

Proposed Syllabus and Scheme of Examination  
for  
B.A. / B.Sc. (Generic Elective) Information Technology

Submitted to

*Dibrugarh University, Dibrugarh*

Under

Choice Based Credit System

May 2019

## **Generic Elective/ Interdisciplinary Papers (GE) of Information Technology for other Department / Disciplines: (Credit: 06 each)**

### **1<sup>ST</sup> Semester: GE-1 (Any One)**

1. Computer Fundamentals (4) + Lab (4)
2. IT Fundamentals (4) + Lab (4)

### **2<sup>nd</sup> Semester: GE-2 (Any One)**

1. Information Security and Cyber Laws (4) + Lab (4)
2. Introduction to Programming C/C++ (4) + Lab (4)
3. Web and E-Commerce Technologies (4) + Lab (4)

### **3<sup>rd</sup> Semester: GE-3 (Any One)**

4. Introduction to Database Systems (4) + Lab (4)
5. Computer Networks and Internet Technologies (4) + Lab (4)
6. UNIX/LINUX Programming (4) + Lab (4)

### **4<sup>th</sup> Semester: GE-4 (Any One)**

1. Computer Graphics (4 + 4 Lab)
2. Multimedia and Web Design (4 + 4 Lab)
3. Programming in Python (4) + Lab (4)

**Detailed Syllabus  
Of  
Generic Elective Papers (GE)  
for  
B.A. / B.Sc.  
WITH  
INFORMATION TECHNOLOGY**

**SYLLABUS OF THE UG PROGRAMME IN EDUCATION**  
**DIBRUGARH UNIVERSITY**  
**B.A./ B. Sc. IN INFORMATION TECHNOLOGY (Generic Elective)**  
**1<sup>st</sup> Semester**  
**CREDIT: 6**

**GE-1.1A: Computer Fundamentals**

**[MARKS: 60 (IN-SEMESTER: 12; END-SEMESTER: 48)]**

**Theory: 60 Lectures**

<b>Introduction:</b> Introduction to computer system, uses, types.	<b>6L</b>
<b>Data Representation:</b> Number systems and character representation, binary Arithmetic	<b>12L</b>
<b>Human Computer Interface:</b> Types of software, Operating system as user interface, utility programs	<b>6L</b>
<b>Devices:</b> Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter	<b>10L</b>
<b>Memory:</b> Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks	<b>6L</b>
<b>Computer Organisation and Architecture:</b> 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.	<b>12L</b>
<b>Overview of Emerging Technologies:</b> Bluetooth, cloud computing, big data, data mining, mobile computing and embedded systems.	<b>8L</b>

**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

**GE-1.1B:: Computer Fundamentals Lab**

**[MARKS: 40 (IN-SEMESTER: 8; END-SEMESTER: 32)]**

**Practical: 60 lectures**

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

**MS Word**

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.

- Compose a note inviting friends to a get-together at your house, Including a list of things to bring with them.
- Design a certificate in landscape orientation with a border around the document.
- Design a Garage Sale sign.
- Make a sign outlining your rules for your bedroom at home, using a numbered list.

6. Create the following documents:

- A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
- 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
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. 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

### MS Excel

1. Enter the Following data in Excel Sheet

REGIONAL SALES PROJECTION						Rate	Amount
State	Qtr1	Qtr2	Qtr3	QTR4	Qtr Total		
Delhi	2020	2400	2100	3000	15		
Punjab	1100	1300	1500	1400	20		
U.P.	3000	3200	2600	2800	17		
Haryana	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

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
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
$\geq 80$	A+
$\geq 60 < 80$	A
$\geq 50 < 60$	B
$< 50$	F

3. Given the following worksheet

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
<b>1</b>	<b>Salesman</b>	<b>Sales in (Rs.)</b>					
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
$\geq 35000$	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 ≤ 3000

20% of Basic if Basic > 3000

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

### Deductions

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

Calculate the following:

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

Total deduction = Provident Fund + Group Insurance Premium

Net Salary = Gross Salary – Total Deduction

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

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

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

Rate of Interest	8%
Time	5 Years
Principal	Simple Interest
1000	?
18000	?
5200	?

7. The following table gives 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.



- (ii) Otherwise give 2% commission.
- (e) Draw a bar graph representing the sale made by each salesman.
- (f) Draw a pie graph representing the sale made by salesman in 2000.
8. Enter the following data in Excel Sheet

**PERSONAL BUDGET FOR FIRST QUARTER**

**Monthly Income (Net): 1,475**

EXPENSES	JAN	FEB	MARCH	QUARTER TOTAL	QUARTER AVERAGE
Rent	600.00	600.00			
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.

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

## **GE-1.2A: IT Fundamentals**

**[MARKS: 60 (IN-SEMESTER: 12; END-SEMESTER: 48)]**

### **Theory: 60 lectures**

**Introduction:** Introduction to logical organization of computer, input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, monitor, printer, plotter, primary memory, secondary memory, auxiliary memory.

15L

**User Interface:** Operating system as user interface, system tools, utility programs

5L

<b>Database:</b> Introduction to database, relational data model, Entity types, entity set, attribute and key, relationships, relation types, SQL queries: select, from, where, order	16L
<b>Networks:</b> 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.	12L
<b>Internet Applications:</b> Internet as a global network, Search Engine, Online education, Internet utilities – email, online banking, reservations etc.	8L
<b>Use of Computers in Education and Research:</b> 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

### GE-1.2B: IT Fundamentals Lab

[MARKS: 40 (IN-SEMESTER: 8; END-SEMESTER: 32)]

#### . Practical: 60 Lectures

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

#### **MS Word**

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.

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, M8.**

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

<b>Salesperson</b>	<b>Dolls</b>	<b>Trucks</b>	<b>Puzzles</b>
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.

9.

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

## MS Excel

1. Enter the Following data in Excel Sheet

<b>REGIONAL SALES PROJECTION</b>					
<b>State</b>	<b>Qtr1</b>	<b>Qtr2</b>	<b>Qtr3</b>	<b>QTR4</b>	<b>Total Rate Amount</b>
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
<b>TOTAL</b>					
<b>AVERAGE</b>					

- (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
$\geq 80$	A+
$\geq 60 < 80$	A
$\geq 50 < 60$	B
$< 50$	F

3. Given the following worksheet

	A	B	C	D	E	F	G
1	<b>Salesman</b>		<b>Sales in (Rs.)</b>				
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
$\geq 35000$	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 an year wise sale figure of five salesmen in Rs.

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

(a) Calculate total sale year wise.

(b) Calculate the net sale made by each salesman

(c) Calculate the maximum sale made by the salesman

(d) Calculate the commission for each salesman under the condition.

(i) If total sales  $> 4,00,000$  give 5% commission on total sale made by the salesman.

(ii) Otherwise give 2% commission.

(e) Draw a bar graph representing the sale made by each salesman.

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

8. Enter the following data in Excel Sheet

**PERSONAL BUDGET FOR FIRST QUARTER**

**Monthly Income (Net) : 1,475**

EXPENSES	JAN	FEB	MARCH	QUARTER TOTAL	QUARTER AVERAGE
Rent	600.00	600.00	600.00		
Telephone	48.25	43.50	60.00		

Utilities	67.27	110.00	70.00
Credit Card	200.00	110.00	70.00
Oil	100.00	150.00	90.00
AV to Insurance	150.00		
Cable TV	40.75	40.75	40.75

### Monthly Total

- 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

- Compute the total revenue earned.
- Plot the line chart to compare the revenue of all publisher for 4 years.
- Chart Title should be 'Total Revenue of sam's Bookstall (1997-2000)'
- 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.

**SYLLABUS OF THE UG PROGRAMME IN EDUCATION**  
**DIBRUGARH UNIVERSITY**  
**B.A./ B. Sc. IN INFORMATION TECHNOLOGY (Generic Elective)**  
**2<sup>nd</sup> Semester**  
**CREDIT: 6**

**GE-2.1A: Information Security and Cyber Laws**

**[MARKS: 60 (IN-SEMESTER: 12; END-SEMESTER: 48)]**

**Theory: 60 Lectures**

- 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, Caesar Cipher, Rail-Fence Cipher, Public key cryptography (Definitions only), Private key cryptography (Definition and Example) **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

**Cyber laws to be covered as per IT 2008:**

- Chapter 1: Definitions
- Chapter 2: Digital Signature And Electronic Signature
- [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

## **GE-2.1B Information Security and Cyber Laws Lab**

**[MARKS: 40 (IN-SEMESTER: 8; END-SEMESTER: 32)]**

### **Practical: 60 lectures**

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.

## **GE-2.2A: Introduction to Programming C and C++**

**[MARKS: 60 (IN-SEMESTER: 12; END-SEMESTER: 48)]**

### **Theory: 60 lectures**

**(5 Lectures)**

History of C and C++, Overview of Procedural Programming and Object-Oriented Programming, Using main() function, Compiling and Executing Simple Programs in C++.

### **Data Types, Variables, Constants, Operators and Basic I/O**

**(10 Lectures)**

Declaring, Defining and Initializing Variables, Scope of Variables, Using Named Constants, Keywords, Data Types, Casting of Data Types, Operators (Arithmetic, Logical and Bitwise), Using Comments in programs, Character I/O (getc, getchar, putc, putchar), Formatted and Console I/O (printf(), scanf(), cin, cout), Using Basic Header Files (stdio.h, iostream.h, conio.h).

### **Expressions, Conditional Statements and Iterative Statements**

**(10 Lectures)**

Simple Expressions in C++ (including Unary Operator Expressions, Binary Operator Expressions), Understanding Operators Precedence in Expressions, Conditional Statements (if construct, switch-case construct), Understanding syntax and utility of Iterative Statements (while, do-while, and for loops), Use of break and continue in Loops, Using Nested Statements (Conditional as well as Iterative)



## **Functions and Arrays**

**(10 Lectures)**

Utility of functions, Call by Value, Call by Reference, Functions returning value, Void functions, Inline Functions, Return data type of functions, Functions parameters, Differentiating between Declaration and Definition of Functions, Command Line Arguments/Parameters in Functions, Functions with variable number of Arguments.

Creating and Using One Dimensional Arrays ( Declaring and Defining an Array, Initializing an Array, Accessing individual elements in an Array, Manipulating array elements using loops), Use Various types of arrays (integer, float and character arrays / Strings) Two-dimensional Arrays (Declaring, Defining and Initializing Two Dimensional Array, Working with Rows and Columns), Introduction to Multi-dimensional arrays

## **Derived Data Types (Structures and Unions)**

**(5 Lectures)**

Understanding utility of structures and unions, Declaring, initializing and using simple structures and unions, Manipulating individual members of structures and unions, Array of Structures, Individual data members as structures, Passing and returning structures from functions, Structure with union as members, Union with structures as members.

## **File I/O, Preprocessor Directives**

**(8 Lectures)**

Opening and closing a file (use of fstream header file, ifstream, ofstream and fstream classes), Reading and writing Text Files, Using put(), get(), read() and write() functions, Random access in files, Understanding the Preprocessor Directives (#include, #define, #error, #if, #else, #elif, #endif, #ifdef, #ifndef and #undef), Macros

## **Using Classes in C++**

**(8 Lectures)**

Principles of Object-Oriented Programming, Defining & Using Classes, Class Constructors, Constructor Overloading, Function overloading in classes, Class Variables & Functions, Objects as parameters, Specifying the Protected and Private Access, Copy Constructors, Overview of Template classes and their use.

## **Inheritance and Polymorphism**

**(4 Lectures)**

Introduction to Inheritance and Polymorphism

### **Reference Books:**

1. HerbtzSchildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill.2003
2. BjarneStroustrup, "The C++ Programming Language", 4th Edition, Addison-Wesley , 2013.
3. BjarneStroustrup, "Programming -- Principles and Practice using C++", 2nd Edition, Addison-Wesley 2014.
4. E Balaguruswamy, "Object Oriented Programming with C++", Tata McGraw-Hill Education, 2008.
5. Paul Deitel, Harvey Deitel, "C++ How to Program", 8th Edition, Prentice Hall, 2011.
6. John R. Hubbard, "Programming with C++", Schaum's Series, 2nd Edition, 2000.
7. Andrew Koeni, Barbara, E. Moo, "Accelerated C++", Published by Addison-Wesley , 2000.
8. Scott Meyers, "Effective C++", 3rd Edition, Published by Addison-Wesley, 2005.
9. Harry, H. Chaudhary, "Head First C++ Programming: The Definitive Beginner's Guide", First Create space Inc, O-D Publishing, LLC USA.2014
10. Walter Savitch, "Problem Solving with C++", Pearson Education, 2007.
11. Stanley B. Lippman, JoseeLajoie, Barbara E. Moo, "C++ Primer", Published by Addison-Wesley, 5th Edition, 2012

## **GE-2.2B: Introduction to Programming C/C++ Lab**

**[MARKS: 40 (IN-SEMESTER: 8; END-SEMESTER: 32)]**

**Practical: 60 lectures**

1. Write a program to find greatest of three numbers.
2. Write a program to find gross salary of a person
3. Write a program to find grade of a student given his marks.
4. Write a program to find divisor or factorial of a given number.
5. Write a program to print first ten natural numbers.
6. Write a program to print first ten even and odd numbers.
7. Write a program to find grade of a list of students given their marks.
8. Create Matrix class. Write a menu-driven program to perform following Matrix operations (2-D array implementation):
  - a) Sum    b) Difference    c) Product    d) Transpose

## **GE-2.3A: Web and E-Commerce Technologies**

**[MARKS: 60 (IN-SEMESTER: 12; END-SEMESTER: 48)]**

**Theory: 60 Lectures**

**UNIT 1- An introduction to Electronic commerce:** What is E-Commerce (Introduction And Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, 9 Electronic Commerce and Electronic Business(C2C)(C2G,G2G, B2G, B2P, B2A, P2P, B2A, C2A, B2B, B2C) **(10L)**

**UNIT 2- The Internet and WWW:** Evolution of Internet, Domain Names and Internet Organization (.edu, .com, .mil, .gov, .net etc.) , Types of Network, Internet Service Provider, World Wide Web, Internet & Extranet, Role of Internet in B2B Application, building own website, Cost, Time, Reach, Registering a Domain Name, Web promotion, Target email, Baner, Exchange, Shopping Bots **(10L)**

**UNIT 3- Internet Security:** Secure Transaction, Computer Monitoring, Privacy on Internet, Corporate Email privacy, Computer Crime( Laws , Types of Crimes), Threats, Attack on Computer System, Software Packages for privacy, Hacking, Computer Virus( How it spreads, Virus problem, virus protection, Encryption and Decryption, Secret key Cryptography, DES, Public Key Encryption, RSA, Authorisation and Authentication, Firewall, Digital Signature( How it Works) **(10L)**

**UNIT 4:** Electronic Data Exchange: Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model,Electronic Payment System: Introduction, Types of Electronic Payment System, Payment Types, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash **(10L)**

**UNIT 5:** Planning for Electronic Commerce: Planning Electronic Commerce initiates, Linking objectives to business strategies, Measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites **(10L)**

**UNIT 6:** Internet Marketing: The PROS and CONS of online shopping, The cons of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce. **(10L)**

**Recommended Books :**

1. G.S.V.Murthy, E-Commerce Concepts, Models, Strategies- :- Himalaya Publishing House, 2011.
2. Kamlesh K Bajaj and Debjani Nag , E- Commerce , 2005.
3. Gray P. Schneider , Electronic commerce, International Student Edition, 2011,
4. HENRY CHAN, RAYMOND LEE, THARAM DILLON, ELIZABETH CHANG  
E-COMMERCE, FUNDAMENTALS AND APPLICATIONS, Wiely Student Edition, 2011

**GE-2.3B: Web and E-Commerce Technologies Lab****[MARKS: 40 (IN-SEMESTER: 8; END-SEMESTER: 32)]****Practical: 60 Lectures****Web and E- Commerce Technologies LAB (based on the following topics):**

**HyperText Markup Language (HTML):** structural setup; page layout; text manipulation; special characters; images; links. Intermediate: image maps; tables; frames, forms; meta tags; web forms.

**Cascading Style Sheets (CSS) :** embedding/linking; HTML element selectors; classes; ID selectors, text manipulation; background; borders and spacing; layout; context selectors and grouping, pseudo-classes; pseudo-elements.

**JavaScript :** writing your first script; creating HTML tags; user input and output; loops and tables; payroll calculator, forms and text fields; validating an email address; radio buttons; check boxes; self-grading tests, image rollovers; slide shows; real-time clock; controllable clock; working with cookies.

**Perl/CGI 10:** sample Perl operations; random numbers; lists; dealing four poker hands; time manipulation; subroutines, hash tables; files; string matching, CGI; registration lists; surveys.

**SQL and regular expressions:** Regular expressions: basics; repeating; positioning. Beginner: select; where; order by; insert; update; delete, like; between; in; distinct; group by; aliases; aggregate functions; create table; alter table; drop table., nested selects; SoundEx; join; deterministic functions; non-deterministic functions.

**ASP structural setup:** response.write; retrieving from forms; retrieving from querystring; variables; control constructs; subroutines and functions; session state; application variables; server variables; debugging, reading and writing cookies; server-side includes; response object methods; VBScript functions; error handling; debugging, browser details; CDONTS; files; output from a recordset; global.asa; setup instructions for using IIS and ASP. Flash 3 Create Flash movies of moving and interactive objects.

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**3<sup>rd</sup> Semester**  
**CREDIT: 6**

**GE-3.1A: Introduction to Database System**

**[MARKS: 60 (IN-SEMESTER: 12; END-SEMESTER: 48)]**

**Theory: 60 lectures**

**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. Elmasri, S. Navathe Fundamentals of Database Systems, Pearson Education, Fifth Edition, 2007
3. MySQL : Reference Manual

**GE-3.1B: Introduction to Database System Lab**

**[MARKS: 40 (IN-SEMESTER: 8; END-SEMESTER: 32)]**

**Practical: 60 lectures**

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)**

- b) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
  - c) Delete the record of book titled —Database System Concepts|| .
  - d) Change the Department of the book titled —Discrete Maths|| to —CS|| .
  - e) List all books that belong to —CS|| department.
  - f) List all books that belong to —CS|| department and are written by author —Navathe|| .
  - g) List all computer (Department=|| CS|| ) that have been issued.
  - h) 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)**

- Identify primary and foreign keys.
- Get supplier numbers for suppliers in Paris with status>20.
- Get suppliers details for suppliers who supply part P2. Display the supplier list in increasing order of supplier numbers.
- Get suppliers names for suppliers who do not supply part P2.
- For each shipment get full shipment details, including total shipment weights.
- Get all the shipments where the quantity is in the range 300 to 750 inclusive.
- Get part nos. for parts that either weigh more than 16 pounds or are supplied by suppliers S2, or both.
- Get the names of cities that store more than five red parts.
- Get full details of parts supplied by a supplier in London.
- Get part numbers for part supplied by a supplier in London to a project in London.
- Get the total number of project supplied by a supplier (say, S1).
- Get the total quantity of a part (say, P1) supplied by a supplier (say, S1).

### **GE-3.2A: Computer Networks and Internet Technologies**

**[MARKS: 60 (IN-SEMESTER: 12; END-SEMESTER: 48)]**

**Theory: 60 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. **6L**

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

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

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

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

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

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

**Introduction to Web Design:** Introduction to hypertext markup language (html) 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. **16L**

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

**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 W. Willard, 2009
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

**GE-3.2B: Computer Networks and Internet Technologies****[MARKS: 40 (IN-SEMESTER: 8; END-SEMESTER: 32)]****Practical: 60 lectures**

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:

- V. Text Box
- VI. Option/radio buttons
- VII. Check boxes
- VIII. Reset and Submit buttons

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### List of Practical using Javascript :

Create event driven program for following:

- 11. Print a table of numbers from 5 to 15 and their squares and cubes using alert.
- 12. Print the largest of three numbers.
- 13. Find the factorial of a number n.
- 14. Enter a list of positive numbers terminated by Zero. Find the sum and average of these numbers.
- 15. 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.
- 16. Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.

### **GE-3.3A: Unix/Linux Programming**

**[MARKS: 60 (IN-SEMESTER: 12; END-SEMESTER: 48)]**

**Theory: 60 Lectures**

#### **Introduction**

**(10 L)**

- ☐ What is linux/unix Operating systems
- ☐ Difference between linux/unix and other operating systems
- ☐ Features and Architecture
- ☐ Various Distributions available in the market
- ☐ Installation, Booting and shutdown process

- System processes (an overview)
- External and internal commands
- Creation of partitions in OS
- Processes and its creation phases – Fork, Exec, wait
- **User Management and the File System**
- Types of Users, Creating users, Granting rights
- User management commands
- File quota and various file systems available
- File System Management and Layout, File permissions
- Login process, Managing Disk Quotas
- Links (hard links, symbolic links)

**(20L)**

- **Shell introduction and Shell Scripting**
- What is shell and various type of shell, Various editors present in linux
- Different modes of operation in vi editor
- What is shell script, Writing and executing the shell script
- Shell variable (user defined and system variables)
- System calls, Using system calls
- Pipes and Filters
- Decision making in Shell Scripts (If else, switch), Loops in shell
- Functions
- Utility programs (cut, paste, join, tr , uniq utilities)
- Pattern matching utility (grep)

**(30L)**

### **Reference Books:**

1. Sumitabha, Das, Unix Concepts And Applications, Tata McGraw-Hill Education, 2006
2. Michael Jang RHCSA/ RHCE Red Hat Linux Certification: Exams (Ex200 & Ex300) (Certification Press), 2011
3. Nemeth Synder & Hein, Linux Administration Handbook, Pearson Education, 2nd Edition ,2010
4. W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, Unix Network Programming, The sockets Networking API, Vol. 1, 3rd Edition, 2014

### **GE-3.3B: Unix/Linux Programming Lab**

**[MARKS: 40 (IN-SEMESTER: 8; END-SEMESTER: 32)]**

#### **Practical: 60 Lectures**

1. Write a shell script to check if the number entered at the command line is prime or not.
2. Write a shell script to modify —cal|| command to display calendars of the specified months.
3. Write a shell script to modify —cal|| command to display calendars of the specified range of months.
4. Write a shell script to accept a login name. If not a valid login name display message —Entered login name is invalid|| .
5. Write a shell script to display date in the mm/dd/yy format.
6. Write a shell script to display on the screen sorted output of —who|| command along with the total number of users .
7. Write a shell script to display the multiplication table any number,
8. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.
9. Write a shell script to find the sum of digits of a given number.

10. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
11. Write a shell script to find the LCD(least common divisor) of two numbers.
12. Write a shell script to perform the tasks of basic calculator.
13. Write a shell script to find the power of a given number.
14. Write a shell script to find the binomial coefficient  $C(n, x)$ .
15. Write a shell script to find the permutation  $P(n, x)$ .
16. Write a shell script to find the greatest number among the three numbers.
17. Write a shell script to find the factorial of a given number.
18. Write a shell script to check whether the number is Armstrong or not.
19. Write a shell script to check whether the file have all the permissions or not.
20. Program to show the pyramid of special character

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**GE-4.1A: Computer Graphics**

**[MARKS: 60 (IN-SEMESTER: 12; END-SEMESTER: 48)]**

**Theory Lecture: 60**

**1.Introduction** (5 L)

Basic elements of Computer graphics, Applications of Computer Graphics.

**2.Graphics Hardware** (8 L)

Architecture of Raster and Random scan display devices, input/output devices.

**3.Fundamental Techniques in Graphics** (22L)

Raster scan line, circle and ellipse drawing, thick primitives, Polygon filling, line and polygon clipping algorithms, 2D and 3D Geometric Transformations, 2D and 3D Viewing Transformations (Projections- Parallel and Perspective), Vanishing points.

**4.Geometric Modeling** (10L)

Representing curves & Surfaces.

**5.Visible Surface determination** (8 Lectures)

Hidden surface elimination.

**6.Surface rendering** (7 Lectures)

Illumination and shading models. Basic color models and Computer Animation.

**Books Recommended:**

1. J.D.Foley, A.Van Dam, van Dam, van Dam, van Dam Computer Graphics Principles & Practice 2<sup>nd</sup> edition Publication Addison Wesley 1990.
2. D.Hearn, Baker: Computer Graphics, Prentice Hall of India 2008.
3. D.F.Rogers Procedural Elements for Computer Graphics, McGraw Hill 1997.
4. D.F.Rogers, Adams Mathematical Elements for Computer Graphics, McGraw Hill 2<sup>nd</sup> edition 1989.

### **GE-4.1B: Computer Graphics Lab**

**[MARKS: 40 (IN-SEMESTER: 8; END-SEMESTER: 32)]**

**Practical Lecture: 60**

#### **List of Practicals for Computer Graphics to be implemented in C programming language**

1. Implementation of Line Drawing algorithms
2. Implementation of Scan-Line Polygon Fill Algorithm
3. Implementation of Circle Drawing Algorithm
4. Implementation of Ellipse Drawing Algorithm
5. Implementation of 2D Transformations
6. Implementation of Line Clipping Algorithms
7. Implementation of Polygon Clipping, character and text Clipping Algorithm
8. Implementation of 3D Transformations
9. Implementation of Character Generation
10. Implementation of Bezier curves, B-Spline Curves
11. Implementation of Visible Surface methods
12. Implementation of Shading Algorithms
13. Drawing a Smiley using Fractals

#### **Text Book**

1. Donald Hearn and M. Pauline Baker, "Computer Graphics-C Version", Second Edition, Pearson Education, 2005.

#### **References**

1. Foley, Vandom, Feiner, Huges, "Computer Graphics: Principles & Practice", Second edition in C, Pearson Education, 2005
2. Ranjan Parekh, "Principles of Multimedia", ,Tata McgrawHill,2006
3. D.P. Mukherjee, "Fundamentals of Computer Graphics and Multimedia", PHI.
4. "Procedural elements of Computer Graphics", Rogers, Mc-Graw Hill.
5. "Mathematical elements of Computer Graphics", Rogers, Mc-Graw Hill.
6. Steven Harrington, "Computer Graphics- A Programming Approach", Second Edition, McgrawHill International.

### **GE-4.2A: Multimedia and Applications**

**[MARKS: 60 (IN-SEMESTER: 12; END-SEMESTER: 48)]**

**Theory: 60 lectures**

<b>Multimedia:</b> Introduction to multimedia, components, uses of multimedia, multimedia applications, virtual reality.	<b>6L</b>
<b>Text:</b> Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia & Hypertext.	<b>4L</b>
<b>Images:</b> Still Images – bitmaps, vector drawing, 3D drawing & rendering, natural light & colors, computerized colors, color palettes, image file formats.	<b>6L</b>
<b>Sound:</b> Digital Audio, MIDI Audio, MIDI vs Digital Audio, Audio File Formats.	<b>6L</b>
<b>Video:</b> How video works, analog video, digital video, video file formats, video shooting and editing.	<b>8L</b>

<b>Animation:</b> Principle of animations, animation techniques, animation file formats.	<b>10L</b>
<b>Internet and Multimedia:</b> www and HTML, multimedia on the web – web servers, web browsers, web page makers and site builders.	<b>6L</b>
<b>Making Multimedia:</b> 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.	<b>14L</b>

### References:

1. Tay Vaughan, —Multimedia: Making it work|| , TMH, Eighth edition.2011
2. Ralf Steinmetz and KlaraNaharstedt, —Multimedia: Computing, Communications Applications|| , Pearson.2012
3. Keyes, —Multimedia Handbook|| , TMH,2000.
4. K. Andleigh and K. Thakkar, —Multimedia System Design|| , PHI.2013

### **GE-4.2B: Multimedia and Applications Lab**

**[MARKS: 40 (IN-SEMESTER: 8; END-SEMESTER: 32)]**

**Practical: 60 lectures**

Practical exercises based on concepts listed in theory using Flash/ GIMP/ PhotoShop/ Animation Tools/ Image Editors/ Video Editors. Optional Implement the followings using Flash-

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).

## **GE-4.3A: Programming in Python**

**[MARKS: 60 (IN-SEMESTER: 12; END-SEMESTER: 48)]**

**Theory: 60 lectures**

- 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 values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists **8L**
- Object Oriented Programming:** Introduction to Classes, Objects and Methods, Standard Libraries. **4L**
- Data Structures:** Arrays, list, set, stacks and queues. **4L**
- Searching and Sorting:** Linear and Binary Search, Bubble, Selection and Insertion sorting. **8L**

### **References:**

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

## **GE-4.3B: Programming in Python Lab**

**[MARKS: 40 (IN-SEMESTER: 8; END-SEMESTER: 32)]**

### **Practical: 60 lectures**

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 sines, 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  $1 + 1/1! + 1/2! + 1/3! + \dots + 1/n$
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.