BACHELOROFCOMPUTER APPLICATIONS (BCA)

(Revised Syllabus)

BCA(Revised Syllabus)/ASSIGN/SEMESTER-V

ASSIGNMENTS

(July-2024 &January-2025)

(BCS-051,BCS-052,BCS-053,BCS-054,BCS-055

BCSL-056, BCSL-057, BCSL-058)

SCHOOLOFCOMPUTERANDINFORMATIONSCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068

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Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to BCA Programme Guide.
3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the BCA Programme Guide.

Course Code	**:**	**BCS-051**
Course Title	**:**	**Introduction to Software Engineering**
Assignment Number	**:**	**BCA(V)051/Assignment/2024-25**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**31st October,2024(For July, Session)**
		30th April, 2025(For January, Session)

This assignment has eight questions for a total of 80 marks. Answer all the questions. Each question carries 10 marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1. What is SRS? Develop SRS for "Railway Reservation System". Make necessary assumptions. Follow IEEE SRS format. Briefly explain the characteristics of a good SRS.

Q2. Draw first three levels of DFDs for a "Railway Reservation System". Make assumptions, wherever necessary. Briefly explain the all the DFDs with respect to Railway Reservation System.

Q3. Develop a test case for any testing technique for "Railway Reservation System". Briefly explain the all the test cases with respect to Railway Reservation System.

Q4. What are application logic objects? Explain with the help of an example.

Q5. What is Spiral model for software development? Explain the types of software systems developed using this model.

Q6.

a) Explain the different categories of Software Maintenance.
b) Draw GANTT chart for the development of "Railway Reservation System". Briefly explain the chart with respect to Railway Reservation System.

Q7. What is Software Configuration Management (SCM) ? Explain the need of SCM with the help of an example.

Q8. Write short notes on the following:
(a) Object Oriented Metrics
(b) Coupling
(c) Software Quality Assurance
(d) Capability Maturitys Model

Course Code	**:**	**BCS-052**
Course Title	**:**	**Network Programming and Administration**
Assignment Number	**:**	**BCA(V)/052/Assignment/2024-25**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**31st October,2024(For July, Session)** **30th April, 2025(For January, Session)**

There are three questions in this assignment. In total, they carry 80 marks. Answer all the questions. 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: Illustrate the complete procedure of mapping a domain name to an IP address **(30 marks)**

Q2: Explain different ways of sending a message to multiple recipients **(30 marks)**

Q3: Write a short note on Disk Security Management **(20 marks)**

Course Code	**:**	**BCS-053**
Course Title	**:**	**Web Programming**
Assignment Number	**:**	**BCA(V)053/Assignment/2024-25**
Maximum Marks	**:**	**100**
Last Date of Submission	**:**	**31st October,2024(For July, Session)**
		30th April, 2025(For January, Session)

This assignment has two questions of 80 marks. Answer all the questions. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Please give precise answers. The word limit for each part is 300 words.

Question 1: (Covers Block 1)

a) Explain the features of the following technologies – Blogging, Mashups and Rich Internet Applications. How are these technologies useful for you? **(6 Marks)**

b) (i) Create an online membership form for an Online Library using HTML. The form should ask for the following information: **(3 Marks)**

- The Name of the member
- Aadhar Number
- Type of Membership (Student/Faculty/Staff/Other to be chosen from a drop down list)
- Year of membership
- Were you a member earlier? Yes/No
- Description of services expected from the Library

(ii) Create an external CSS file for this form. This CSS file should select the font size of 14 point italics for all the labels; font colour should be red for the headings and dark blue for the normal text. The background colour of the form should be light green. **(2 Marks)**

(iii) Write JavaScript code to validate if any of the field of the form is not filled. **(3 Marks)**

Submit the HTML code, JavaScript code and screenshot of the form opened in a browser window. You must demonstrate the form and validations at the time of viva.

c) Using tables, create a webpage displaying the course list of the BCA programme. This webpage should display the semester wise list of courses with the headings - serial number, course code, course title, course credits, and course type (Theory, Practical or Project). Create a second page containing separate ordered lists of course titles of theory courses and practical courses. You should use tags, wherever needed; and create an internal CSS file, which formats the web pages as given below:

(i) The headings of the table must be in 12-point Bold and all other content should be in 11-point Arial font.

(ii) The table heading should be in different shade. The data rows of the table should have alternatively light pink and light blue colour. The background of the table should be light green.

(iii) The font of the ordered list should be "Times New Roman" with font size of 11 points. The background colour of list should be light yellow.

(iv) At the time of viva, you should demonstrate how changes in CSS can change the display.

(You must submit the HTML and CSS code and the screenshot of pages in a browser window.)

(6 Marks)

d) A University maintains the list of its students using XML. Every student is allotted a unique enrolment Number, which can be used as an attribute in the XML document. In addition, the following information is stored about the students – Name, Programme, Duration of Programme, List of courses enrolled (assume that student takes at least one and maximum of five courses in a programme). Create an XML document containing information of five Students of BCA programme. Also create the DTD to verify the XML document created by you. **(8 Marks)**

e) Write JavaScript code that displays the text "Welcome to JavaScript Event Demonstration". When you click on this text, then it changes to "We just demonstrated the click Event". You may use event handling to perform the action as stated above. Make suitable assumptions, if any. You should demonstrate this code at the time of viva. **(6 Marks)**

f) Explain the working of the WAP model. Also, list the benefits and limitations of WAP. Explain the following WML elements with the help of an example of each:

- Preformatted text in WML
- WML Navigational elements
- WML <select> element

(6 Marks)

Question 2: (Covers Block 2) **(10×4=40 Marks)**

a) Explain the following with the help of a diagram/example, if needed:

(i) Static web pages and Dynamic web pages

(ii) N-Tier Architecture

(iii) Tools for server side scripting

(iv) HTTP primitives

(v) Web Container

b) Explain with the help of an example/diagram or write code for the following using JSP:

(i) *include* and *taglib* directives of JSP

(ii) Write a JSP scriptlet to display a list of first 10 positive odd numbers.

(iii) <jsp:setProperty> and <jsp:getProperty > action elements of JSP

(iv) *session* and *application* implicit objects in JSP

(v) JSP Life cycle

c) Write JSP programs which can perform the following tasks (you may create a single or multiple webpages for these tasks):

(i) Write a JSP code to create a webpage that requires input of three variables x, y, and z; after successful input of values in the variables, the JSP program finds the smallest of these three variables.

The code then displays the smallest value along with a message.

(ii) Create a web page for issuing a Book of a library. The page takes input of three fields namely membershipID, bookID and date of return of the book. In case, the data is correctly entered in all the three fields - two cookies one for the membershipID and the second for the bookID are created.

d) Create a database for Book Sales System consisting of the following two tables:

Book (ISBNnumber, Title, FirstAuthor, YearOfPublication, CopiesAcquired)

Sales (ISBNnumber, PersonName, NumberofCopiesSold)

Develop and deploy a web based "Book Sales System" using JSP, a database backend and a web server (you may select DBMS and web server, as per your choice). Your system should use JDBC for input of information to both the tables. The system should output list of all the sales made for a Book whose ISBNnumber is given.

Submit the JSP program, screens and database of the system. You must demonstrate this system at the time of viva voce.

Make and state suitable assumptions, if any.

Course Code	**:**	**BCS-054**
Course Title	**:**	**Computer Oriented Numerical Techniques**
Assignment Number	**:**	**BCA(V)/054/Assignment/2024-25**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**31st October,2024(For July, Session)** **30th April, 2025(For January, Session)**

This assignment has seven questions of total 80 marks. Answer all the questions. 20 marks are for viva voce. You may use illustrations and diagrams to enhance explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Illustrations/ examples, where-ever required, should be different from those given in the course material. Use of simple calculator is allowed.

Question 1.

(a) Explain each of the following concepts, along with at least one suitable example for each: **(6 Marks)**
(i) Fixed-point number representation (ii) round-off error (iii) representation of zero as floating point number (iv) significant digits in a decimal number representation (v) normalized representation of a floating point number (vi) overflow

(b) Explain with suitable example that in computer arithmatics (i.e., numbers represented in computer, with +, −, *, / as implemented in a computer) the multiplication operation(*) may not be distributive over plus (+), i.e. $(a*(b+c)) = ((a*b)+(a*c))$ may not be true for some computer numbers a, b and c **(2 Marks)**

(c) Find out to how many decimal places the value 22/ 7 is accurate as an approximation of 3.14159265, where the latter is value of π, calculated up to 8 places after decimal ? **(6 Marks)**

(d) Calculate a bound for the truncation error in approximating f(x) = sin x by **(3 Marks)**

$$\sin(x) = x - x^3/(\text{fact } 3) + x^5/(\text{fact } 5),$$

where $-1 =< x =< 1$ and (fact n) denotes factorial of n

(e) Obtain Approximate the value of $(3.7)^{-1}$, using first three terms of Taylor's series expansion. **(3 Marks)**

Question 2.

(a) Solve the system of equations **(4 Marks)**

$$4x_1 + x_2 + 2X_3 = 16$$
$$2x_1 + 5x_2 + 3x_3 = 19$$
$$3x_1 + 2x_2 - x_3 = 12$$

using Gauss elimination method with partial pivoting.

(b) Perform four iterations (rounded to four decimal places) using **(8 Marks)**
(i) Jacobi Method and
(ii) Gauss-Seidel method ,
for the following system of equations.

$$\begin{bmatrix} 5 & -5 & -1 \\ 1 & -4 & 1 \\ -2 & 1 & -6 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} -8 \\ -4 \\ -18 \end{bmatrix}$$

With $\mathbf{x}^{(0)} = (0, 0, 0)^T$. The exact solution is $(1, 2, 3)^T$.

Which method gives better approximation to the exact solution?

Question 3.

(a) Determine the smallest roots of the following equation: **(8 Marks)**

$f(x) = x^2 \cos(x) + \sin(x) = 0$

to three significant digits using

(i) Regula-falsi method (ii) Newton Raphson method (iii) Bisection method (iv) Secant method

Question 4.

(a) Explain what is the role of interpolation in solving numerical problems? **(2 Marks)**

(b) Express $\Delta^3 f_1$ as a backward difference. **(2 Marks)**

(c) Express $\Delta^3 f_1$ as a central difference. **(2 Marks)**

(d) For the following data develop difference table and find forward differences and backward differences **(4 Marks)**

I	x_i	y_i
0	–1	16.8575
1	0	24.0625
2	1	16.5650
3	2	–13.9375
4	3	28.5625
5	4	**144.0625**

Question 5.

(a) By decinnial census, the population of a town was given below. **(10 Marks)**

Year (x) :	1971	1981	1991	2001	2011
Population (y):	**112**	132	**158**	**189**	**226** (in thousands)

(i) Using Stirling's central difference formula, estimate the population for the year 2006

(ii) Using Newton's forward formula, estimate the population for the year 1992.

Using Newton's backward formula, estimate the population for the year 1980.

(b) If values of the function f: x → y are given as f(1) = –32, f(4) = 08, f(5) = 52, $f(7) = 167$, **(5 Marks)**

find the Lagrange's interpolation polynomial of f(x). Also, find f(3)

Question 6.

(a) Find the values of the first and second derivatives of f(x) at x = 76 from the following table. Use $0(h^2)$ forward difference method. Also, find Truncation Error (TE) and actual errors. **(5 Marks)**

x	:	76	81	86	91
f(x)	:	5.3147	5.4346	5.5637	5.6629

Question 7.

(a) Compute the value of the integral **(10 Marks)**

$$\int_{8.4}^{10.4} (5x + 4x^2 + 3)\, dx$$ by using

Rectangular Rule (ii) Trapezoidal Rule and then (iii) Simpson's 1/3 Rule

CourseCode	**:**	**BCS-055**
Course Title	**:**	**Business Communication**
Assignment Number	**:**	**BCA(V)/055/Assignment/2024-25**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Lastdate of submission	**:**	**31st October,2024(For July, Session)**
		30th April, 2025(For January, Session)

This assignment has 09 questions and carries 100 marks. Answer all questions. (You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.)

Q1. Read the passage below and answer the questions that follow:

In the 21st century, technology has become an integral part of our daily lives, transforming the way we work, communicate, and even perceive the world around us. The rapid advancements in digital technology have ushered in a new era where the boundaries between the physical and virtual realms are increasingly blurred.

The ubiquity of smartphones, laptops, and other smart devices has revolutionized the way we access information, stay connected, and manage our daily tasks. With the internet at our fingertips, we can now communicate with people across the globe, access a wealth of knowledge, and even work remotely from the comfort of our homes. This level of connectivity and accessibility has brought about both benefits and challenges.

On the one hand, technology has empowered us to be more productive, efficient, and informed. It has opened up new avenues for learning, collaboration, and entrepreneurship, allowing individuals to pursue their passions and unlock their full potential. The abundance of online resources and digital tools has democratized access to education, enabling people from diverse backgrounds to acquire knowledge and skills.

However, the reliance on technology has also given rise to new social and psychological challenges. The constant need to be online and the pressure to maintain a curated digital presence can lead to feelings of isolation, anxiety, and FOMO (fear of missing out). The blurring of work-life boundaries and the constant influx of information can also contribute to increased stress and burnout.

As we navigate this technology-driven world, it is crucial to strike a balance between embracing the benefits of technology and maintaining a healthy, well-rounded lifestyle. This requires developing digital literacy, cultivating mindfulness, and prioritizing self-care practices to ensure that technology enhances our lives rather than dominates them.

Q1:

1. Describe the impact of technology on the way we work and communicate in the 21st century. **(2 Marks)**
2. Discuss the benefits and challenges of the increased connectivity and accessibility brought about by technology. **(2 Marks)**

3. Explain how technology has democratized access to education and enabled individuals to pursue their passions. **(2 Marks)**
4. Discuss the potential negative consequences of the reliance on technology, such as feelings of isolation, anxiety, and burnout. **(2 Marks)**
5. Suggest strategies for maintaining a healthy balance between embracing technology and prioritizing self-care in a technology-driven world. **(2 Marks)**

Read the following sentences and write in correct form; (10x1=10 Marks)

1. She don't like to play football.
2. He go to school every day.
3. The cat is sleeping on it's bed.
4. They was very happy with the results.
5. I have seen her yesterday.
6. She is tallest than her brother.
7. The book which I borrowed from you is very interesting.
8. Each of the students have a unique talent.
9. There is many reasons to support this decision.
10. Neither of the options are good.

Q2. Write a letter to the head of the study center,explaining the importance of addressing mental health issues among college students and the potential consequences of neglecting these concerns. Describe in detail the requirements and give suggestions for the same on how this might be done.
(10 Marks)

Q3. Write short notes on any two of the following: (5 x 2= 10 Marks)

a) Phone interviews.
b) Walk-in interviews.
c) Active Listening Skills.
d) Using Positive Influencing Skills in the Workplace.

Q4. Complete the sentences with the comparative or superlative form of the adjective/adverb. (5 Marks)

1. This year's vacation was _____ (good) than last year's.
2. She is the _____ (intelligent) student in the class.
3. The weather is _____ (warm) today than it was yesterday.
4. My sister runs _____ (fast) than I do.
5. This is the _____ (expensive) restaurant in the city.

Q5. Change the following into passive voice: (5 Marks)

1. The chef prepared a delicious meal for the guests.
2. The teacher will assign a project to the students next week.

3. The construction workers are building a new bridge.
4. The police arrested the suspect last night.
5. The company will launch a new product next month.

Q6. Complete the following sentences by putting the verbs in the Simple Past, Past Perfect or Past Continuous Tense: (10 Marks)

1. By the time I _____ (arrive) at the party, most of the guests _____ (leave).
2. While I _____ (study) for my exam, my friend _____ (call) to invite me to the movies.
3. The team _____ (win) the championship after they _____ (work) hard all season.
4. I _____ (walk) to the park when it _____ (start) to rain.
5. By the end of the week, I _____ (finish) all my chores and _____ (relax) on the weekend.
6. The children _____ (play) in the park when their mother _____ (come) to pick them up.
7. After the concert, the band _____ (greet) their fans and _____ (sign) autographs.
8. I _____ (watch) a movie when my roommate _____ (come) home and _____ (ask) me to join them for dinner.
9. The teacher _____ (explain) the lesson while the students _____ (take) notes.
10. By the time I _____ (graduate), I _____ (apply) to several jobs and _____ (receive) a few offers.

Q7. Fill in the blanks with suitable articles (a/an, the or no article) (10 Marks)

1. I saw _____ beautiful sunset over the ocean last night.
2. Can you pass me _____ pen on the desk?
3. My friend is _____ engineer who works for _____ large tech company.
4. I need to buy _____ new pair of shoes for my job interview.
5. _____ Eiffel Tower is _____ iconic landmark in Paris.
6. She is _____ artist who paints _____ most stunning landscapes.
7. I would like to visit _____ Grand Canyon during _____ summer.
8. My sister is _____ accountant, and she works at _____ local firm.
9. _____ apple a day keeps _____ doctor away.
10. I'm going to _____ park to walk _____ dog.

Q8. Discuss various kinds of communication with suitable examples. Discuss kinds of communication and their significance. (20 Marks)

Q9. Write an e-mail to your friend sharing your reasons to join a particular company. Give appropriate reasons for your choice and how that would be meaningful for the society large. (10 Marks)

Course Code	**:**	**BCSL-056**
Course Title	**:**	**Network Programming and Administration Lab**
Assignment Number	**:**	**BCA(V)/L-056/Assignment/2024-25**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last date of Submission	**:**	**31st October,2024(For July, Session)** **30th April, 2025 (For January, Session)**

Note: This assignment has two questions. Answer all the questions. These questions carry 40 marks. Rest 10 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Make necessary assumptions.

Q1

(a): Write and execute a TCP client and a server program in C-language to perform the following tasks:

(14 Marks)

The TCP client program sends two strings to the TCP server program to find length of these to strings and return the sum of lenghts of these two strings. Also the TCP server program sends the concatenated strings to the client.

(b) Run the following Linux commands on your machine and show the output:

(6 Marks)

- cat
- sort
- ping
- more
- df-h
- tail - f

Q2.

(a) Configure and test the Telnet server in Linux. **(6 Marks)**

(b) Configure the DHCP server on the Linux operating system. Write all the steps involved in configuration. Sort each column of the table and show the result. **(14 Marks)**

Course Code	**:**	**BCSL-057**
Course Title	**:**	**Web Programming Lab**
Assignment Number	**:**	**BCA(V)/L-057/Assignment/2024-25**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**31st October,2024(For July, Session)**
		30th April, 2025(For January, Session)

This assignment has one question of 40 marks. Rest 10 marks are for viva voce. Please go through the guidelines regarding assignments given in the programme guide for the format of presentation.

Q1.(a) Design and implement a website/web application consisting of three pages having the following layout:

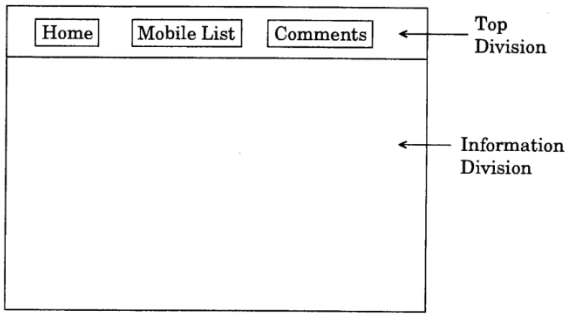


Figure 1 : Layout of Web Pages

Create three pages having the same layout as shown in Figure 1. The Top Division contains the following links:

Home	:	Link to Home Page
Mobile List	:	Link to a Mobile List Page created using JSP
Comments	:	Link to a Comments Page containing a form

The Information Division of the three pages should be as per the following description:

(i) The Home Page should display the name of the mobile store "Mobile for You". It should display the objectives and address of the mobile store. **(3 Marks)**

(ii) The Mobile List Page should be generated by a query to a database "Mobiles" having a single relation Mobile_ram (Mobile_make, RAM_size). **(3 Marks)**

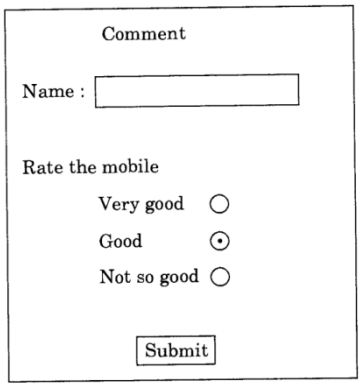
You must use JSP to connect to database and display information as:

Mobile List

Make	RAM (GB)
Samsung	2
Apple	4

You must display at least five mobiles in this list. **(18 Marks)**

iii) The Comments Page should display a form as shown below : (Please do not write the code for processing or verification of the form) **(6 Marks)**



(b) Create an external CSS file that ensures that format of all the three pages is as per the layout of Figure 1. The background colour of Link Division should be light green.

(10 Marks)

You may make suitable assumptions, if needed.

Course Code	**:**	**BCSL-058**
Course Title	**:**	**Computer oriented Numerical techniques Lab**
Assignment Number	**:**	**BCA(V)/L-058/Assignment/2024-25**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**31st October,2024(For July Session)** **30th April,2025(For January Session)**

This assignment has eight problems of 40 marks, each of 5 marks. All problems are compulsory. 10 marks are for viva voce. Please go through the guidelines regarding assignments given in the programme guide for the format of presentation.

Q1. Write a program in C that accepts a decimal number and displays its floating-point equivalent number. You may make assumptions to simplify theprogram, however, yourrepresentation of floating point number should becloser to IEEE 754 standard 32 bit representation. **(5Marks)**

Q2. Write a program in C to implement Gauss Seidel method for finding the roots oflinear equations. **(5Marks)**

Q3. Write a program in C to implement Bisection method for finding a positive rootof the equation X^2 - 9x + 21 = 0. You have to make suitable choice for thebounds. **(5Marks)**

Q4. Write a program in C for the demonstration of Newton's BackwardInterpolation Formula. **(5Marks)**

Q5. Write program in C for the demonstration of Bessel's Formula. **(5Marks)**

Q6. Write a program in C to demonstrate theNewton's Divided DifferenceMethod. **(5Marks)**

Q7. Write a program in C to find the approximate value of the following definiteintegral usingSimpson's 1/3 rule: **(5Marks)**

$$\int_0^{\frac{\pi}{4}} tan\, x\, dx$$

Q8. Write a C program to implement Euler's rule/method, of approximating solution of the i.v.p.:$y'(x) = \left(\frac{dy}{dx}\right) = f(x, y)\ with\ initial\ condition\ at\ x = a\ as\ y(a) =$ y0$over\ an\ interval\ [a, b]$.

(5Marks)