

# **BACHELOR OF COMPUTER APPLICATION (BCA)**

## **(Revised Syllabus)**

BCA(Revised Syllabus)/ASSIGN/SEMESTER-V

**ASSIGNMENTS**

**(July - 2018 & January - 2019)**

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

**BCSL-056, BCSL-057, BCSL-058**



**SCHOOL OF COMPUTER AND INFORMATION SCIENCES  
INDIRA GANDHI NATIONAL OPEN UNIVERSITY  
MAIDAN GARHI, NEW DELHI – 110 068**

Course Code	Assignment No.	Submission-Schedule		Page No.
		For July-December Session	For January-June Session	
<b>BCS-051</b>	<b>BCA(5)/051/Assignment/18-19</b>	<b>15<sup>th</sup> October, 2018</b>	<b>15<sup>th</sup> April, 2019</b>	<b>3</b>
<b>BCS-052</b>	<b>BCA(5)/052/Assignment/18-19</b>	<b>15<sup>th</sup> October, 2018</b>	<b>15<sup>th</sup> April, 2019</b>	<b>4</b>
<b>BCS-053</b>	<b>BCA(5)/053/Assignment/18-19</b>	<b>15<sup>th</sup> October, 2018</b>	<b>15<sup>th</sup> April, 2019</b>	<b>5</b>
<b>BCS-054</b>	<b>BCA(5)/054/Assignment/18-19</b>	<b>15<sup>th</sup> October, 2018</b>	<b>15<sup>th</sup> April, 2019</b>	<b>7</b>
<b>BCS-055</b>	<b>BCA(5)/L-055/Assignment/18-19</b>	<b>15<sup>th</sup> October, 2018</b>	<b>15<sup>th</sup> April, 2019</b>	<b>10</b>
<b>BCSL-056</b>	<b>BCA(5)/L-056/Assignment/18-19</b>	<b>15<sup>th</sup> October, 2018</b>	<b>15<sup>th</sup> April, 2019</b>	<b>13</b>
<b>BCSL-057</b>	<b>BCA(5)/L-057/Assignment/18-19</b>	<b>15<sup>th</sup> October, 2018</b>	<b>15<sup>th</sup> April, 2019</b>	<b>14</b>
<b>BCSL-058</b>	<b>BCA(5)/L-058/Assignment/18-19</b>	<b>15<sup>th</sup> October, 2018</b>	<b>15<sup>th</sup> April, 2019</b>	<b>16</b>

### 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.

<b>Course Code</b>	<b>:</b>	<b>BCS-051</b>
<b>Course Title</b>	<b>:</b>	<b>Introduction to Software Engineering</b>
<b>Assignment Number</b>	<b>:</b>	<b>BCA(5)-051/Assignment/2018-19</b>
<b>Maximum Marks</b>	<b>:</b>	<b>100</b>
<b>Weightage</b>	<b>:</b>	<b>25%</b>
<b>Last Date of Submission</b>	<b>:</b>	<b>15<sup>th</sup> October, 2018 (For July, 2018 Session)</b> <b>15<sup>th</sup> April, 2019 (For January, 2019 Session)</b>

**This assignment has three questions carrying a total 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.**

**Question 1:** Develop SRS as per IEEE standard for Student Admission System. Make assumptions wherever necessary. (30 marks)

**Question 2:** Develop Design Document for the System mentioned in Question no.1 (30 marks)

**Question 3:** What is meant by Change Management? How does it impact the overall Project Life Cycle. (20 marks)

<b>Course Code</b>	:	<b>BCS-052</b>
<b>Course Title</b>	:	<b>Network Programming and</b>
<b>Assignment Number</b>	:	<b>BCA(5)-052/Assignment/2018-19</b>
<b>Maximum Marks</b>	:	<b>100</b>
<b>Weightage</b>	:	<b>25%</b>
<b>Last Dates of Submission</b>	:	<b>15<sup>th</sup> October, 2018 (For July, 2018 Session)</b> <b>15<sup>th</sup> April, 2019 (For January, 2019 Session)</b>

**There are four questions in this assignment, which carries 80 marks. Rest 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. Answer to each part of the question should be confined to about 300 words.**

**Question 1:**

- (a) List and explain the role of various internetworking devices used at different layers of OSI model. (10 Marks)
- (b) Differentiate between static and dynamic routing. Also, explain distance vector routing algorithm with the help of an example. (10 Marks)

**Question 2:**

- (a) Explain the working of 3 bit sliding window protocol with suitable example. (10 Marks)
- (b) Explain the use of different fields of UDP header format. Also, draw a diagram to illustrate the header format. (10 Marks)

**Question 3:**

- (a) Compare GET and SET in SNMP. (4 Marks)
- (b) In class-ful addressing how is an IP address in class A, Class B and Class C divided? (6 Marks)
- (c) Given the address 23.56.7.91 and the default class A mask, find the network address. (5 Marks)
- (d) Given the address 201.180.56.5 and the default class C mask, find the network address. (5 Marks)

**Question 4:**

- (a) What is the significance of switching in computer network? Compare and contrast different types switching methodologies. (10 Marks)
- (b) Write a client and a server program using C- language in Unix with the following specification.
  1. A UDP client will send a string to the server.
  2. Sever will send back the reverse of the given string to the respective client
 (10 Marks)

<b>Course Code</b>	:	<b>BCS-53</b>
<b>Course Title</b>	:	<b>Web Programming</b>
<b>Assignment Number</b>	:	<b>BCA (R5)-53/Assignment/2018-19</b>
<b>Maximum Marks</b>	:	<b>100</b>
<b>Last Date of Submission</b>	:	<b>15<sup>th</sup> October, 2018 (For July, 2018 Session) 15<sup>st</sup> April, 2019 (For January, 2019 Session)</b>

**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) What is the meaning of "Web Services" and "Rich Internet Applications"? List at least two popular web services. How is a Rich Internet Application related to Web 2.0? Also find information on Web 3.0? How is it different than Web 2.0. (6 Marks)
- b) Create a re-registration form using HTML having the following input fields - Enrolment Number (it should contain only decimal digits), Name of the student (should contain only alphabets), programme code (it should be selected from a drop down list, default value BCA), Semester in which re-registering (should be maximum 10), valid email ID (it should be validated), Fee submission details (like Draft no, draft date and amount of fee submitted). The form should include a SUBMIT button. You must create a CSS file for this form. This CSS file should define font family, font size as 14 point, font colour as dark green, and background colour as light blue. Validate the form using JavaScript code as stated for various fields. (8 Marks)
- c) Using table and Lists create two web pages first showing the Semester wise courses of BCA having course code, course name and credits. The second page should display syllabus of one course using an unordered list. You should use <div> tags and create an internal CSS file which formats the web pages as follows:
- (i) Table must have a centrally aligned heading . The content of the table heading should be in Bold.
  - (ii) The table heading should be shaded and every alternate row of table should have a fill colour. The background of the table should be light yellow.
  - (iii)The font size in unordered list should be 14.
  - (iv)Demonstrate how change in CSS can change the display.
- (6 Marks)

- d) A University maintains the list of its students using XML. Each student has a unique enrolment number which may be used as an attribute in XML document. The XML document also stores the student name, programme name, and result of zero or more subjects. In addition, optional email id and telephone numbers may also be stored. Create an XML documents containing information of five such student records. Also create the DTD for the XML document created by you. (8 Marks)
- e) Write a JavaScript code that changes the background of the page after every 10 seconds. Make suitable assumptions, if any. (6 Marks)
- f) Explain the WAP model with the help of a diagram. Give examples of use of WML table and image tags. (6 Marks)

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

- a) What is MVC architecture? Explain with the help of a diagram. What is meant by HTTP methods? Explain the difference between GET and POST method. Which of the two is a safe method and why? What is a web container? Why are they used?
- b) Which JSP element/elements will be required for performing each of the following tasks/activities. Explain these JSP elements with the help of an example each.
- (i) Method of JSP that can be used to initialise an object; and the method that destroys an object.
  - (ii) Including the content statically or dynamically
  - (iii) Getting a parameter from a jsp form
  - (iv) Performing a computation repeatedly
  - (v) Declaration of scripting elements
- c) An application requires that a user logs on to a web site and performs electronic transactions with proper error correction. Explain what kind of JSP coding will be required to perform this kind of application. Your answer must focus on error correction and session management.
- d) Explain the process of a web application development and deployment with the help of an example of the following system:  
Develop and deploy a Book issue and return system for a small library. You may assume that library issues Books only. A member can be issued only one Book. No fine is charged on late return. You must use a database with two to three tables - one for Books, second for members and third for issued books. Your application should display the list of books, list of members and list of issued books.  
Make and state suitable assumptions.

<b>Course Code</b>	:	<b>BCS-054</b>
<b>Course Title</b>	:	<b>Computer Oriented Numerical Techniques</b>
<b>Assignment Number</b>	:	<b>BCA(5)/054/Assignment/2018-19</b>
<b>Maximum Marks</b>	:	<b>100</b>
<b>Weightage</b>	:	<b>25%</b>
<b>Last Dates for Submission</b>	:	<b>15<sup>th</sup> October, 2018(For July, 2018 Session)</b> <b>15<sup>th</sup> April, 2019(For January, 2019 Session)</b>

**This assignment has eight 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. You must use only simple calculator to perform the calculations.**

**Question 1:**

- (a) Consider that you are using an eight-decimal digit floating point (3 marks) representation as given in your Block 1, Unit 1, Section 1.3.1 page 29. Perform the following operations:
- (i) Represent 0.000035234545 and 789264123 as floating point numbers using Rounding in normalised form.
  - (ii) Given the above two numbers what is the absolute and relative error in their representation.
  - (iii) Subtract the smaller number from the bigger numbers. What is the error in the resulting number?
  - (iv) Divide the first number by the second number. Convert the result into normalized form in the given format.
  - (v) Take the first number as 0.000035234545 and assume any second number to demonstrate the concepts of overflow or underflow for the given representation. (You may assume any second number to demonstrate overflow or underflow).
  - (vi) Define the concept of machine-epsilon.
- (b) Consider the following two equations: (2 marks)
- $$5x + 8y = 340$$
- $$2.45x + 4.10y = 172$$
- Does the problem of solving the above two equations can be categorised as Ill-conditioned? Justify your answer.
- (c) Find the Maclaurin series for calculating  $e^{2x}$ . Use first four terms of (3 marks) this series to calculate the value of  $e^{2x}$  for any value of  $x$ . Also find the bounds of truncation error for such cases.
- (d) Obtain Approximate the value of  $(0.999)^{-1}$  using first four terms of (2 marks) Taylor's series expansion.

**Question 2:**

- (a) Solve the system of equations (5 marks)

$$3x + 4y + 5z = 6$$

$$2x - 6y + 3z = -13$$

$$5x - 7y + 2z = -11$$

using Gauss elimination method with **partial pivoting**. Show all the steps.

- (b) Perform four iterations (rounded to four decimal places) using (5 marks)

(i) Jacobi Method and

(ii) Gauss-Seidel method

for the following system of equations.

$$\begin{bmatrix} 3 & 1 & -4 \\ 2 & -3 & -4 \\ -3 & 3 & 7 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}$$

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

Which method gives better approximation to the exact solution?

**Question 3:**

Determine the smallest positive root of the following equation: (10 marks)

$$f(x) = 2x^3 + 3x^2 - 9x - 10 = 0$$

The root should be correct up to 2 decimal places, using

- (a) Regula-falsi method (b) Newton-Raphson method (c) Bisection method (d) Secant method

**Question 4:**

- (a) Find Lagrange's interpolating polynomial that fits the following data. (5marks)
- 
- Hence obtain the value of
- $f(3.5)$
- .

x	1	3	6	10
f(x)	5	12	22	35

- (b) Using the Lagrange's inverse interpolation method, find the value of x when y is 6. (5 marks)

x	2	23	34	55
y=f(x)	1	3	5	8

**Question 5:**

- (a) The GDP of a country is given in the following table: (3+2+3 = 8 marks)

Year (x)	1995	2000	2005	2010	2015
GDP (y) (in Billion Rupees):	347	610	920	1402	1745

- (i) Using Stirling's central difference formula estimate the GDP for the year 2007
- 
- (ii) Using Newton's forward difference formula estimate the GDP for the year 1998.



(iii) Using Newton's backward difference formula estimate the GDP for the year 2013.

(b) Derive an expression of E operators in terms of  $\delta$ . (2 marks)

**Question 6:**

(a) Find the values of the first and second derivatives of  $y = x^2$  for  $x=2.75$  using the following table. Use forward difference method. Also, find Truncation Error (TE) and actual errors. (5 marks)

x	:	2	2.5	3	3.5
y	:	4.00	6.25	9.00	12.25

(b) Find the values of the first and second derivatives of  $y = x^2$  for  $x=2.75$  from the following table using Lagrange's interpolation formula. Compare the results with (a) part above. (5 marks)

x	:	2	2.5	3	3.5
y	:	4.00	6.25	9.00	12.25

**Question 7:**

Compute the value of the integral (10 marks)

$$\int_0^4 (x^3 + x^2 + 7) dx$$

By taking 8 equal subintervals using (a) Trapezoidal Rule and then (b) Simpson's 1/3 Rule. Compare the result with the actual value.

**Question 8:**

(a) Solve the Initial Value Problem, using Euler's Method for the differential Equation: (4 marks)

$$y' = 1+xy, \text{ given that } y(0) = 1.$$

Find  $y(1.0)$  taking (i)  $h = 0.2$  and then (ii)  $h = 0.1$

(b) Solve the following Initial Value Problem using (i)R-K method of  $O(h^2)$  and (ii) R-K method of  $O(h^4)$  (6 marks)

$$y' = xy + x \text{ and } y(0) = 1.$$

Find  $y(0.4)$  taking  $h = 0.2$ , where  $y'$  means  $dy/dx$

<b>Course Code</b>	:	<b>BCS-055</b>
<b>Course Title</b>	:	<b>Business Communication</b>
<b>Assignment Number</b>	:	<b>BCS/(5)/055/Assignment/2018-19</b>
<b>Maximum Marks</b>	:	<b>100</b>
<b>Weightage</b>	:	<b>25%</b>
<b>Last date of submission</b>	:	<b>15<sup>th</sup> October, 2018 (For July, 2018 Session)</b> <b>15<sup>th</sup> April, 2019 (For January, 2019 Session)</b>

**This assignment has ten questions. Answer all questions. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation of assignment.**

**Question 1:** This passage is part of the speech that Steve Jobs (who began Apple and created Macintosh and the I-Phone) gave at the convocation in Stanford University, USA. Read the passage carefully and answer the questions given below:

I was lucky I found what I loved to do early in life. Woz and I started Apple in my parents' garage when I was 20. We worked hard, and in 10 years Apple had grown from just the two of us in a garage into a two billion dollar company with over 4000 employees. We'd just released our finest creation the Macintosh a year earlier, and I had just turned 30.

And then I got fired. How can you get fired from a company you started? Well, as Apple grew we hired someone who I thought was very talented to run the company with me, and for the first year or so things went well. But then our visions of the future began to diverge and eventually we had a falling out. When we did, our Board of Directors sided with him. And so at 30, I was out. And very publicly out. What had been the focus of my entire adult life was gone, and it was devastating.

I really didn't know what to do for a few months. I felt that I had let the previous generation of entrepreneurs down – that I had dropped the baton as it was being passed to me. I met with David Packard and Bob Noyce and tried to apologize for screwing up so badly. I was a very public failure, and I even thought about running away from the valley. But something slowly began to dawn on me: I still loved what I did. The turn of events at Apple had not changed that one bit. I had been rejected, but I was still in love. And so I decided to start over.

I didn't see it then, but it turned out that getting fired from Apple was the best thing that could have ever happened to me. The heaviness of being successful was replaced by the lightness of being a beginner again, less sure about everything. It freed me to enter one of the most creative periods of my life.

During the next five years, I started a company named NeXT; another company named Pixar, and fell in love with an amazing woman who would become my wife. Pixar went on to create the world's first computer animated feature film, Toy Story, and is now the most successful animation studio in the world. In a remarkable turn of events,

Apple bought NeXT, and I returned to Apple, and the technology we developed at NeXT is at the heart of Apple's current renaissance. And Laurene and I have a wonderful family together. I'm pretty sure none of this would have happened if I hadn't been fired from Apple. It was an awful tasting medicine, but I guess the patient needed it. Sometimes life's going to hit you in the head with a brick. Don't lose faith. I'm convinced that the only thing that kept me going was that I loved what I did. You've got to find what you love.

And that is as true for work as it is for your lovers. Your work is going to fill a large part of your life, and the only way to be truly satisfied is to do what you believe is great work. And the only way to do great work is to love what you do. If you haven't found it yet, keep looking and – don't settle. As with all matters of the heart, you'll know when you find it. And like any great relationship, it just gets better and better as the years roll on. So keep looking, don't settle.

**Question 1(a)** How and why was Steve Jobs fired from the company that he started? (2 marks)

**Question 1(b)** Why does Steve Jobs say that getting fired was the best thing that happened to him? (3 marks)

**Question 1(c)** How did Steve Jobs rejoin Apple? (2 marks)

**Question 1(d)** What kept Steve Jobs going when he was fired from his job? (2 marks)

**Question 1(e)** Why is it important to love what you do in your professional life? (2 marks)

**Question 1(f)** What is Pixar famous for? (2 marks)

**Question 1(g)** From the passage given above, write five sentences on what you think was the character and personality of Steve Jobs. (3 marks)

**Question 1(h)** In about hundred words write a passage on 'The job that I would love to do if I get the chance'. (4 marks)

**Question 2:** Use the following words/phrases from the passage in sentences of your own: (5 marks)  
diverge, falling out, entrepreneur, devastating, dropped the baton

**Question 3:** You are a firm manufacturing toys for children. Your main distributor 'Kids World' has threatened to break off relations with you because you sent a large consignment of defective dinky cars. Write an email to them: (10 marks)

- Apologizing profusely
- Offering to replace the defective pieces

- Talk about the changes that you will make in the organization so that such a thing does not recur

**Question 4:** This matter is serious enough for a senior member of your organization to speak to 'Kids World'. Write a dialogue between the Regional Manager of your company and the Regional Manager of 'Kids World'. Take about ten turns. (10 marks)

**Question 5:** Write a memo to your staff calling them for a meeting to discuss this issue. Ask them to come with suggestions and solutions. (10 marks)

**Question 6:** Write short notes on the following: (10 marks)

- The use of graphics in presentations
- The value of 'social small talk' in business

**Question 7:** You have seen an online advertisement for a vacancy on [www.indiajobs.com](http://www.indiajobs.com) in your dream company. Prepare an application indicating your interest in that particular job and how you are a suitable candidate. Also compile your Curriculum Vitae (CV) that you will attach with this letter of application. (15 marks)

**Question 8:** Prepare the outline of a presentation on any one of the following: (10 marks)

- Your career so far
- The history of a company that interests you
- The importance of communication skills in business

**Question 9:** Fill in the blanks with the suitable (*active or passive*) form of the verbs in brackets: (10 marks)

Once a valve..... (damage) beyond repair, as happens with recurrent attacks of a rheumatic fever, the only way to save the patient, .....(be) to replace it. Almost all replacements .....(do) today using mechanical devices. Among the earliest .....(be) the ball-and-cage valve which .....(invent) in 1961 by Albert Sterr, a surgeon of Portland, Oregon, USA and his collaborators M. Lowell Edwards. It .....(have) a plastic ball in a stainless steel or titanium cage. But the device .....(have) several disadvantages. The presence of the ball..... (cause) severe turbulence and cavitation which also .....(cause) damage to red blood cells leading to the risk of clot formation. It ..... (be) therefore necessary to put the patient on a long term anticoagulant therapy.

**Course Code** : **BCSL-056**  
**Course Title** : **Network Programming and Administration Lab**  
**Assignment Number** : **BCA(5)/056/Assignment/2018-19**  
**Maximum Marks** : **50**  
**Weightage** : **25%**  
**Last date of Submission** : **15<sup>th</sup> October, 2018 (For July, 2018 Session)**  
**15<sup>th</sup> April, 2019 (For January, 2019 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 suitable assumption is necessary.**

**Question 1:** Write a UDP client and UDP server program in C language on Unix/Linux, where client program interact with the Server as given below: (20 Marks)

- The client will send a list of numbers to the client.
- Server program send an acknowledgement for receiving the complete list.
- Sever program will sort the list in ascending order and send it back to respective client.
- Client will send the acknowledgement for receiving the sorted list to the server.

**Question 2:**

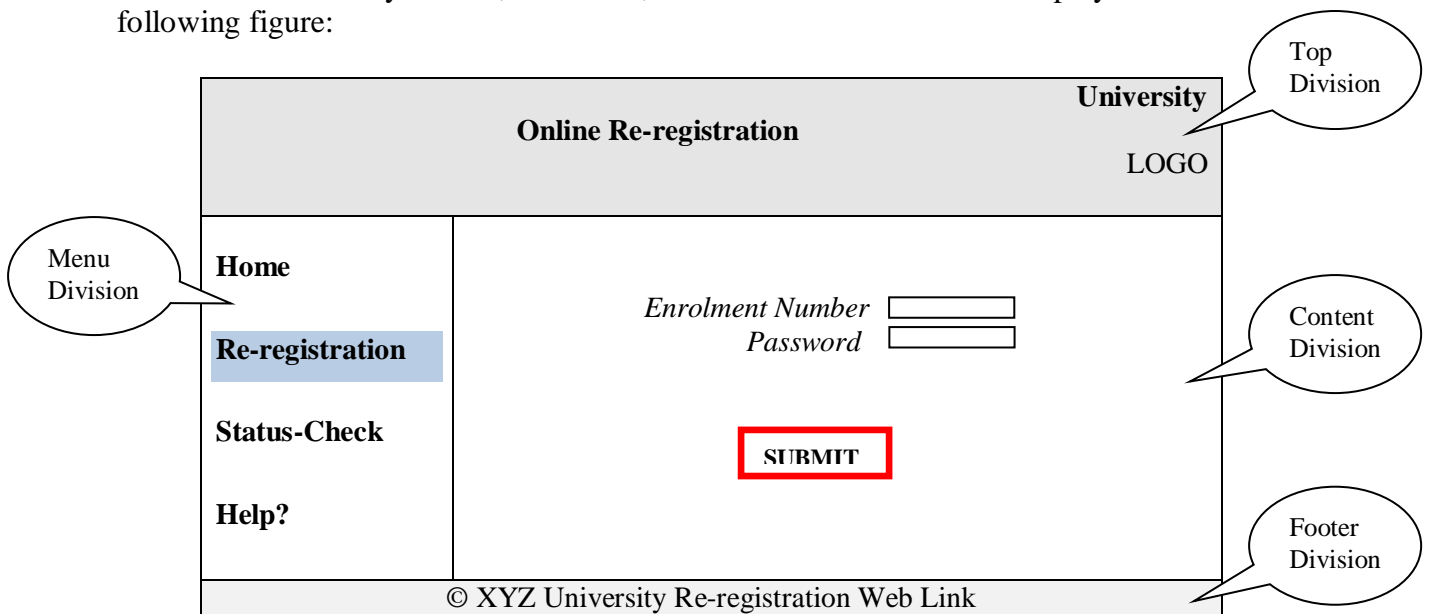
- (a) Write the steps for adding Users, Groups and Computers to the active directory. (10 Marks)
- (b) Write the steps to install network monitor application on Unix/Linux Demonstrate the use of capture filter and display filter with the help of examples for each. (10 Marks)

**Course Code** : **BCSL-057**  
**Course Title** : **Web Programming Lab**  
**Assignment Number** : **BCA(5)/057/ Assignment/2018-19**  
**Maximum Marks** : **50**  
**Weightage** : **25%**  
**Last Dates for Submission** : **15<sup>th</sup> October, 2018 (For July, 2018 Session)**  
**15<sup>st</sup> April, 2019 (For January, 2019 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.**

**Question 1:**

Create a website for a University which offers online re-registration service to its already registered students. The website should be designed using logical divisions through <div> tags and an external CSS file. Every page of the website is divided into four divisions namely – TOP, FOOTER, MENU and CONTENT as displayed in the following figure:



Perform the following tasks for the website as given above:

$$(12 + 05 + 05 + 18 = 40)$$

- (a) Create four pages for the website viz Home, Re-registration, Status-Check and Help; all the four pages should have same Top, Footer and Menu division but different Content division. The *Menu Division* should provide links to all the pages. Thus, Menu division provides the navigation. The *Content Division* of the four pages should display information as given below:
- (i) The Home page should display the process and rules of re-registration.
  - (ii) The Re-registration page should display a form for logging into [fee-payment form page].
  - (iii) The Status-Check page contains a form to accept the Enrolment number of the student. It also contains a DISPLAY button.

- (iv) The Help page should show the site map of the website
- (b) Create an external CSS that give different background colour to each area. You may choose the format of other elements as per your choice. (5 marks)
- (c) Create a JavaScript program that generates an error message if *Enrolment Number* field is left blank in the re-registration page form; or if the length of entered password is less than 6 characters. After displaying the error message, the user is taken back to the Re-registration page form again. (5 marks)
- (d) You must implement the following using jsp pages, servlets, java classes, database(s), etc. in the pages as described under:
- (i) When a user presses Submit button in Re-registration form after filling both *Enrolment Number* and *password* properly, this information is checked using a student table having fields such as Enrolment Number, Name of student, Password, Last Semester Enrolled etc. (you must create this table as well as put some data in the table). On successful login a *Fee Payment Form* should get displayed. This form should display Enrolment Number and ask for Fee submission details - such as Draft number, date of draft and amount of fee paid. (you need not create jsp file to process this form for this assignment) (10 marks)
- (ii) When you press the DISPLAY button of the *Status-Check* page, it should display the enrolment number, name and Last semester Enrolled information of the student, if the submitted enrolment number exists. (8 marks)  
You may make suitable assumptions for this page.

Course Code	:	BCSL-058
Course Title	:	Computer oriented Numerical techniques Lab
Assignment Number	:	BCA(5)/L-058/Assignment/2018-19
Maximum Marks	:	50
Weightage	:	25%
Last Dates for Submission	:	15 <sup>th</sup> October, 2018 (For July, 2018 Session) 15 <sup>th</sup> April, 2019 (For January, 2019 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.

**Note:** The programs are to be written in C/C++ and/or in MS-Excel/Any spread sheet.

#### Question 1:

Write a program that implements pivot condensation Gaussian elimination method for solving  $n$  linear equations in  $n$  variables, that calls procedure (5 Marks)

- (i) Exchange of rows
- (ii) lower-triangularisation and
- (iii) back substitutions

*(codes of procedures are also to be written).*

Use the program for solving the following system of linear equations:

$$\begin{aligned}x + y + z &= 3 \\2x + y + 3z &= 6 \\4x + 5y + 2z &= 11\end{aligned}$$

#### Question 2:

Write a program that uses **Gauss-Jacobi iterative method** to solve system of linear equations. Use the method to solve the system of linear equations given in Q. No. 1 above. (5 Marks)

#### Question 3:

Write a program that approximates a root of the equation  $f(x) = 0$  in an interval  $[a, b]$  using **Bisection method**. The necessary assumptions for application of this method should be explicitly mentioned. Use the method to find smallest positive root of the equation (5 Marks)

$$x^4 + 2x^3 - 5x^2 + 10x - 19 = 0.$$

#### Question 4:

Write a program that uses Lagrangian polynomials for interpolation. You must use only three nodes such that the interpolating polynomial is at most quadratic. Using this program find approximate value of  $f(x) = 2^x$  at  $x = 0.5$ . (5 Marks)



The nodes are at points  $x_0 = 0, x_1 = 1, x_2 = 2$ .

**Question 5:**

Write a program to interpolate using Newton's Forward difference formula having only three points. Solve Problem No. 4 using Newton's Interpolating polynomial using Forward difference (instead of Lagrangian Polynomial). (5 Marks)

**Question 6:**

Write a program that approximates the derivative of a given (differentiable) function  $f(x)$  at  $x = x_0$ , using forward difference formula taking only 3 points having value of  $x$  as 0, 1 and 2 respectively. Using the program find the derivative of function  $f(x) = (x)^{1/2}$  at  $x=0.5$  (5 Marks)

**Question 7:**

Write a program that approximates the value of a definite integral (5 Marks)

$\int_a^b f(x)dx$  using **Trapezoidal Rule**, with  $M$  sample points. Find an approximate value of the integral of  $2x^2$  using the program with 8 intervals over the interval  $[0, 4]$ .

**Question 8:**

Write a program that approximates the solution of the initial value problem:  $y' = f(t, y)$  with  $y(a) = y_0$  over  $[a, b]$  using **Euler's method**. (5 Marks)  
Using the program approximate the solution of the initial value problem:  
 $y' = -2ty^2$  with  $y(0) = 1$