables, Constants, Keywords Data Types, Operators (Arithmetic, Logical and Bitwise) and Expressions, Comments, Doing Basic Program Output, Decision Making Constructs (conditional statements and loops) and Nesting, Java Methods (Defining, Scope, Passing and Returning Arguments, Type Conversion and Type and Checking, Built-in Java Class Methods),

3. Arrays, Strings and I/O (8 Lectures)

Creating & Using Arrays (One Dimension and Multi-dimensional), Referencing Arrays Dynamically, Java Strings: The Java String class, Creating & Using String Objects, Manipulating Strings, String Immutability & Equality, Passing Strings To & From Methods, String Buffer Classes. Simple I/O using System.out and the Scanner class, Byte and Character streams, Reading/Writing from console and files.

4. Object-Oriented Programming overview (4 Lectures)

Defining & Using Classes, Controlling Access to Class Members, Class Constructors, Method Overloading, Class Variables & Methods, Objects as parameters, final classes, Object class, Garbage Collection.

5. Inheritance, Interfaces, Packages, Enumerations, Autoboxing and Metadata

(14 lectures)

Inheritance: (Single Level and Multilevel, Method Overriding, Dynamic Method Dispatch, Abstract Classes), Interfaces and Packages, Extending interfaces and packages, Package and Class Visibility, Using Standard Java Packages (util, lang, io, net), Wrapper Classes, Autoboxing/Unboxing, Enumerations and Metadata.

6. Exception Handling, Threading, Networking and Database Connectivity (15 Lectures)

Exception types, uncaught exceptions, throw, built-in exceptions, Creating your own exceptions;

Multi-threading: The Thread class and Runnable interface, creating single and multiple threads, Thread prioritization, synchronization and communication,

7. Applets and Event Handling

(10 Lectures)

Java Applets: Introduction to Applets, Writing Java Applets, Working with Graphics, Incorporating Images & Sounds. Event Handling Mechanisms, Listener Interfaces, Adapter and Inner Classes. The design and Implementation of GUIs using the AWT controls,

Reference Books

1. Timothy A. Budd, "Introduction to Object-Oriented Programming", 3RD edition, Pearson Education India
2. Mahesh P. Matha; "Core Java : a Comprehensive Study"; PHI Learning Pvt. Ltd., 2011
3. E. Balaguruswamy, "Programming with Java", 4th Edition, McGraw Hill.2009.
4. Ken Arnold, James Gosling, David Homes, "The Java Programming Language", 4th Edition, 2005.
5. Bruce Eckel, "Thinking in Java", 3rd Edition, PHI, 2002.
6. Paul Deitel, Harvey Deitel, "Java: How to Program", 10th Edition, Prentice Hall, 2011.
7. "Computing Concepts with Java 2 Essentials" by Cay Horstmann, Wiley Publications
8. Herbert Schildt, "Java The Complete Reference (English) 9th Edition Paperback", Tata McGraw Hill, 2014.
9. http://en.wikibooks.org/wiki/Java_Programming

DSC8P: Programming in Java (Lab)

Practical's: 60 Lectures

1. To find the sum of any number of integers entered as command line arguments
2. To find the factorial of a given number
3. To learn use of single dimensional array by defining the array dynamically.
4. To learn use of .length in case of a two dimensional array
6. To check if a number is prime or not, by taking the number as input from the keyboard
7. To find the sum of any number of integers interactively, i.e., entering every number from the keyboard, whereas the total number of integers is given as a command line argument
8. Write a program that show working of different functions of String and String Buffer class like setCharAt(), setLength(), append(), insert(), concat() and equals().
9. Write a program to create a —distance class with methods where distance is computed in terms of feet and inches, how to create objects of a class and to see the use of this pointer
10. Modify the —distance class by creating constructor for assigning values (feet and inches) to the distance object. Create another object and assign second object as reference variable to another object reference variable. Further create a third object which is a clone of the first object.
11. Write a program to show that during function overloading, if no matching argument is found, then java will apply automatic type conversions(from lower to higher data type)
12. Write a program to show the difference between public and private access specifiers. The program should also show that primitive data types are passed by value and objects are passed by reference and to learn use of final keyword
13. Write a program to show the use of static functions and to pass variable length arguments in a function.
14. Create a multi-file program where in one file a string message is taken as input from the user and the function to display the message on the screen is given in another file (make use of Scanner package in this program).
15. Write a program to create a multilevel package and also creates a reusable class to generate Fibonacci series, where the function to generate fibonacci series is given in a different file belonging to the same package.
16. Write a program that creates illustrates different levels of protection in classes/subclasses belonging to same package or different packages
17. Write a program “DivideByZero” that takes two numbers a and b as input, computes a/b, and invokes Arithmetic Exception to generate a message when the denominator is zero.
18. Write a program to show the use of nested try statements that emphasizes the sequence of checking for catch handler statements.
19. Write a program to create your own exception types to handle situation specific to your application (Hint: Define a subclass of Exception which itself is a subclass of Throwable).

20. Write a program to demonstrate priorities among multiple threads.
21. Write a program to demonstrate multithread communication by implementing synchronization among threads (Hint: you can implement a simple producer and consumer problem).
22. Write a program to create URL object, create a URL Connection using the `openConnection()` method and then use it to examine the different components of the URL and content.
23. Write a program to implement a simple datagram client and server in which a message that is typed into the server window is sent to the client side where it is displayed.
24. Write a program that creates a Banner and then creates a thread to scroll the message in the banner from left to right across the applet's window.
25. Write a program to get the URL/location of code (i.e. java code) and document (i.e. html file).
26. Write a program to demonstrate different mouse handling events like `mouseClicked()`, `mouseEntered()`, `mouseExited()`, `mousePressed`, `mouseReleased()` and `mouseDragged()`.
27. Write a program to demonstrate different keyboard handling events.
28. Write a program to generate a window without an applet window using `main()` function.
29. Write a program to demonstrate the use of push buttons.
 30. Write a program to demonstrate `ArrayList` class.
 31. Write a program to demonstrate collections.

Semester III : Paper IX

DSC9 : Internet Technology

Total Marks: 150 (4 credits for theory and 2 credits for practical)

Theory: 100

Practical: 50

Internal Assessment for theory : 20 marks ISA and 80 marks SEE

Workload :

Theory : 4 Lectures per week of 1 hours duration

Practical : 2 Practical sessions of 2 hours duration per week per batch .
(correspond to total 4 lectures per week)

Theory : 60 Lectures

1). Basic HTML : (7 Lectures)

Introduction, Doctype, Header, Body and footer of HTML page,
Page formatting: Paragraph, Line break, blank spaces, Preformatted text, Div;
Techniques of HTML: Lists, Table, Image, Hyperlinks, Iframes.

2). CSS : (5 Lectures)

Introduction to CSS, Advantages, Types of style sheets: Inline, Internal, External, Multiple Style sheets and Cascading order, Grouping or nesting, Syntax, ID and Class, Pseudo-class, Pseudo-element, CSS units of measurement, Colors.

3). HTML5, CSS3 : (6 Lectures)

What's new in HTML5, CSS3; Introduction to Framework.

4). Client side scripting - JavaScript and Ajax: (11 Lectures)

DOM, Introduction to JavaScript, Functions and variables, HTML Form processing, Uses of JavaScript : validations, Introduction and use of Ajax.

5). Server side scripting : (13 Lectures)

Static versus Dynamic Pages, Examples of server side languages. Simple Java Servlet, Relation between a servlet and Java Server Pages(JSP), JSP environment, Directives, Comments, Scripting elements : expressions, declarations, scriptlets. 6). XML :

(8 Lectures)
XML syntax, XML versus HTML, Uses of XML, XML Namespaces , XML Schemas, Document Type Definitions(DTD), XSL(Extensible Style Sheet Language), Generating XML from database and using XSL to format it.

7) Java Beans (10 lectures)

Java Beans Fundamentals, JAR files, Introspection, Developing a simple Bean, Connecting to DB.

Recommended Books:

- 1) Atchut S. Godbole & Atul Kahate , "Web Technologies TCP/IP Architecture and Java Programming", Tata McGraw Hill.
- 2) Dane Cameron , "HTML5, Javascript and JQuery 24-Hour Trainer", Wiley India Pvt. Ltd.
- 3) Elizabeth Robson & Eric Freeman, "Head First HTML and CSS", O'reilly

- 4) [Glenn Johnson](#), "Programming in HTML5 with JavaScript and CSS3", Microsoft Press, PHI Learning.
- 5) www.w3schools.com/html/html5_intro.asp
- 6) www.w3schools.com/css/css3_intro.asp

DSC9P : Internet Technology (Lab)

Practicals : 60 Lectures

- Basic HTML, HTML Form processing
- Web pages using HTML5, CSS3
- JavaScript Validations
 - ✓ Checking for empty value
 - ✓ Checking for presence of digits and characters
 - ✓ Date format
 - ✓ Email
- Demonstration of JavaScript event do a AJAX request.

- JSP programs using JDBC to execute delete, update, select queries on database tables
- JSP programs to use JSTL tags
- Java Bean
- Create XML with DTD and Schema's
- Display XML using XSL
- JSP programs to generate XML which is formatted using XSL
- FOUR PROGRAMS ON JAVABEANS .

Semester IV: PAPER X
DSC10 : Software Engineering

DSC- 1D : Software Engineering (GENERAL)

Total Marks: 150 (4 credits for theory and 2 credits for practical)

Theory: 100

Practical: 50

Internal Assessment for theory : 20 marks ISA and 80 marks SEE

Workload :

Theory : 4 Lectures per week of 1 hours duration

Practical : 2 Practical sessions of 2 hours duration per week per batch .

(correspond to total 4 lectures per week)

Theory : 60 Lectures

1. Introduction (12Lectures)

The Evolving Role of Software, Software Characteristics, Changing Nature of Software, Software Engineering as a Layered Technology, Software Process Framework, Framework and Umbrella Activities, Process Models, Capability Maturity Model Integration (CMMI).

2.Requirement Analysis (12 Lectures)

Software Requirement Analysis, Initiating Requirement Engineering Process, Requirement Analysis and Modeling Techniques, Flow Oriented Modeling, Need for SRS, Characteristics and Components of SRS.

3.Software Project Management (6 Lectures)

Estimation in Project Planning Process, Project Scheduling.

4. Risk Management (5 Lectures)

Software Risks, Risk Identification, Risk Projection and Risk Refinement, RMMM Plan.

5. Quality Management (5 Lectures)

Quality Concepts, Software Quality Assurance, Software Reviews, Metrics for Process and Projects.

6.Design Engineering (10 Lectures)

Design Concepts, Architectural Design Elements, Software Architecture, Data Design at the Architectural Level and Component Level, Mapping of Data Flow into Software Architecture, Modeling Component Level Design.

7.Testing Strategies & Tactics (10Lectures)

Software Testing Fundamentals, Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System testing,

Recommended Books:

1. R.S. Pressman, "Software Engineering: A Practitioner's Approach" (7th Edition), McGraw-Hill, 2009.
2. P. Jalote, "An Integrated Approach to Software Engineering (2nd Edition)", Narosa Publishing House, 2003.
3. K.K. Aggarwal and Y. Singh, "Software Engineering (2nd Edition)", New Age International Publishers, 2008.
4. I. Sommerville, "Software Engineering (8th edition)", Addison Wesley, 2006.
5. D. Bell, "Software Engineering for Students (4th Edition)", Addison-Wesley, 2005.
6. R. Mall, "Fundamentals of Software Engineering (2nd Edition)", Prentice-Hall of India, 2004.

DSC10P : Software Engineering (Lab)

Practicals : 60 Lectures

Practical List :

1. Problem Statement, Process Model
2. Requirement Analysis: Creating a Data Flow
3. Project Management: Computing FP, Effort, Schedule, Risk Table, Timeline chart
4. Design Engineering: Architectural Design, Data Design, Component Level Design
5. Testing: Basis Path Testing

Sample Projects:

1. Criminal Record Management: Implement a criminal record management system for jailers, police officers and CBI officers
2. DTC Route Information: Online information about the bus routes and their frequency and fares
3. Car Pooling: To maintain a web based intranet application that enables the corporate employees within an organization to avail the facility of carpooling effectively.
4. Patient Appointment and Prescription Management System
5. Organized Retail Shopping Management Software
6. Online Hotel Reservation Service System
7. Examination and Result computation system
8. Automatic Internal Assessment System
9. Parking Allocation System
10. Wholesale Management System

Semester IV : Paper XI

DSC11: Programming in Python

Total Marks: 150 (4 credits for theory and 2 credits for practical)

Theory: 100

Practical: 50

Internal Assessment for theory : 20 marks ISA and 80 marks SEE

Workload :

Theory : 4 Lectures per week of 1 hours duration

Practical : 2 Practical sessions of 2 hours duration per week per batch .

(correspond to total 4 lectures per week)

Theory : 60 Lectures

Overview of Programming :

(2 Lectures)

Structure of a Python Program, Elements of Python.

Introduction to Python :

(8 Lectures)

Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators: Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator)

Creating Python Programs :

(8 Lectures)

Input and Output Statements, Control statements, Conditional Statement, Difference between break, continue and pass. Error and Exception handling, Defining Functions, default arguments, Exit function.

Recursion :

(4 Lectures)

The Three laws of Recursion, Stack diagrams for recursive functions,

Strings

(3 Lectures)

String as a compound data type, Length, Traversal and the for loop, String slices, String comparison, A find function, Looping and counting,

Python Data Structures :

(15 Lectures)

Lists: List values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested list. Tuples, Dictionary, Sequences, Stack , queue, Dequeue, shell and merge sort , Sets, Date & Time, Modules.

Advance Data Structures :

(10 Lectures)

Trees as recursive Data Structure, A Python Class to store trees, traversing a tree , binary trees, binary tree traversal, inserting an item, Removing an item, balancing a Binary Tree. AVL trees.

Introduction to Advanced Python:

(10 Lectures)

Objects and Classes, Fraction Class, Polymorphism , Inheritance, Regular Expressions, File processing, database connectivity , Introduction to Graphical user interface design in Python (including the Tkinter module), Widgets and basic components, Layout options, Event handling , C integration with Python (including the SWIG module),

Reference Books :

1. 1. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser , “Data Structures and Algorithms in Python”, Wiley
2. Allen Downey, “Think Python”, Green Tree Press .
3. Brad Miller, David Ranum “Problem Solving with Algorithms and Data Structures Release 3.0”, Franklin, Beedle & Associates Inc, ISBN-13 > 9781590282571, ISBN -10 > 1590282574
4. T. Budd, Exploring Python, TMH, 1st Ed, 2011
5. Python Tutorial/Documentation www.python.org 2015
6. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012
7. <http://docs.python.org/3/tutorial/index.html>
8. <http://interactivepython.org/courselib/static/pythonds>
9. <http://www.ibiblio.org/g2swap/byteofpython/read/>
- 9.Narasimha Karumanchi , Data structures and algorithms with Python, Careermonk Publication
10. Mark summerfield , “Rapid GUI programming with python and Qt”, prentice hall open source software development series .
11. Mark Summerfield “ Programming in Python 3 “, Addison wisely.

DSC11P : Programming in Python (Lab)

Practical's : 60 Lectures

Suggested list of Practical's:

1. Write a program that takes a positive integer n and then produces n lines of output shown as follows.

For example enter a size: 5

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

2. Write a function that takes an integer `n` as input and calculates the value of $1 + 1/1! + 1/2! + 1/3! + \dots + 1/n$
3. Write a list function to convert a string into a list, as in `list ('abc')` gives `[a, b, c]`.

4. **Write a Python program to print the following string in a specific format (see the output).**

Sample String : "Twinkle, twinkle, little star, How I wonder what you are! Up above the world so high, Like a diamond in the sky. Twinkle, twinkle, little star, How I wonder what you are"

Output :

```
Twinkle, twinkle, little star,
    How I wonder what you are!
        Up above the world so high,
            Like a diamond in the sky.
Twinkle, twinkle, little star,
    How I wonder what you are
```

5. Write a Python program which accepts a sequence of comma-separated numbers from user and generate a list and a tuple with those numbers.
Sample data : 3, 5, 7, 23
Output :
List : ['3', ' 5', ' 7', ' 23']
Tuple : ('3', ' 5', ' 7', ' 23')

6. Write a Python program to accept a filename from the user print the extension of that.

Sample filename : abc.java
Output : java

7. Write a Python program to display the examination schedule. (extract the date from exam_st_date).
exam_st_date = (11, 12, 2014)
Sample Output : The examination will start from : 11 / 12 / 2014

8. Write a Python program to calculate number of days between two dates.
Sample dates : (2014, 7, 2), (2014, 7, 11)
Expected output : 9 days

9. Write a Python program to get a string made of the first 2 and the last 2 chars from a given a string. If the string length is less than 2, return instead the empty string.
Sample String : 'w3resource'
Expected Result : 'w3ce'
Sample String : 'w3'
Expected Result : 'w3w3'
Sample String : ' w'
Expected Result : Empty String

10. Write a Python program to add 'ing' at the end of a given string (length should be at least 3). If the given string is already ends with 'ing' then add 'ly' instead. If the string length of the given string is less than 3, leave it unchanged. Sample String : 'abc'
Expected Result : 'abcing'
Sample String : 'string'
Expected Result : 'stringly'

2. Write a Python program for sequential search
Sequential Search : In computer science, linear search or sequential search is a method for finding a particular value in a list that checks each element in sequence until the desired element is found or the list is exhausted. The list need not be ordered.
Test Data :
Sequential_Search([11,23,58,31,56,77,43,12,65,19],31) -> (True, 3)

3. Write a Python program to sort a list of elements using the shell sort algorithm.

4. Write a Python program to sort a list of elements using the merge algorithm.

5. Write a Python program of recursion list sum

Test Data : [1, 2, [3,4], [5,6]]

Expected Result : 21

6. Write a Python program to solve the Fibonacci sequence using recursion.

7. Write a Python program to calculate the geometric sum of n-1

Note : In mathematics, a geometric series is a series with a constant ratio between successive terms.

Example :

$$\sum_{n=1}^{\infty} \frac{1}{n} = 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \dots$$

8. Write a Python script to display the

a) Current date and time

b) Current year

c) Month of year

d) Week number of the year

e) Weekday of the week

f) Day of year

g) Day of the month

h) Day of week

18. Write a Python class to convert a roman numeral to an integer.

19. Write a Python class to find validity of a string of parentheses, '(', ')', '{', '}', '[' and ']'.

These brackets must be close in the correct order, for example "()" and "()[{}]" are valid but "[)", "{([])}" and "{{{" are invalid. –

20. Write a Python class to get all possible unique subsets from a set of distinct integers. –

Input : [4, 5, 6]

Output : [], [6], [5], [5, 6], [4], [4, 6], [4, 5], [4, 5, 6]]

21. Write a Python class to find a pair of elements (indices of the two numbers) from an given array whose sum equals a specific target number. –

Input: numbers= [10,20,10,40,50,60,70], target=50

Output: 3, 4

22. Write a Python class to find the three elements that sum to zero from a set of n real numbers. -

Input array : [-25, -10, -7, -3, 2, 4, 8, 10]

Output : [[-10, 2, 8], [-7, -3, 10]]

23. Write a program to create Stack Class and implement all its methods. (Use Lists).

24. Write a program to create Queue Class and implement all its methods. (Use Lists)

25. Write a program to implement linear and binary search on lists.

26. Write a program to sort a list using insertion sort and bubble sort and selection sort.

27. 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

28. Implement various operations on AVL Tree

29. Implement C integration with Python using SWIG.

Semester IV , Paper XII

DSC12 : Data Mining & Warehousing

Total Marks: 150 (4 credits for theory and 2 credits for practical)

Theory: 100

Practical: 50

Internal Assessment for theory : 20 marks ISA and 80 marks SEE

Workload :

Theory : 4 Lectures per week of 1 hours duration

Practical : 2 Practical sessions of 2 hours duration per week per batch .

(correspond to total 4 lectures per week)

Theory : 60 Lectures

1. Introduction and Background: [12 L]

Introduction to the multidisciplinary field of data mining,. Discussion on the evolution of database technology that has led to the need for data warehousing and data mining. Stress on importance of its application potential. Introduction to the different key words and techniques.

2. Data Warehousing And OLAP: [12L]

Insight of data warehouse and on-line analytical processing, Aggregation Operations, models for data Warehousing, star schema, fact and dimension tables Conceptualization of data warehouse and multidimensional databases. Life cycle of data warehouse development. Relationship between data warehouse and data mining.

3.Data Mining Primitives: [12L]

Data preprocessing including data cleaning, data integration, data transformation. Definition and Specification of a generic data mining task. Description of Data mining query language with few example queries.

1. Association Analysis: [12L]

Different methods(algorithms) for mining association rules in transaction based databases. Illustration of confidence and support. ,Classification of association rules. Discussion on few association rule algorithms e.g. Apriori

5.Classification and Clustering: [12L]

Different decision tree induction, genetic algorithms, Clustering: Partition based clustering, Hierarchical clustering, model based clustering for continuous and discrete data. Discussion on scalability of clustering algorithms.

Refernces:

1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques," 1st Edition Indian Reprint 2001, Harcourt India Private Limited, ISBN 1-55860-489-8.
2. Margaret Dunham, "Data Mining: Introductory and Advanced Topics," 1st Edition, 2003, Prentice Hall (Pearson Publication), ISBN 0-13-088892-3.
3. Arun K Pujari, "Data Mining Techniques". Universities Press.
4. T. Mitchell, "Machine Learning", 1997, McGraw Hill.
5. S.M. Weiss and N. Indurkha, "Predictive Data Mining", 1998, Morgan Kaufmann.

6. M. Jarke, M. Lenzen, Y. Vassiliou, and P. Vassiladis, “Fundamentals of Data Warehouses”, 2000, Springer Verlag, Isbn 3-540-65365-1.

Practicals will be drafted later /

Semester V , Paper XIII

DSC13 : COMPUTER NETWORKS

DSC - 5A : COMPUTER NETWORKS (GENERAL)

Total Marks: 150 (4 credits for theory and 2 credits for practical)

Theory: 100

Practical: 50

Internal Assessment for theory : 20 marks ISA and 80 marks SEE

Workload :

Theory : 4 Lectures per week of 1 hours duration

Practical : 2 Practical sessions of 2 hours duration per week per batch .

(correspond to total 4 lectures per week)

Theory : 60 Lectures

1. Introduction to Computer Networks (7 Lectures)

Network definition; network topologies; network classifications; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite.

2. Data Communication Fundamentals and Technique (9 Lectures)

Analog and digital signal; data-rate limits; digital to digital line encoding schemes; pulse code modulation; parallel and serial transmission; digital to analog modulation; multiplexing techniques- FDM, TDM; transmission media.

3. Networks Switching Techniques and Access mechanisms (9 Lectures)

Circuit switching; packet-switching- connectionless datagram switching, connection-oriented virtual circuit switching; dial-up modems; digital subscriber line; cable TV for data transfer.

4. Data Link Layer Functions and Protocol (9 Lectures)

Error detection and error correction techniques; data-link control- framing and flow control; error recovery protocols- stop and wait ARQ, go-back-n ARQ; Point to Point Protocol on Internet.

5. Multiple Access Protocol and Networks (8 Lectures)

CSMA/CD protocols; Ethernet LANS; connecting LAN and back-bone networks- repeaters, hubs, switches, bridges, router and gateways

6. Networks Layer Functions and Protocols (7 Lectures)

Routing; routing algorithms; network layer protocol of Internet- IP protocol, Internet control protocols.

7. Transport Layer Functions and Protocols (7Lectures)

Transport services- error and flow control, Connection establishment and release- three way handshake

8. Overview of Application layer protocol (4 Lectures)

Overview of DNS protocol; overview of WWW & HTTP protocol.

Reference Books

1. B. A. Forouzan: "Data Communications and Networking", Fourth edition, THM ,2007.
2. A. S. Tanenbaum: "Computer Networks", Fourth edition, PHI , 2002

DSC13P : Computer Networks Lab

Practical: 60 Lectures

Suggested list of practical's :

1. Simulate Cyclic Redundancy Check (CRC) error detection algorithm for noisy channel.
2. Simulation of framing using Bit stuffing and character stuffing.
3. Simulate and implement stop and wait protocol for noisy channel.
4. Simulate and implement distance vector routing algorithm
5. Simulate and implement Dijkstra algorithm for shortest path routing.
6. Configuring TCP/IP on a desktop,(use of command ipconfig)
7. Using diagnostic Network Commands : ping, traceroute, netstat, nslookup
8. Setting up of wireless network (ad-hoc and Infrastructure)
9. IP address manipulation (Extract network id and Host id given netmask)
10. Simulating IP fragmentation and reassembly.

Semester VI : PAPER - XIV

DSC14 : Information Security

Total Marks: 150 (4 credits for theory and 2 credits for practical)

Theory: 100

Practical: 50

Internal Assessment for theory : 20 marks ISA and 80 marks SEE

Workload :

Theory : 4 Lectures per week of 1 hours duration

Practical : 2 Practical sessions of 2 hours duration per week per batch .
(correspond to total 4 lectures per week)

Theory : 60 Lectures

1. Introduction

5 lectures

Security, Attacks, Computer Criminals, Security Services, Security Mechanisms.

2. Cryptography

10 lectures

Substitution ciphers, Transpositions Cipher, Confusion, diffusion, Symmetric, Asymmetric Encryption. DES Modes of DES, Uses of Encryption, Hash function, key exchange, Digital Signatures, Digital Certificates.

3. Program Security

10 lectures

Secure programs, Non malicious Program errors, Malicious codes virus, Trap doors, Salami attacks, Covert channels, Control against program

4. Threats.

8 lectures

Protection in OS: Memory and Address Protection, Access control, File Protection, User Authentication.

5. Database Security

8 lectures

Requirements, Reliability, Integrity, Sensitive data, Inference, Multilevel Security.

6. Security in Networks

9 lectures

Threats in Networks, Security Controls, firewalls, Intrusion detection systems, Secure e-mails

7. Administrating Security

10 lectures

Security Planning, Risk Analysis, Organisational Security Policy, Physical Security. Ethical issues in Security: Protecting Programs and data. Information and law.

Reference Books

1. Stallings William, " Cryptography and Network Security: Principles and Practises", 5th edition, Prentice Hall
2. Kahate Atul, "Cryptography and Network Security" Tata McGraw-Hill.
3. Menezes A. J., P.C. Van Oorschot and S.A. Vanstone, "Handbook of Applied Cryptography"
4. C. P. Pfleeger, S. L. Pfleeger; Security in Computing, Prentice Hall of India, 2006

DSC14 : Information Security (Lab)
Practical's : 60 Lectures.

List of suggested Assignments:

1. Demonstrate the use of Network tools: ping, ipconfig, ifconfig, tracert, arp, netstat, whois
2. Use of Password cracking tools : John the Ripper, Ophcrack. Verify the strength of passwords using these tools.
3. Perform encryption and decryption of Caesar cipher. Write a script for performing these operations.
4. Perform encryption and decryption of a Rail fence cipher. Write a script for performing these operations.
5. Use nmap/zenmap to analyse a remote machine.
6. Use Burp proxy to capture and modify the message.
7. Demonstrate sending of a protected word document.
8. Demonstrate sending of a digitally signed document.
9. Demonstrate sending of a protected worksheet.
10. Demonstrate use of steganography tools.
11. Demonstrate use of gpg utility for signing

Discipline Specific Core Subject :

DSC1: Programming fundamentals using C
DSC2: Computer Fundamentals
DSC3: Computer System Architecture
DSC4: Data Structures
DSC5: Operating System
DSC6: Multimedia and Applications
DSC7: Database Management Systems
DSC8: Programming in Java
DSC9: internet Technology
DSC10: Software Engineering
DSC11: Programming in Python
DSC12: Data Mining
DSC13: Computer Networks
DSC14: Information Security

**Discipline Specific Elective Papers: (Credit: 06 each) (4 papers to be selected) –
DSE 1 – 4 At semester V and VI**

1. Network Programming
2. Microprocessor
3. Computational Linguistics
4. Digital Image Processing
5. Introduction to Data Sciences
6. Cloud Computing
7. Big Data Analytics
8. Computer Graphics
9. Artificial Intelligence
10. Embedded Systems
11. Human Computer Interface
12. Network Programming
13. Design and Analysis of Algorithms
14. Simulation and Modeling
15. Digital Forensics
16. Game Programming.
17. PHP OOPs MVC Programming
18. Modern Development Frameworks
19. Design and Analysis of Algorithms

Generic Elective Papers (GE) (Credit: 04 each)

1. Computer Fundamentals
2. Introduction to Database Systems
3. Introduction to Programming
4. Computer Networks and Internet Technologies
5. Multimedia and Applications
6. Programming in Python
7. Programming in Visual Basic / Gambas
8. Information Security and Cyber Laws
9. Web and E-Commerce Technologies
10. Management Information System

Skill Enhancement Courses: 4 credits

1. Android Programming
2. Programming in MATLAB
3. HTML Programming
4. XML Programming
5. Oracle (SQL/PL-SQL)
6. Programming in Python
7. PHP Programming
8. UNIX/LINUX Programming
9. R Programming
10. Software Testing

Appendix

General Elective Papers

Semester – I GE1

Semester – II GE2

(Credits : 04) - (3 + 1 Lab)

General Elective : GE-1 : IT Fundamentals

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**

Internet 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, F
Tom, 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+
$\geq 60 < 80$	A
$\geq 50 < 60$	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

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

- Calculate total sale year wise.
- Calculate the net sale made by each salesman
- Calculate the maximum sale made by the salesman
- Calculate the commission for each salesman under the condition.
 - If total sales >4,00,000 give 5% commission on total sale made by the salesman.
 - Otherwise give 2% commission.
- Draw a bar graph representing the sale made by each salesman.
- 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

- Calculate Quarter total and Quarter average.
- Calculate Monthly total.
- Surplus = Monthly income - Monthly total.
- What would be total surplus if monthly income is 1500.
- How much does telephone expense for March differ from quarter average.
- Create a 3D column graph for telephone and utilities.
- 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.

General Elective :GE-2 : Multimedia and Web Design

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**

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

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)

B.Sc. Semester III:

Generic Elective - 3: Introduction to Cyber security and cyber law (4 credits)

Objective:

To give an overview of the computer, networking and why and how of securing information in e-World.

Theory Lectures : 45

1. Operating Systems [5L]

Windows OS, Linux OS: Directory structure, Environment variables setting and use, Users rights and security, Services, Software installation.

2. Basics of Computer Networking [10L]

Networking basics, why networking of computer is needed, Network media, topology, Types, Internet: role and importance, IP Addressing - public Vs Private, Static Vs Dynamic; WWW & related protocols, Intranet & Extranet, Internet Infrastructure, Search Engines, Web Browser, Web server.

3. Cyber Crimes [5L]

Introduction, types of cyber crimes, its impact: social, personal, financial; reporting cyber crimes

4. e-World security [10L]

Threats in Cyber Space, Classification of threats, BYOD and portable devices threats, 0-day attacks, insider threats, Cyber Warfare, Malware threats, mobile apps threats Social media and its safe uses: Social media- its usages, Social networking- types, uses, importance, social networking safety

5. Online Privacy [8L]

Privacy : basic concepts, Sensitive personal information, Privacy policies, Google/Facebook privacy policies, Privacy laws, IPR, Ethics & safe practices

6. Cyber Laws [13L]

Evolution and purpose, offence & defence, bailable and non-bailable offences, provisions related to e-commerce, provisions for cyber crimes, adjudicating officers, CERT-IN- its role and powers

7. Cyber Forensic [4L]

Data recovery, evidence collection, cloning of devices, media sanitization

Web Resources:

1. www.linux.org
2. www.cert.org
3. www.sans.org
4. www.us.cert.gov
5. en.wikipedia.org/wiki/List_of_cyber_attack_threat_trends
6. compnetworking.about.com/od/basicnetworkingconcepts

Practical syllabus will furnish later

BSc Semester IV:

Generic Elective – 4 : Information Systems & IT Entrepreneurship (4 credits)

Objective:

To study the different aspects of human computer interaction and the computer interface design concepts.

Theory Lectures 45

1. Information Systems & its role in business- operational, management, strategic. Data & Information. Types of information systems- TPS, MIS, DSS, EIS. – [3L]
2. e-Commerce- Concept and Models : Introduction to E-Commerce -Definition and scope of E-Commerce and M-Commerce, E-Commerce trade cycle, Electronic Markets, Internet Commerce, Benefits and Impacts of E-Commerce. Elements of E-Commerce –various elements, e-visibility, e-shops, Delivery of goods and services, Online payments, After-sales services, Internet E-Commerce security . EDI and Electronic Payment Systems Electronic Payment Systems: credit/debit/smart cards, e-credit accounts, e-money , EDI. Introduction to EC models -Inter-organization and intra-organization E-Commerce, E-Commerce Models: B2B, B2C, C2B, C2C, G2C, C2G. Practices in E-Commerce . E-Business-Introduction to Internet bookshops, Grocery Suppliers, Software Supplies and support, Electronic newspapers, Virtual auctions, Online share dealing, e-diversity . Mobile Commerce and Future of E-Commerce -Introduction to Mobile Commerce, Benefits of Mobile Commerce, Impediments of M-Commerce, M-Commerce framework, Emerging and future trends – [15L]
3. ERP- Enterprise-An Overview-. Introduction to ERP, Basic Concepts of ERP, Risks and Benefits of ERP, ERP and Related Technologies. ERP Marketplace and Marketplace Dynamics. ERP-Functional Modules. ERP Implementation -ERP Implementation Basics, ERP Implementation Life Cycle, ERP Package Selection, ERP (Implementation) Transition Strategies, ERP Implementation Process, ERP Project Teams, Consultants, Vendors, and Employees, Success & Failure Factors of an ERP Implementation. ERP Operation & Maintenance, Maximizing the ERP System- [12L]
4. Information systems development & maintenance approaches, IT outsourcing- [9L]
5. current & future trends- cloud computing, mobile & ubiquitous computing, big data and its impact on information systems- [3L]
6. Entrepreneurship & Start-ups- business models, venture capital etc. (3 l)

Text Book:

1. Enterprise Resource Planning, ALEXIS LEON, ISBN: 9780070656802,2007
2. Kenneth C. Laudon, Jane P. Laudon; Management Information Systems; Prentice Hall; 12th Edition
3. The lean Startup- Eric Ries, Penguin India

Practical / tutorial syllabus will furnish later