Generic Electives for Semesters – I to IV (2020 – 2021) offered by Department of Computer Science and Applications (Under the Framework of Honors School System)
PANJAB UNIVERSITY, CHANDIGARH
OUTLINES OF TESTS, SYLLABI AND COURSES OF READING FOR
CHOICE BASED CREDIT SYSTEM GENERAL ELECTIVES OFFERED BY DEPARTMENT
OF COMPUTER SCIENCE AND APPLICATIONS
UNDER THE FRAMEWORK OF HONORS SCHOOL SYSTEM
(SEMESTER SYSTEM) EXAMINATION, 2020-2021

OUTLINES OF TESTS

GENERIC ELECTIVE (COMPUTER SCIENCE)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Department</th>
<th>Paper Code</th>
<th>Maximum Seats (Two sections)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester I</td>
<td>Comp. Sc. and Applications</td>
<td>CSC-C-GE1: Computer Fundamentals</td>
<td>40 + 0</td>
</tr>
<tr>
<td>1</td>
<td>Comp. Sc. and Applications</td>
<td>CSC-C-GE2: Introduction to Programming</td>
<td>40 + 0</td>
</tr>
<tr>
<td>Semester III</td>
<td>Comp. Sc. and Applications</td>
<td>CSC-C-GE3: Introduction to Database Systems</td>
<td>40 + 0</td>
</tr>
<tr>
<td>3</td>
<td>Comp. Sc. and Applications</td>
<td>CSC-C-GE4: Software Engineering</td>
<td>40 + 0</td>
</tr>
</tbody>
</table>

- There will be only ONE Section of 40 students (for both theory as well as practical)
Semester - I

Theory Paper:
Generic Elective - CSC-C-GE-1  100 Marks (4 credits)

Practical:
Generic Elective - Practical based on CSC-C-GE-1  50 Marks (2 credits)

Semester - II

Theory Paper:
Generic Elective - CSC-C-GE-2  100 Marks (4 credits)

Practicals:
Generic Elective - Practical based on CSC-C-GE-2  50 Marks (2 credits)

EVALUATION

1. There shall be one Mid Term Examination of 20% Marks (20 marks) in each semester.
2. End-semester examination will be of 80% of total marks (80 marks).
3. Each practical examination shall be of 3 hours duration.
4. There shall be continuous internal assessment for practicals of 20% marks (10 marks). The final examination will be of 80% marks (40 marks).

Pattern of end-semester question paper
(i) Nine questions in all with equal weightage (16 marks). The candidate will be asked to attempt five questions
(ii) One Compulsory question (consisting of short answer type questions) covering whole syllabus. There will be no choice in this question.
(iii) The remaining eight questions will have Four Units comprising two questions from each Unit.
(iv) Students will attempt one question from each unit and the compulsory question.
PREAMBLE

The Computer Culture at the Panjab University dates back to 1966. An independent Centre for Computer Science and Applications (now a full fledged department) was set-up in 1983. The department aims at ingraining the spirit of ingenuity, innovativeness and technical competence in the students through rigorous competition and regular guidance. The department also caters to the need of users in the region and organizes training programmes for teaching and research communities.

The Department is running Master of Computer Applications (MCA) (3 year full time course) and was initiated in 1992-93. Admissions are held through an annual entrance test conducted by the Panjab University. Ph.D. program has been started from year 2005. The department has its own library with over 2700 books for exclusive use of the students and the faculty. The library has separate magazine and journal sections. Various computer journals are available online through the University Library.
### COURSE STRUCTURE COMPUTER SCIENCE
(GENERAL ELECTIVE)

<table>
<thead>
<tr>
<th>SEMESTER I</th>
<th>SEMESTER II</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC-C-GE1*</td>
<td>Theory and Practical : Computer Fundamentals</td>
</tr>
</tbody>
</table>

**GE: General Elective**

*: GE subjects are to be selected by the students from the pool of GE Subjects offered by various Departments of the University. Above mentioned GE are offered by Computer Science Department.
Objective: The student becomes aware of fundamentals of computer related to its hardware, software and data storage.

Note: The question paper for the End-semester examination will consist of 9 questions including one compulsory question covering the whole syllabus. The candidate will attempt five questions in all including compulsory question. All questions will carry equal marks and duration of examination will be 3 hours.

UNIT - I
Introduction: Introduction to computers, characteristics of computer; History of computers; Classification of computers on size: (Micro, Mini, Mainframe and super computers), Generations; Applications of computers; commonly used terms–Hardware, Software, Firmware. (6 Lectures)

Data Representation: Number systems and character representation, binary arithmetic. (6 Lectures)

UNIT - II
Human Computer Interface: Types of software: System and Application software; Programming Languages: Generation of Languages; Translators - Interpreters, Compilers, Assemblers and their comparison ; Operating system as user interface, utility programs. (12 Lectures)

UNIT - III
Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter. (10 Lectures)

Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks. (6 Lectures)

UNIT - IV
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. (12 Lectures)

Overview of Emerging Technologies: Bluetooth, cloud computing, big data, data mining, mobile computing and embedded systems. (8 Lectures)

Reference Books:
CSC-C-GE1 PRACTICAL - COMPUTER FUNDAMENTALS

Total Lectures : 60          Credits: 2
Max. Marks : 50

Note : 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.
   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

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

<table>
<thead>
<tr>
<th>Salesperson</th>
<th>Dolls</th>
<th>Trucks</th>
<th>Puzzles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kennedy, Sally</td>
<td>1327</td>
<td>1423</td>
<td>1193</td>
</tr>
<tr>
<td>White, Pete</td>
<td>1421</td>
<td>3863</td>
<td>2934</td>
</tr>
<tr>
<td>Pillar, James</td>
<td>5214</td>
<td>3247</td>
<td>5467</td>
</tr>
<tr>
<td>York, George</td>
<td>2190</td>
<td>1278</td>
<td>1928</td>
</tr>
<tr>
<td>Banks, Jennifer</td>
<td>1201</td>
<td>2528</td>
<td>1203</td>
</tr>
<tr>
<td>Atwater, Kelly</td>
<td>4098</td>
<td>3079</td>
<td>2067</td>
</tr>
<tr>
<td>Pillar, James</td>
<td>5214</td>
<td>3247</td>
<td>5467</td>
</tr>
<tr>
<td>York, George</td>
<td>2190</td>
<td>1278</td>
<td>1928</td>
</tr>
<tr>
<td>Banks, Jennifer</td>
<td>1201</td>
<td>2528</td>
<td>1203</td>
</tr>
<tr>
<td>Atwater, Kelly</td>
<td>4098</td>
<td>3079</td>
<td>2067</td>
</tr>
</tbody>
</table>

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.

9. Wrapping of text around the image.

10. 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**

<table>
<thead>
<tr>
<th>State</th>
<th>Qtr1</th>
<th>Qtr2</th>
<th>Qtr3</th>
<th>QTR4</th>
<th>Qtr Total</th>
<th>Rate Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delhi</td>
<td>2020</td>
<td>2400</td>
<td>2100</td>
<td>3000</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Punjab</td>
<td>1100</td>
<td>1300</td>
<td>1500</td>
<td>1400</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>U.P.</td>
<td>3000</td>
<td>3200</td>
<td>2600</td>
<td>2800</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Haryana</td>
<td>1800</td>
<td>2000</td>
<td>2200</td>
<td>2700</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Rajasthan</td>
<td>2100</td>
<td>2000</td>
<td>1800</td>
<td>2200</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

**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
<table>
<thead>
<tr>
<th>Roll No.</th>
<th>Name</th>
<th>Marks</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>Sachin</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>1002</td>
<td>Sehwag</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>1003</td>
<td>Rahul</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>1004</td>
<td>Sourav</td>
<td>89</td>
<td></td>
</tr>
<tr>
<td>1005</td>
<td>Har Bhajan</td>
<td>56</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>If Marks</th>
<th>Then Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;= 80</td>
<td>A+</td>
</tr>
<tr>
<td>&gt;= 60 &lt; 80</td>
<td>A</td>
</tr>
<tr>
<td>&gt;= 50 &lt; 60</td>
<td>B</td>
</tr>
<tr>
<td>&lt; 50</td>
<td>F</td>
</tr>
</tbody>
</table>

3. Given the following worksheet

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

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

<table>
<thead>
<tr>
<th>If Total Sales</th>
<th>Commission</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20000</td>
<td>0% of sales</td>
</tr>
<tr>
<td>&gt; 20000 and &lt; 25000</td>
<td>4% of sales</td>
</tr>
<tr>
<td>&gt; 25000 and &lt; 30000</td>
<td>5.5% of sales</td>
</tr>
<tr>
<td>&gt; 30000 and &lt; 35000</td>
<td>8% of sales</td>
</tr>
<tr>
<td>&gt;= 35000</td>
<td>11% of sales</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Allowances</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRA Dependent on Basic</td>
</tr>
</tbody>
</table>
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:
   
<table>
<thead>
<tr>
<th>No. of Installments</th>
<th>5%</th>
<th>6%</th>
<th>7%</th>
<th>8%</th>
<th>9%</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
</tr>
<tr>
<td>4</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
</tr>
<tr>
<td>5</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
</tr>
<tr>
<td>6</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
</tr>
</tbody>
</table>

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
   (A) 1000 (B) 18000 (C) 5200 ?

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

<table>
<thead>
<tr>
<th>Salesman</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>10000</td>
<td>12000</td>
<td>20000</td>
<td>50000</td>
</tr>
<tr>
<td>S2</td>
<td>15000</td>
<td>18000</td>
<td>50000</td>
<td>60000</td>
</tr>
<tr>
<td>S3</td>
<td>20000</td>
<td>22000</td>
<td>70000</td>
<td>70000</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>EXPENSES</th>
<th>JAN</th>
<th>FEB</th>
<th>MARCH QUARTER TOTAL</th>
<th>QUARTER AVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent</td>
<td>600.00</td>
<td>600.00</td>
<td>600.00</td>
<td>600.00</td>
</tr>
<tr>
<td>Telephone</td>
<td>48.25</td>
<td>43.50</td>
<td>60.00</td>
<td>60.00</td>
</tr>
<tr>
<td>Utilities</td>
<td>67.27</td>
<td>110.00</td>
<td>70.00</td>
<td>70.00</td>
</tr>
<tr>
<td>Credit Card</td>
<td>200.00</td>
<td>110.00</td>
<td>70.00</td>
<td>70.00</td>
</tr>
<tr>
<td>Oil</td>
<td>100.00</td>
<td>150.00</td>
<td>90.00</td>
<td>90.00</td>
</tr>
<tr>
<td>AV to Insurance</td>
<td>150.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable TV</td>
<td>40.75</td>
<td>40.75</td>
<td>40.75</td>
<td>40.75</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Publisher name</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Rs. 1,000.00</td>
<td>Rs. 1,100.00</td>
<td>Rs. 1,300.00</td>
<td>Rs. 800.00</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Rs. 1,500.00</td>
<td>Rs. 700.00</td>
<td>Rs. 1,000.00</td>
<td>Rs. 2,000.00</td>
<td></td>
</tr>
</tbody>
</table>
(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
SEMIESTER II

CSC-C-GE2 INTRODUCTION TO PROGRAMMING

THEORY

Total Lectures : 60
Credits: 4
Max. Marks: 100

Objective: The student will learn the basic constructs of programming which will enable him to develop programs using C/C++ programming languages.

Note: The question paper for the End-semester examination will consist of 9 questions including one compulsory question covering the whole syllabus. The candidate will attempt five questions in all including compulsory question. All questions will carry equal marks and duration of examination will be 3 hours.

UNIT - I

Introduction to C and C++
History of C and C++, Overview of Procedural Programming and Object-Orientation Programming, Using main() function, Compiling and Executing Simple Programs in C++. (5 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, pute, putchar etc), Formatted and Console I/O (printf(), scanf(), cin, cout), Using Basic Header Files (stdio.h, iostream.h, conio.h etc). (10 Lectures)

Expressions, Conditional Statements and Iterative Statements: 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) (10 Lectures)

UNIT - II

Functions and Arrays: 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. (10 Lectures)
Derived Data Types (Structures and Unions) 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. (5 Lectures)

UNIT - III

File I/O, Preprocessor Directives
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, ifndef and #undef), Macros. (8 Lectures)

UNIT - IV

Using Classes in C++
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, Introduction to Inheritance. (12 Lectures)

Reference Books:
Note: The student should develop programs using C and C++ to implement the various programming concepts. Following list is not exhaustive. The teacher can add more programs to it.

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. Write a program to perform various matrix operation on a given 2-D array.
9. Write a program to read a data from file and copy into another file.
10. Write a program to implement concept of structures and union.
11. Write a program to implement concept of classes and objects in C++.
12. Write a program in C++ to implement various types of inheritance.
OUTLINES OF TESTS, SYLLABI AND COURSES OF READING For CBCS
GENERIC ELECTIVE (COMPUTER SCIENCE)

Semester - III

Theory Paper:
Generic Elective - CSC-C-GE-3 100 Marks (4 credits)

Practical:
Generic Elective - Practical based on CSC-C-GE-3 50 Marks (2 credits)

Semester - IV

Theory Paper:
Generic Elective - CSC-C-GE-4 100 Marks (4 credits)

Practicals:
Generic Elective - Practical based on CSC-C-GE-4 50 Marks (2 credits)

EVALUATION

1. There shall be one Mid Term Examination of 20% Marks (20 marks) in each semester.
2. End-semester examination will be of 80% of total marks (80 marks).
3. Each practical examination shall be of 3 hours duration.
4. There shall be continuous internal assessment for practicals of 20% marks (10 marks). The final examination will be of 80% marks (40 marks).

Pattern of end-semester question paper
(a) Nine questions in all with equal weightage (16 marks). The candidate will be asked to attempt five questions
(b) One Compulsory question (consisting of short answer type questions) covering whole syllabus. There will be no choice in this question.
(c) The remaining eight questions will have Four Units comprising two questions from each Unit.
(d) Students will attempt one question from each unit and the compulsory question.
## COURSE STRUCTURE COMPUTER SCIENCE
### (GENERAL ELECTIVE)

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<thead>
<tr>
<th>SEMESTER III</th>
<th>SEMESTER IV</th>
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<td>CSC-C-GE3* Theory and Practical:</td>
<td>CSC-C-GE4* Theory and Practical:</td>
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<tr>
<td>Introduction to Database Systems</td>
<td>Software Engineering</td>
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**GE: General Elective**

*: GE subjects are to be selected by the students from the pool of GE Subjects offered by various Departments of the University. Above mentioned GE are offered by Computer Science Department.
SEMESTER III
CSC-C-GE3: INTRODUCTION TO DATABASE SYSTEM

THEORY

Total Lectures: 60
Credits: 4
Max. Marks: 100

Objective: The objective of this subject is to introduce the database concepts to the student and enable him to query the RDBMS package using SQL queries.

Note: The question paper for the End-semester examination will consist of 9 questions including one compulsory question covering the whole syllabus. The candidate will attempt five questions in all including compulsory question. All questions will carry equal marks and duration of examination will be 3 hours.

UNIT-I
Database: Introduction to database, relational data model, DBMS architecture, data independence, DBA, database users, end users, front end tools (14 Lectures)

UNIT-II
E-R Modeling: Entity types, entity set, attribute and key, relationships, relation types, E-R diagrams, database design using ER diagrams (14 Lectures)

UNIT-III
Relational Data Model: Relational model concepts, relational constraints, primary and foreign key, normalization: 1NF, 2NF, 3NF (14 Lectures)

UNIT-IV
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. (18 Lectures)

Reference Books:
Practical: 60 lectures

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

   **Library Books** (Accession number, Title, Author, Department, Purchase Date, Price)
   **Issued Books** (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 London.

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

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).
SEMESTER IV
CSC-C-GE4: SOFTWARE ENGINEERING
THEORY

Total Lectures: 60  
Credits: 4  
Max. Marks: 100

Objective: The objective of this subject is to introduce the software development process and enable the student to design and develop small software projects.

Note: The question paper for the End-semester examination will consist of 9 questions including one compulsory question covering the whole syllabus. The candidate will attempt five questions in all including compulsory question. All questions will carry equal marks and duration of examination will be 3 hours.

UNIT-I
   (8 Lectures)

UNIT-II
   (10 Lectures)
   (8 Lectures)

UNIT-III
   (8 Lectures)
   (8 Lectures)

UNIT-IV
   (10 Lectures)
   (8 Lectures)

Recommended Books:
CSC-C-GE4: PRACTICAL - SOFTWARE ENGINEERING LAB

PRACTICAL

Total Lectures : 60          Credits: 2
Max. Marks : 50

Practical: 60 lectures

<table>
<thead>
<tr>
<th>S. No</th>
<th>Practical Title</th>
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<tbody>
<tr>
<td>1.</td>
<td>Problem Statement, Process Model</td>
</tr>
<tr>
<td>2.</td>
<td>Requirement Analysis: Creating a Data Flow, Data Dictionary, Use Cases</td>
</tr>
<tr>
<td>3.</td>
<td>Project Management: Computing FP, Effort, Schedule, Risk Table, Timeline chart</td>
</tr>
<tr>
<td>5.</td>
<td>Testing: Basis Path Testing</td>
</tr>
</tbody>
</table>

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