University of Delhi

DEPARTMENT OF COMPUTER SCIENCE

UNDERGRADUATE PROGRAMME
(Courses effective from Academic Year 2015-16)

SYLLABUS OF COURSES TO BE OFFERED
Core Courses, Elective Courses & Ability Enhancement Courses

Preamble

The University Grants Commission (UGC) has initiated several measures to bring equity, efficiency and excellence in the Higher Education System of country. The important measures taken to enhance academic standards and quality in higher education include innovation and improvements in curriculum, teaching-learning process, examination and evaluation systems, besides governance and other matters.

The UGC has formulated various regulations and guidelines from time to time to improve the higher education system and maintain minimum standards and quality across the Higher Educational Institutions (HEIs) in India. The academic reforms recommended by the UGC in the recent past have led to overall improvement in the higher education system. However, due to lot of diversity in the system of higher education, there are multiple approaches followed by universities towards examination, evaluation and grading system. While the HEIs must have the flexibility and freedom in designing the examination and evaluation methods that best fits the curriculum, syllabi and teaching–learning methods, there is a need to devise a sensible system for awarding the grades based on the performance of students. Presently the performance of the students is reported using the conventional system of marks secured in the examinations or grades or both. The conversion from marks to letter grades and the letter grades used vary widely across the HEIs in the country. This creates difficulty for the academia and the employers to understand and infer the performance of the students graduating from different universities and colleges based on grades.

The grading system is considered to be better than the conventional marks system and hence it has been followed in the top institutions in India and abroad. So it is desirable to introduce uniform grading system. This will facilitate student mobility across institutions within and across countries and also enable potential employers to assess the performance of students. To bring in the desired uniformity, in grading system and method for computing the cumulative grade point average (CGPA) based on the performance of students in the examinations, the UGC has formulated these guidelines.

CHOICE BASED CREDIT SYSTEM (CBCS):

The CBCS provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective/minor or skill based courses. The courses can be evaluated following the grading system, which is considered to be better than the conventional marks system. Therefore, it is necessary to introduce uniform grading system in the entire higher education in India. This will benefit the students to move across institutions within India to begin with and across countries. The uniform grading system will also enable potential employers in assessing the performance of the candidates. In order to bring uniformity in evaluation system and computation of the Cumulative Grade Point Average (CGPA) based on student's performance in examinations, the UGC has formulated the guidelines to be followed.

Outline of Choice Based Credit System:

1. **Core Course:** A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.
2. **Elective Course:** Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course.
    2.1 **Discipline Specific Elective (DSE) Course**: Elective courses may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective. The University/Institute may also offer discipline related Elective courses of interdisciplinary nature (to be offered by main discipline/subject of study).
    2.2 **Dissertation/Project**: An elective course designed to acquire special/advanced knowledge, such as supplement study/support study to a project work, and a candidate studies such a course on his own with an advisory support by a teacher/faculty member is called dissertation/project.
    2.3 **Generic Elective (GE) Course**: An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is called a Generic Elective.
    P.S.: A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa and such electives may also be referred to as Generic Elective.
3. **Ability Enhancement Courses (AEC)/Competency Improvement Courses/Skill Development Courses/Foundation Course:** The Ability Enhancement (AE) Courses may be of two kinds: AE Compulsory Course (AECC) and AE Elective Course (AEEC). "AECC" courses are the courses based upon the content that leads to Knowledge enhancement. They ((i) Environmental Science, (ii) English/MIL Communication) are mandatory for all disciplines. AEEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc.
    3.1 AE Compulsory Course (AECC): Environmental Science, English Communication/MIL Communication.
    3.2 AE Elective Course (AEEC): These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based instruction.

Project work/Dissertation is considered as a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem. A Project/Dissertation work would be of 6 credits. A Project/Dissertation work may be given in lieu of a discipline specific elective paper.

Details of Courses Under Undergraduate Programme (B.A./ B.Com.)

Course	*Credits	
	Paper+ Practical	Paper + Tutorial
I. Core Course	12X4= 48	12X5=60
(12 Papers)		
Two papers – English		
Two papers – MIL		
Four papers – Discipline 1.		
Four papers – Discipline 2.		
Core Course Practical / Tutorial*	12X2=24	12X1=12
(12 Practicals)		
II. Elective Course	6x4=24	6X5=30
(6 Papers)		
Two papers- Discipline 1 specific		
Two papers- Discipline 2 specific		
Two papers- Inter disciplinary		
Two papers from each discipline of choice		
and two papers of interdisciplinary nature.		
Elective Course Practical / Tutorials*	6 X 2=12	6X1=6
(6 Practical/ Tutorials*)		
Two papers- Discipline 1 specific		
Two papers- Discipline 2 specific		
Two papers- Generic (Inter disciplinary)		
Two papers from each discipline of choice		
including papers of interdisciplinary nature.		

- **Optional Dissertation or project work in place of one elective paper (6 credits) in 6th Semester**

III. Ability Enhancement Courses		
1**. Ability Enhancement Compulsory**	2 X 2=4	2 X 2=4
(2 Papers of 2 credits each)		
Environmental Science		
English Communication/MIL		
2**. Ability Enhancement Elective**	4 X 2=8	4 X 2=8
(Skill Based)		
(4 Papers of 2 credits each)		
	Total credit= 120	**Total = 120**

Institute should evolve a system/policy about ECA/ General Interest/Hobby/Sports/NCC/NSS/related courses on its own.

*wherever there is a practical there will be no tutorial and vice-versa.

SEMESTER	COURSEOPTED	COURSENAME	Credits
I	Ability Enhancement Compulsory Course-I	English/MIL communications/ Environmental Science	2
	Core course-I	English/MIL-1	6
	Core Course-II	DSC -1A-Computer Fundamentals	4
	Core course-II Practical/Tutorial	DSC -1A-Computer Fundamentals Lab	2
	Core Course-III	DSC 2A	6
II	Ability Enhancement Compulsory Course-II	English/MIL communications/ Environmental Science	2
	Core course-IV	English/MIL-1	6
	Core Course-V	DSC -1B-Database Management	4
	Core course-V Practical/Tutorial	DSC -1B-Database Management Systems Lab	2
	Core Course-VI	DSC 2B	6
III	Core course-VII	English/MIL-2	6
	Core Course-VIII	DSC -1C-Computer Networks and Internet Technologies	4
	Core course-VIII Practical/Tutorial	DSC -1C-Computer Networks and Internet Technologies Lab	2
	Core Course-IX	DSC 2C	6
	SkillEnhancementCourse-1 Theory/ Practical/Tutorial	SEC-1- Office Automation Tools	1 + 1
IV	Core course-X	English/MIL-2	6
	Course-XI	DSC -1D-Multimedia Systems and Applications	4
	Core course-XI Practical/Tutorial	DSC -1D-Multimedia Systems and Applications Lab	2
	Course-XII	DSC 2D	6
	SkillEnhancementCourse-2 Theory/Practical/Tutorial	SEC-2 Search Engine Optimisation	1 + 1
V	SkillEnhancementCourse-3A Theory/Practical/Tutorial	SEC-3A - Open Source Software	1 + 1
	SkillEnhancementCourse-3B Theory/Practical/Tutorial	SEC-3B - Introduction to Linux	1 + 1
	Discipline Specific Elective -1A	DSE-1A - Programming with Python	4
	Discipline Specific Elective -1A Practical/Tutorial	DSE-1A - Programming with Python Lab	2
	Discipline Specific Elective -1B	DSE-1B – Visual Programming	4
	Discipline Specific Elective -1B Practical/Tutorial	DSE-1B - Visual Programming Lab	2

	Generic Elective – 1	GE – 1 - IT Fundamentals	4
	Generic Elective – 1 Practical/Tutorial	GE – 1 – Lab	2
VI	Skill Enhancement Course -4A Theory/Practical/Tutorial	SEC-4A - Web Design using HTML5	1+1
	Skill Enhancement Course -4B Theory/Practical/Tutorial	SEC-4B - PHP Programming	1 + 1
	Skill Enhancement Course -4C Theory/Practical/Tutorial	SEC-4C - Programming using C++	1 + 1
	Discipline Specific Elective -2A	DSE-2A - Information Security and Cyber Laws	4
	Discipline Specific Elective -2A Practical/Tutorial	DSE-2A - Information Security and Cyber Laws Lab	2
	Discipline Specific Elective -2B	DSE-2B - Software Engineering	4
	Discipline Specific Elective -2B Practical/Tutorial	DSE-2B - Software Engineering Lab	2
	Discipline Specific Elective -2C	DSE-2C - Dissertation / Project Work	2
	Discipline Specific Elective -2C Practical/Tutorial	DSE-2C - Dissertation / Project Work Lab	4
	Generic Elective –2	GE – 2 - Multimedia and Web Design	4
	Generic Elective –2 Practical/Tutorial	GE – 2 – Lab	2
Total Credits			120

Core Papers: (Credit: 06 each) (DSC-1,DSC2,DSC3,DSC4)(1 period / week for tutorials or 4 periods / week of practical) : All Compulsory from Semester I to IV one paper each.
1. Computer Fundamentals
2. Database Management Systems
3. Computer Networks and Internet Technologies
4. Multimedia Systems and Applications

Discipline Specific Elective Papers: (Credit: 06 each) (DSE-1, DSE -2):
 Options for DSE 1, choose one
 1. DSE-1A Programming with Python
 2. DSE-1B Visual Programming
 Options for DSE 2 , choose one
 1. DSE-2A Information Security and Cyber Laws
 2. DSE-2B Software Engineering
Note: Universities may include more options or delete some from this list

Skill Enhancement Courses (Credit: 02 each) – SEC1,SEC2,SEC3, SEC4:
 1. SEC-1   Office Automation Tools
 2. SEC-2   Search Engine Optimisation
 3. **Options for SEC-3 , choose one**
  SEC-3A Open Source Software
 4. **Options for SEC-4 , choose one**
  SEC-4A Web Design using HTML5

Note: Universities may include more options or delete some from this list

Important:
1. Each University/Institute should provide a brief write-up about each paper outlining the salient features, utility, learning objectives and prerequisites.
2. University/Institute can add/delete some experiments of similar nature in the Laboratory papers.
3. The size of the practical group for practical papers is recommended to be 10-15 students.
4. University/Institute can add to the list of reference books given at the end of each paper.
5. Latest edition of the referenced books may be used.
6. The focus should be on promoting open source software\ while introducing their proprietary options for completeness.

Core Papers: BA with Computer Applications
(Credit: 06 each)

Core Paper I :Semester-I:
DSC-1A   Computer Fundamentals

Total Marks: 150

Theory : 75

Practical: 50

Internal Assessment: 25

5Lectures ,4 Practicals (each in group of 10 to 15)

Introduction: Introduction to computer system, uses, types.	**6L**
Data Representation: Number systems and character representation, binary arithmetic	**10L**
Human Computer Interface: Types of software, Operating system as user interface, utility programs	**6L**
Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter	**10L**
Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks	**6L**
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.	**10L**
Overview of Emerging Technologies: Bluetooth, cloud computing, big data, data mining, mobile computing and embedded systems.	**8L**
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 :
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-table form** 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	

10

3	1002	Sehwag	65
4	1003	Rahul	41
5	1004	Sourav	89
6	1005	Har Bhajan	56

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

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

3. Given the following worksheet

	A	B	C	D	E	F	G
1	**Salesman**			**Sales in (Rs.)**			
2	No.	Qtr1	Qtr2	Qtr3	Qtr4	Total	Commission
3	S001	5000	8500	12000	9000		
4	S002	7000	4000	7500	11000		
5	S003	4000	9000	6500	8200		
6	S004	5500	6900	4500	10500		
7	S005	7400	8500	9200	8300		
8	S006	5300	7600	9800	6100		

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

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

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

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

Allowances

- HRA Dependent on Basic

  30% of Basic if Basic <=1000

  25% of Basic if Basic>1000 & Basic<=3000

  20% of Basic if Basic >3000

- DA Fixed for all employees, 30% of Basic

- Conveyance Allowance   Rs. 50/- if Basic is <=1000

  Rs. 75/- if Basic >1000 & Basic<=2000

  Rs. 100 if Basic >2000

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

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

Calculate the following:

Gross Salary   = Basic + HRA + DA + Conveyance + Entertainment
Total deduction   = Provident Fund + Group Insurance Premium
Net Salary   = Gross Salary – Total Deduction

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

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

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

(*f*) Draw a pie graph representing the sale made by salesman in 2000.

8.   Enter the following data in Excel Sheet

PERSONAL BUDGET FOR FIRST QUARTER

Monthly Income (Net): 1,475

EXPENSES	JAN	FEB	MARCH	QUARTER TOTAL	QUARTER AVERAGE
Rent600.00	600.00	600.00			
Telephone	48.25	43.50	60.00		
Utilities	67.27	110.00	70.00		
Credit Card	200.00	110.00	70.00		
Oil	100.00	150.00	90.00		
AV to Insurance	150.00				
Cable TV	40.75	40.75	40.75		
Monthly Total					

(a) Calculate Quarter total and Quarter average.

(b) Calculate Monthly total.

(c) Surplus = Monthly income - Monthly total.

(d) What would be total surplus if monthly income is 1500.

(e) How much does telephone expense for March differ from quarter average.

(f) Create a 3D column graph for telephone and utilities.

(g) Create a pie chart for monthly expenses.

9.   Enter the following data in Excel Sheet

TOTAL REVENUE EARNED FOR SAM'S BOOKSTALL

Publisher name	1997	1998	1999	2000	total
A	Rs. 1,000.00	Rs. 1100.00	Rs. 1,300.00	Rs. 800.00	
B	Rs. 1,500.00	Rs. 700.00	Rs. 1,000.00	Rs. 2,000.00	
C	Rs. 700.00	Rs. 900.00	Rs. 1,500.00	Rs. 600.00	
D	Rs. 1,200.00	Rs. 500.00	Rs. 200.00	Rs. 1,100.00	
E	Rs 800.00	Rs. 1,000.00	Rs. 3,000.00	Rs. 560.00	

(a) Compute the total revenue earned.

(b) Plot the line chart to compare the revenue of all publisher for 4 years.

(b) Chart Title should be 'Total Revenue of sam's Bookstall (1997-2000)'

(c) Give appropriate categories and value axis title.

10. Generate 25 random numbers between 0 & 100 and find their sum, average and count. How many no. are in range 50-60

Core Paper II :Semester – II:
DSC-2A   Database Management System

Total Marks: 150

Theory : 75

Practical: 50

Internal Assessment: 25

5Lectures ,4 Practicals (each in group of 10 to 15)

Database: Introduction to database, relational data model, DBMS architecture, data independence, DBA, database users, end users, front end tools   **14L**

E-R Modeling: Entity types, entity set, attribute and key, relationships, relation types, E- R diagrams, database design using ER diagrams   **14L**

Relational Data Model: Relational model concepts, relational constraints, primary and foreign key, normalization: 1NF, 2NF, 3NF   **14L**

Structured Query Language: SQL queries, create a database table, create relationships between database tables, modify and manage tables, queries, forms, reports, modify, filter and view data.   **18L**

Reference Books :
1. P. Rob, C. Coronel, Database System Concepts by, Cengage Learning India, 2008
2. R. Elmsasri,S. Navathe Fundamentals of Database Systems, Pearson Education, Fifth Edition, 2007
3. MySQL : Reference Manual

Practical:

Practical List
1) Create a database having two tables with the specified fields, to computerize a library system of a Delhi University College.

   LibraryBooks (Accession number, Title, Author, Department, PurchaseDate, Price)
   IssuedBooks (Accession number, Borrower)
   a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
   b) Delete the record of book titled "Database System Concepts".
   c) Change the Department of the book titled "Discrete Maths" to "CS".
   d) List all books that belong to "CS" department.
   e) List all books that belong to "CS" department and are written by author "Navathe".
   f) List all computer (Department="CS") that have been issued.
   g) List all books which have a price less than 500 or purchased between "01/01/1999" and "01/01/2004".

2) Create a database having three tables to store the details of students of Computer Department in your college.

Personal information about Student (College roll number, Name of student, Date of birth, Address, Marks(rounded off to whole number) in percentage at 10 + 2, Phone number)
Paper Details (Paper code, Name of the Paper)
Student's Academic and Attendance details (College roll number, Paper code, Attendance, Marks in home examination).

a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
b) Design a query that will return the records (from the second table) along with the name of student from the first table, related to students who have more than 75% attendance and more than 60% marks in paper 2.
c) List all students who live in "Delhi" and have marks greater than 60 in paper 1.
d) Find the total attendance and total marks obtained by each student.
e) List the name of student who has got the highest marks in paper 2.

3) Create the following tables and answer the queries given below:

Customer (CustID, email, Name, Phone, ReferrerID)
Bicycle (BicycleID, DatePurchased, Color, CustID, ModelNo)
BicycleModel (ModelNo, Manufacturer, Style)
Service (StartDate, BicycleID, EndDate)

a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
b) List all the customers who have the bicycles manufactured by manufacturer "Honda".
c) List the bicycles purchased by the customers who have been referred by customer "C1".
d) List the manufacturer of red colored bicycles.
e) List the models of the bicycles given for service.

4) Create the following tables, enter at least 5 records in each table and answer the queries given below.

EMPLOYEE (Person_Name, Street, City)
WORKS (Person_Name, Company_Name, Salary)
COMPANY (Company_Name, City)
MANAGES (Person_Name, Manager_Name)

a) Identify primary and foreign keys.
b) Alter table employee, add a column "email" of type varchar(20).
c) Find the name of all managers who work for both Samba Bank and NCB Bank.
d) Find the names, street address and cities of residence and salary of all employees who work for "Samba Bank" and earn more than $10,000.
e) Find the names of all employees who live in the same city as the company for which they work.
f) Find the highest salary, lowest salary and average salary paid by each company.
g) Find the sum of salary and number of employees in each company.
h) Find the name of the company that pays highest salary.

5) Create the following tables, enter at least 5 records in each table and answer the queries given below.

Suppliers (SNo, Sname, Status, SCity)
Parts (PNo, Pname, Colour, Weight, City)
Project (JNo, Jname, Jcity)
Shipment (Sno, Pno, Jno, Qunatity)

a) Identify primary and foreign keys.

b) Get supplier numbers for suppliers in Paris with status>20.

c) Get suppliers details for suppliers who supply part P2. Display the supplier list in increasing order of supplier numbers.

d) Get suppliers names for suppliers who do not supply part P2.

e) For each shipment get full shipment details, including total shipment weights.

f) Get all the shipments where the quantity is in the range 300 to 750 inclusive.

g) Get part nos. for parts that either weigh more than 16 pounds or are supplied by suppliers S2, or both.

h) Get the names of cities that store more than five red parts.

i) Get full details of parts supplied by a supplier in Delhi.

j) Get part numbers for part supplied by a supplier in Allahabad to a project in Chennai.

k) Get the total number of project supplied by a supplier (say, S1).

l) Get the total quantity of a part (say, P1) supplied by a supplier (say, S1).

Core Paper III: Semester III:
DSC-3A   Computer Networks and Internet Technologies

Total Marks: 150

Theory : 75

Practical: 50

Internal Assessment: 25

5Lectures ,4 Practicals (each in group of 10 to 15)

Computer Networks: Introduction to computer network, data communication, **6L** components of data communication, data transmission mode, data communication measurement, LAN, MAN, WAN, wireless LAN, internet, intranet, extranet.

Network Models: Client/ server network and Peer-to-peer network, OSI, TCP/IP, **8L** layers and functionalities.

Transmission Media: Introduction, Guided Media: Twisted pair, Coaxial cable, **4L** Optical fiber. Unguided media: Microwave, Radio frequency propagation, Satellite.

LAN Topologies: Ring, bus, star, mesh and tree topologies. **2L**

Network Devices: NIC, repeaters, hub, bridge, switch, gateway and router. **2L**

16

Internet Terms: Web page, Home page, website, internet browsers, URL, Hypertext, **2L**
ISP, Web server, download and upload, online and offline.

Internet Applications: www, telnet, ftp, e-mail, social networks, search engines, **6L**
Video Conferencing, e-Commerce, m-Commerce, VOIP, blogs.

Introduction to Web Design: Introduction to hypertext markup language (html) **16L**
Document type definition, creating web pages, lists, hyperlinks, tables, web forms,
inserting images, frames, hosting options and domain name registration. Customized
Features: Cascading style sheet (css) for text formatting and other manipulations.

JavaScript Fundamentals: Data types and variables, functions, methods and events, **14L**
controlling program flow, JavaScript object model, built-in objects and operators.

Reference Books:
1. Andrew S. Tanenbaum, David J. Wetherall Computer Networks (5th Edition),PHI, 2010
2.B. A. Forouzan, Data Communication and Networking , TMH,2003.
3. D.R. Brooks, An Introduction to HTML and Javascript for Scientists and Engineers, Springer
4. HTML A Beginner's Guide, Tata McGraw-Hill Education, 2009.
5. J. A. Ramalho, Learn Advanced HTML 4.0 with DHTML, BPB Publications, 2007

Practical :
Networking exercises in a trial lab, where effects of different connectors, topologies in practical
could be demonstrated.

Before moving to JavaScript practicals, students must get an idea about fundamental programing
using Scratch (https://scratch.mit.edu). Students should be encouraged to learn Scratch on their own
and work on assignments available online such as
https://sites.google.com/site/christopherscfahs/scratch-programming/scratch-assignments or
http://scratched.gse.harvard.edu/resources/uw-catapult-project .
Alternatively, students may use Alice (http://www.alice.org/index.php) and learn basic
programming. A lot of online assignments and spoken tutorials on YouTube would be helpful.

Practical exercises based on concepts listed in theory using HTML.
1. Create HTML document with following formatting – Bold, Italics, Underline, Colors,
   Headings, Title, Font and Font Width, Background, Paragraph, Line Brakes, Horizontal
   Line, Blinking text as well as marquee text.
2. Create HTML document with Ordered and Unordered lists, Inserting Images, Internal and
   External linking
3. Create HTML document with Table:

			Some image here	

4. Create Form with Input Type, Select and Text Area in HTML.
5. Create an HTML containing Roll No., student's name and Grades in a tabular form.

6. Create an HTML document (having two frames) which will appear as follows:

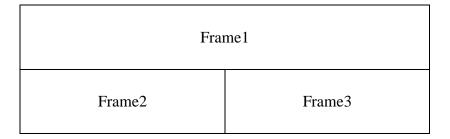|	
About Department 1 Department 2 Department 3	This frame would show the contents according to the link clicked by the user on the left frame.

7. Create an HTML document containing horizontal frames as follows:

Department Names (could be along with Logos)
Contents according to the Link clicked

8. Create a website of 6 – 7 pages with different effects as mentioned in above problems.
9. Create HTML documents (having multiple frames) in the following three formats:

Frame1
Frame2

Frame1	
Frame2	Frame3

10. Create a form using HTML which has the following types of controls:
   - I.   Text Box
   - II.   Option/radio buttons
   - III.   Check boxes
   - IV.   Reset and Submit buttons

Subscribe to XYZ News Magazine and Emails

Interested in receiving daily small updates of all latest News? Well, now you can. And best of all, it is free! Just fill out this form and submit it by clicking the "send it In" button. We will put you on our mailing list and you will receive your first email in 3-5 days.

Please fill the following boxes to help us send the emails and our news letter:

First Name: [_____]

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We must have a correct e-mail address to send you the news letter:

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How did you hear about XYZ News Magazine and Emails?

◉ Here on the Web ◯ In a magazine ◯ Television ◯ Other

Would you like to be on our regular mailing list?

☑ Yes, we love junk emails

[Reset] [Send it in!]

List of Practicals using Scratch : (self-learning by students)

1. Join the Scratch community on scratch.mit.edu. Explore featured projects and modify any one of them.
2. Create a game using SCRATCH similar to that of Beach Baby Volleyball. The game MUST meet the following objectives.

- Have at least 3 sprites. All of which move, bounce, fall, etc. 10 pts.
- Edit at least one of the sprites in some way to make it your own. 10 pts.
- Make some or all sprites move with the use of certain keys. 15 pts.
- Create or use a given background on your game. 10 pts.
- Incorporate sound into your game. 10 pts.
- Use a counter or score keeper in your game. 15 pts.
- Must include a forever loop, show, hide, and "when I receive." 30 pts.

List of Practicals using Javascript :

Create event driven program for following:

1. Print a table of numbers from 5 to 15 and their squares and cubes using alert.
2. Print the largest of three numbers.
3. Find the factorial of a number n.
4. Enter a list of positive numbers terminated by Zero. Find the sum and average of these numbers.
5. A person deposits Rs 1000 in a fixed account yielding 5% interest. Compute the amount in the account at the end of each year for n years.
6. Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.

Core Paper IV :Semester IV:

DSC-4A   Multimedia Systems and Applications

Total Marks: 150
Theory : 75
Practical: 50
Internal Assessment: 25
5Lectures ,4 Practicals (each in group of 10 to 15)

Multimedia: Introduction to multimedia, components, uses of multimedia, multimedia applications, virtual reality. **6L**

Text: Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia & Hypertext. **4L**

Images: Still Images – bitmaps, vector drawing, 3D drawing & rendering, natural light & colors, computerized colors, color palettes, image file formats. **6L**

Sound: Digital Audio, MIDI Audio, MIDI vs Digital Audio, Audio File Formats. **6L**

Video: How video works, analog video, digital video, video file formats, video shooting and editing. **8L**

Animation: Principle of animations, animation techniques, animation file formats. **10L**

Internet and Multimedia: www and HTML, multimedia on the web – web servers, web browsers, web page makers and site builders. **6L**

Making Multimedia: Stages of a multimedia project, Requirements to make good multimedia, Multimedia Hardware - Macintosh and Windows production Platforms, Hardware peripherals - Connections, Memory and storage devices, Multimedia software and Authoring tools. **14L**

References:
1. Tay Vaughan, "Multimedia: Making it work", TMH, Eighth edition,2011
2. Ralf Steinmetz and Klara Naharstedt, "Multimedia: Computing, Communications Applications", Pearson,1996.
3. Keyes, "Multimedia Handbook", TMH. 2000
4. K. Andleigh and K. Thakkar, "Multimedia System Design", PHI.2000

Practical:

Practical exercises based on concepts listed in theory using Presentation tools in office automation tool/ GIMP/Blender / Audacity/ Animation Tools/ Image Editors/ Video Editors.

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)
10. Create an animation to show the ripple effect.
11. Create an animation (using Shape tweening and shape hints) for transforming one shape into another.
12. Create an animation for bouncing ball (you may use motion guide layer).

Project :

Design a minimum 10 page interactive website using Joomla or WordPress.

Semester V and VI : Discipline Specific Electives(DSE) – (Credits : 06 each) - (5 Theory + 4 Lab)
Discipline Specific Elective 1 (Choose 1):
DSE-1A   Programming with Python

Total Marks: 150

Theory : 75

Practical: 50

Internal Assessment: 25

5Lectures ,4 Practicals (each in group of 10 to 15)

Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.   **4L**

Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.   **6L**

Overview of Programming : Structure of a Python Program, Elements of Python   **4L**

Introduction to Python: 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)   **6L**

Creating Python Programs : Input and Output Statements, Control statements(Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.), Defining Functions, default arguments, Errors and Exceptions.   **8L**

Iteration and Recursion: Conditional execution, Alternative execution, Nested conditionals, The return statement, Recursion, Stack diagrams for recursive functions, Multiple assignment, The while statement, Tables, Two-dimensional tables   **8L**

Strings and Lists: String as a compound data type, Length, Traversal and the for loop, String slices, String comparison, A find function, Looping and counting, List   **8L**

21

values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists

Object Oriented Programming: Introduction to Classes, Objects and Methods, **4L** Standard Libraries.

Data Structures: Arrays, list, set, stacks and queues. **6L**

Searching and Sorting: Linear and Binary Search, Bubble, Selection and Insertion **6L** sorting.

References :
1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Allen Downey, Jeffrey Elkner, Chris Meyers. How to think like a computer scientist : learning with Python / 1st Edition,2012 – Freely available online.
1. http://docs.python.org/3/tutorial/index.html
2. http://interactivepython.org/courselib/static/pythonds

Practical :

1. Using for loop, print a table of Celsius/Fahrenheit equivalences. Let c be the Celsius temperatures ranging from 0 to 100, for each value of c, print the corresponding Fahrenheit temperature.
2. Using while loop, produce a table of sins, cosines and tangents. Make a variable x in range from 0 to 10 in steps of 0.2. For each value of x, print the value of sin(x), cos(x) and tan(x).

3. Write a program that reads an integer value and prints "leap year" or "not a leap year".

4. 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
   *
   **
   ***
   ****
   *****

5. Write a function that takes an integer 'n' as input and calculates the value of

   $1 + 1/1! + 1/2! + 1/3! + … + 1/n$
6. Write a function that takes an integer input and calculates the factorial of that number.

7. Write a function that takes a string input and checks if it's a palindrome or not.

8. Write a list function to convert a string into a list, as in list ('abc') gives [a, b, c].

9. Write a program to generate Fibonacci series.

10. Write a program to check whether the input number is even or odd.

11. Write a program to compare three numbers and print the largest one.

12. Write a program to print factors of a given number.

13. Write a method to calculate GCD of two numbers.

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

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

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

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

DSE-1B   Visual Programming

Total Marks: 150

Theory : 75

Practical: 50

Internal Assessment: 25

5Lectures ,4 Practicals (each in group of 10 to 15)

Use any open source alternative such as Tkinter with Python /SharpDevelop/GAMBAS/OPENXAVA with JAVA

GUI Environment: Introduction to graphical user interface (GUI), programming language (procedural, object oriented, event driven), the GUI environment, compiling, debugging, and running the programs.	**4L**
Controls : Introduction to controls textboxes, frames, check boxes, option buttons, images, setting borders and styles, the shape control, the line control, working with multiple controls and their properties, designing the user interface, keyboard access, tab controls, default & cancel property, coding for controls.	**8L**
Operations: Data types, constants, named & intrinsic, declaring variables, scope of variables, val function, arithmetic operations, formatting data.	**4L**
Decision Making : If statement, comparing strings, compound conditions (and, or, not), nested if statements, case structure, using if statements with option buttons & check boxes, displaying message in message box, testing whether input is valid or not.	**8L**
Modular programming: Menus, sub-procedures and sub-functions defining / creating and modifying a menu, using common dialog box, creating a new sub-procedure, passing variables to procedures, passing argument by value or by reference, writing a function/ procedure.	**6L**
Forms Handling : Multiple forms creating, adding, removing forms in project, hide, show method, load, unload statement, me keyword, referring to objects on a different forms	**6L**
Iteration Handling: Do/loops, for/next loops, using msgbox function, using string function	**4L**
Arrays and Grouped Data Control: Arrays - 1-dimension arrays, initializing an array using for each, user-defined data types, accessing information with user-defined data types, using list boxes with array, two dimensional arrays. lists, loops and printing list boxes & combo boxes, filling the list using property window / additem method, clear method, list box properties, removing an item from a list, list box/ combo box operations.	**10L**
Database Connectivity: Database connectivity of forms with back end tool like mysql, populating the data in text boxes, list boxes etc. searching of data in database using forms. Updating/ editing of data based on a criterion.	**10L**

Reference Books:
1. Julia Case Bradley, Anita C. Millispangh Programming in Visual Basic 6.0 by   TMH 2004.
Practical:
1. Print a table of numbers from 5 to 15 and their squares and Cubes.
2. Print the largest of three numbers.
3. Find the factional of a number n.
4. Enter a list of positive numbers terminated by zero. Find the sum and average of these numbers.
5. A person deposits Rs. 1000 in a fixed account yielding 5% interest. Complete the amount in the account at the end of each year for n years.
6. Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.
7. Read n numbers. Count the number of negative numbers, positive numbers and zeroes in the list.use arrays.
8. Read a single dimension array. Find the sum and average of these numbers.
9. Read a two dimension array. Find the sum of two 2D Array.
10. Create a database Employee and Make a form to allow data entry to **Employee Form** with the following command buttons:

Employee Form

Employee Name:		NEXT
Employee Id:		PREV
Date of Joining:		FIRST
		LAST
Designation:		ADD
Department:		DELETE
		SAVE
Address:		CANCEL
Basic Pay:		

Discipline Specific Elective

2 (choose one):
DSE-2A   Information Security and Cyber Laws
Total Marks: 150

Theory : 75

Practical: 50

Internal Assessment: 25

5Lectures ,4 Practicals (each in group of 10 to 15)

Course Introduction: Computer network as a threat, hardware vulnerability, software vulnerability, importance of data security. **8L**

Digital Crime: Overview of digital crime, criminology of computer crime. **4L**

Information Gathering Techniques: Tools of the attacker, information and cyber warfare, scanning and spoofing, password cracking, malicious software, session hijacking **8L**

Risk Analysis and Threat: Risk analysis, process, key principles of conventional computer security, security policies, authentication, data protection, access control, internal vs external threat, security assurance, passwords, authentication, and access control, computer forensics and incident response **10L**

Introduction to Cryptography and Applications : Important terms, Threat, Flaw, Vulnerability, Exploit, Attack, Ciphers, Codes, Substitution Cipher (Caeser), Transposition Cipher (Rail-Fence), Public key cryptography (Definitions only), Private key cryptography (Definition and Example), Cyber forensics, Steganography **10L**

Safety Tools and Issues : Firewalls, logging and intrusion detection systems, Windows and windows XP / NT security, Unix/Linux security, ethics of hacking and cracking **10L**

Cyber laws to be covered as per IT 2008:
Definitions, Digital Signature And Electronic Signature **10L**
- [Section 43] Penalty and Compensation for damage to computer, computer system, etc.
- [Section 65] Tampering with Computer Source Documents
- [Section 66 A] Punishment for sending offensive messages through communication service, etc.
- [Section 66 B] Punishments for dishonestly receiving stolen computer resource or communication device
- [Section 66C] Punishment for identity theft
- [Section 66D] Punishment for cheating by personation by using computer resource
- [Section 66E] Punishment for violation of privacy
- [Section 66F] Punishment for cyber terrorism
- [Section 67] Punishment for publishing or transmitting obscene material in electronic form
- [Section 67A] Punishment for publishing or transmitting of material containing sexually explicit act, etc. in electronic form[Section 67B] Punishment for publishing or transmitting of material depicting children in sexually explicit act, etc. in electronic form
- [Section 72] Breach of confidentiality and privacy

Reference Books:
1. M. Merkow, J. Breithaupt, Information Security Principles and Practices, Pearson Education,2005.
2. G.R.F. Snyder, T. Pardoe, Network Security, Cengage Learning, 2010
3. A. Basta, W.Halton, Computer Security: Concepts, Issues and Implementation, Cengage Learning India, 2008
4. Anderson, Ross. Security engineering. John Wiley & Sons, 2008. (Freely available online)

Practical:

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 and encrypting purposes.

DSE-2B   Software Engineering
Total Marks: 150

Theory : 75

Practical: 50

Internal Assessment: 25

5Lectures ,4 Practicals (each in group of 10 to 15)

Introduction to Software Engineering: Challenges-Scale-Quality and Productivity-Consistency and Repeatability-Change, Software Engineering approach-Phased Development Process-Managing the Process **12L**

Software Process: Desired characteristics-Predictability-Maintainability-Change supportive-Early Defect Removal, Software Process models: Waterfall model-Prototyping-Iterative-Timebox, Comparison of the models. **12L**

More Software Processes: Project Management Process-Inspection Process- **8L**

Configuration.

Management Process: Requirements change management process-Process management process. **8L**

Software Requirement Specification (SRS): Need for SRS-Requirement process, Problem Analysis using UML (Unified Modelling Language) and Data dictionary, Characteristics of SRS, Components of an SRS. **12L**

Testing: Psychology of testing -Error, Fault and Failure-Black box testing-Boundary value analysis, Testing Process-Levels of Testing. **8L**

Reference Books
1. Pankaj Jalote,An Integrated approach to software engineering (third edition), Narosa, 2003
2. Roger S. Pressman ,Software Engineering (Sixth edition) , Tata McGraw Hill,2009

Practical:
Practical exercises based on concepts listed in theory.

S. No	Practical Title
1.	- Problem Statement, - Process Model
2.	Requirement Analysis: - Creating a Data Flow - Data Dictionary, Use Cases - Survey/Interview Questionnaire
3.	Design Engineering: - Architectural Design / Front End using HTML - DataBase Design

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

DSE-2C   Dissertation / Project work

Total Marks:150

Project : 100

Internal Assessment: 50

5Lectures

This option to be offered only in 6th Semester
OR
This could be a compulsory course spread over summer-winter training distributed between semester breaks.
The students will be allowed to work on any project based on the concepts studied in core/elective or skill based elective courses.
The group size should be maximum of three (03) students.
Each group will be assigned a teacher as a supervisor who will handle both their theory as well lab classes.
A maximum of Four (04) projects would be assigned to one teacher.
Theory classes will cover project management techniques.

Skill Enhancement Courses (Credit: 02 each)
SEC1,SEC2,SEC3, SEC4– (Credits : 02)

SEC-1 (Semester III)
1.   **Office Automation Tools**

Total Marks: 75

Practical: 50

Internal Assessment: 25

2Lectures ,2 Practicals (each in group of 10 to 15)

Document Editor - Mail merge with E-mail address lists /Databases	4L
Spreadsheet – Referencing, Relative, Absolute and Mixed, Various charts in detail, VLOOKUP, HLOOKUP, Pivot Table	6L
Use of E-mail clients – MS Outlook, Mozilla Thunderbird- Installation and Configuration	5L

References :

-      User manuals.

Practicals :
Exercises based on tools listed in theory plus any other tool helpful in office automation.

2. SEC-2   (Semester IV) Search Engine Optimisation

Domain, Portal and search engine, SEO, Types of SEO, Black Hat, White	3L

Hat	
Introduction to Search Engines – Working, Examples, Google, Yahoo, Bing, AltaVista etc.	3L
On Page optimization – Meta description and meta keywords, Headings, Bold Text, Domain names and suggestions, Canonical tag, Meta tags, Images and alt, Internal link, sitemap, Invisible text, SWOT analysis	5L
Off Page Optimisation – Page Rank, Link Popularity, Link Building, Directory, Social bookmarks, Blog Submission	4L

References :
Google and other online Manuals

Practicals:
- Complete a project to build five-page website and perform all SEO activities on it.
- Open two/ three websites on similar domain (such as telecom, FMCG) and compare their on-page SEO optimisations. Perform SWOT analysis and Suggest improvements.

SEC-3A (Semester V
Open Source Software
Total Marks: 75
Practical: 50
Internal Assessment: 25
2Lectures ,2 Practicals (each in group of 10 to 15)

The philosophy of OSS, commercial software vs OSS, free software vs freeware.	3L
The Linux operating system, GPL, LGPL and other licenses	4L
Category of OSS Application Software, Study of Commercial Application software vs OSS, Open Office, GAMBAS, GIMP etc.	8L

References :
Understanding Open Source and Free Software Licensing – O'Reilly Media, 2011

Practicals :
- Find out various Open source software for the concepts studied by you till now.
- Install the software like Open office, MySQL etc. and perform

comparative study of their salient features.
- Use GIMP for Image Editing
- Use GAMBAS for creating Admission Forms
- Use GAMBAS for creating Exam Marksheet

SEC-4A   Semester VI
Web Design using HTML5
Total Marks: 75
Practical: 50
Internal Assessment: 25
2Lectures , 2 Practicals (each in group of 10 to 15)

Review of Basic HTML Tags	2L
Handling Forms	4L
Managing Text Flow and Graphical Interface using CSS	4L
Adding Multimedia and Interactivity	5L

References :

1. Head First HTML5 Programming (English) 1st Edition – O'Reilly Media, 2012
2. HTML5 : Up And Running (English) – O'Reilly Media, 2010.

Practicals :

- Create your own CSS files with custom styles.
- Demonstrate the use of these styles in various web pages
- Demonstrate the use of audio in HTML5.
- Demonstrate the use of video in HTML5.
- Demonstrate the HTML5 form with text flow management.