BACHELOR OF COMPUTER APPLICATIONS (BCA)

(Revised Syllabus)

BCA(Revised Syllabus)/ASSIGN/SEMESTER-V

ASSIGNMENTS

(July-2015 & January-2016)

(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

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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.
4. The viva voce is compulsory for the assignments except BCS-055. For any course, if a student submitted the assignment and not attended the viva-voce, then the assignment is treated as not successfully completed and would be marked as ZERO.

Course Code	**:**	**BCS-051**
Course Title	**:**	**Introduction to Software Engineering**
Assignment Number	**:**	**BCA(V)/051/Assignment/ 2015**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2015 (For July 2015 Session)** **15th April, 2016 (For January 2016 Session)**

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.

1. Develop SRS as per IEEE standard for a Railway Reservation System. *(30 Marks)*

2. Develop Design document for the system mentioned in **Question 1**. *(30 Marks)*

3. How will you comment about the quality of a Software System? *(20 Marks)*

Course Code	**:**	**BCS-052**
Course Title	**:**	**Network Programming and Administration**
Assignment Number	**:**	**BCA(V)/052/Assignment/ 2015**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2015 (For July 2015 Session)** **15th April, 2016 (For January 2016 Session)**

There are eight questions in this assignment which carried 80 marks. Rest 20 marks are for viva-voce. Answer all the questions. Also in your programs give appropriate comments to increase understandability. Please go through the guidelines regarding assignments given in the Program Guide for the format of presentation.

1.

(a) Why would an application use UDP instead of TCP? Discuss. *(6 Marks)*

(b) What is the purpose of VPNs and what are the main features they provide? *(4 Marks)*

2.

(a) Draw the IP datagram header format. "IP datagram has a checksum field still and it's called an unreliable protocol." Justify. *(6 Marks)*

(b) What is an "internetwork"? State and compare internetworking devices used to connect different LAN segments. *(4 Marks)*

3.

(a) Describe the activities to be performed at every layer in the TCP model when information flows from layer to another layer. *(6 Marks)*

(b) Classify the problems faced by network administrator. Make a chart to explain the available solutions for each problem. *(4 Marks)*

4.

(a) Explain the connection oriented & connection less services using bind, connect, listen & accept system calls. *(6 Marks)*

(b) List and explain the features of any four popular enterprise security solutions. *(4 Marks)*

5.

(a) What is a mail server? Briefly explain specifying the protocols involved how a sender can send a mail to the server and the recipient retrieves it from the server? *(6 Marks)*

(b) Explain the importance of three-way handshake method for connection establishment in TCP/IP with the help of suitable diagram. *(4 Marks)*

6.

(a) Draw the TCP header and list its components. Also, explain how can TCP handle urgent data? *(6 Marks)*

(b) What do you understand by a domain name? How is a domain name translated to an equivalent IP address? *(4 Marks)*

7.

(a) List the protocols presently supported by Intranet and explain the use of each protocol in Intranet administration. *(6 Marks)*

(b) How many networks can each IP address class (A, B and C) can have? Calculate and justify your answer using a suitable example for each. *(4 Marks)*

8.

(a) What is the purpose of DNS? What is the function of a secondary or tertiary DNS server? In which case will the lookups be transferred to additional DNS servers? *(6 Marks)*

(b) What are the NTFS, FAT, HPFS file systems? *(4 Marks)*

Course Code	**:**	**BCS-053**
Course Title	**:**	**Web Programming**
Assignment Number	**:**	**BCA(V)/053/Assignment/2015**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2015 (For July 2015 Session)** **15th April, 2016 (For January 2016 Session)**

This assignment has two questions of 80 marks (each section of a question carries same 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.

1. (covers Block 1)

(a) What is meant by the term Web Service? Explain with the help of an example. List various protocols that are used for creating a web service. Also explain the process of creating a web service. *(6 Marks)*

(b) Create a simple form that may be used for appearing in the entrance test of a University. The form should include details like name, mother/father name, qualifications with degree name, year of passing the degree, percentage, University/Board name; address (permanent and postal both), contact phone, email Id, the programme in which admission is desired and related information. The form should have relevant drop down lists such as List of Universities or Boards, list of programmes etc. You must use CSS. Explain the advantages of using CSS. *(6 Marks)*

(c) Create a simple HTML based web page showing services offered in a Bank. The web page should consist of three sections. All these three sections should be in separate divisions (using tags). The first section should show list of services offered by Bank, second section should show the site plan and the third section should be a login area for the customers. Also create two CSS files for this page that demonstrates how CSS can change the display format without effecting the content. *(6 Marks)*

(d) Explain the document structure of an XML document. A University programme contains information like programme code, programme name, duration, credits etc. A programme consists of a number of semesters. Every semester a number of courses are offered. Some of these courses are compulsory and some optional. Create an XML documents containing information of five such programmes. Also create the DTD for the XML document you have created. *(8 Marks)*

(e) List at least 5 commands of JavaScript and explain them. Write a program using JavaScript that changes the text colour and background colour of a division after every 5 seconds. *(8 Marks)*

(f) Explain the input options used in WML with the help of an example each. Create a simple WML program that should display an image and a table. *(6 Marks)*

2. (Covers Block 2)

(a) Explain the MVC Architecture with the help of a diagram. Also explain HTTP methods and their use. *(10 Marks)*

(b) Explain the uses of JSP elements with the help of examples. Also explain any five JSP implicit objects. *(10 Marks)*

(c) Differentiate between cookies and sessions with the help of an example. Create a simple HTML login page and write suitable JSP program that checks the user ID and password entered by the user in the HTML page, with a defined value (you need not use database for this problem). If the username and ID is incorrect user is returned to HTML login page, else u is shown a message "Welcome to JSP world". *(10 Marks)*

(d) Explain different types of JDBC drivers. Create a database of username and passwords. Use the same HTML login form as you created for part (c) above, but check the values from the database using JSP. Explain all the steps that you have performed. Make suitable assumptions, if any. *(10 Marks)*

Course Code	**:**	**BCS-054**
Course Title	**:**	**Computer Oriented Numerical Techniques**
Assignment Number	**:**	**BCA(V)/054/Assignment/2015**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2015 (For July 2015 Session)** **15th April, 2016 (For January 2016 Session)**

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. Use of simple calculator is allowed.

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)*

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?

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

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	$\mathbf{x_i}$	$\mathbf{y_i}$	
0	–1	16.8575	
1	0	24.0625	
2	1	16.5650	
3	2	–13.9375	
4	3	28.5625	
5	4	**144.0625**	

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, $f(7) = 167$, find the Lagrange's interpolation polynomial of f(x). Also, find f(3) *(5 Marks)*

6.

(a) Find the values of the first and second derivatives of f(x) at x = 76 from the following table. Use $O(h^2)$ 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

7.

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

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

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

8.

(a) Solve the Initial Value Problem, using Euler's Method *(4 Marks)*

$$y' = (x-y)/2,\ y(0) = 1.$$

Find y(0.8) taking (i) h = 0.2 and then (ii) h = 0.1

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

$y' = 1 + y^2$ and y(0) = 0. Find y(0.4) taking h = 0.2, where y' = dy/dx

Course Code	**:**	**BCS-055**
Course Title	**:**	**Business Communication**
Assignment Number	**:**	**BCA(V)/055/Assignment/2015**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2015 (For July 2015 Session)** **15th April, 2016 (For January 2016 Session)**

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.

Read the passage below and answer the questions that follow:

Job interviews can be difficult and stressful. If you are currently looking for work and preparing yourself for an interview there are a few areas to consider in order to master an interview. They are:

Practice: The first thing needed is practice, as "practice makes perfect'". This is especially true when it comes to job interviews. The more you practice, the better you will become. The best way to practice for an interview is to look at the typical questions that are asked during the interview. While some of the questions may be different, there are a few generic questions that will be asked commonly. However, it isn't just enough to know the answers to these questions. You must know how to answer them. The way you answer is just as important as the questions themselves.

When attending an interview, you should be able to explain with examples how you've used your skills and experience to solve problems. You thus build your credibility and impress the person interviewing you. Anyone can list their skills on a piece of paper. However, it takes a high level of skill to explain these things in detail during the interview process.

Prepare: The next thing needed is to be prepared. The best way is to review the common questions which will be asked. Never allow yourself to be caught off guard. Surprises lead to failure, and can stop you from getting the job. Learn the name of the person who is conducting the interview, and use it while speaking to them. This conveys the message that you are professional and polite.

Attire: Once you are prepared, you will next need to dress appropriately for the interview. Proper interview etiquette requires interviewees to be in an attire that is fitting to the environment around them. Always remember not to overdress and under-dress. Along with dressing well and decently, neatness in appearance matters a lot, too. Clothes should be well-pressed and aptly worn. Shoes should be polished and must be appropriate for the occasion. A pair of black shoes for men is a neutral and safe colour that goes along with any colour of the suit. Ladies must refrain from shoe colours that are too bright especially if it does not complement the dress worn. Hair should be well-combed and nails must be properly trimmed. Keep the make-up and cologne or perfume light. Make sure you wear minimal and unobtrusive jewellery. Do not wear bracelets, bangles or anklets that make a rattling sound.

Body language: Everybody uses body language, but it takes place mostly at a subconscious level. It gives out a lot of information on the type of person one is. Based on the body language it can be seen if one comes across as insecure or self-assured, a busy or a quiet type, stressed out or relaxed and whether one is speaking truthfully or not.

1. Say whether the following statements are true or false. Correct the false statements. *(5 Marks)*

(a) In any interview situation most of the questions are those which are commonly asked in all interviews.

(b) It is important to answer all the questions asked in an interview.

(c) How one uses one's previous experience and skill set to solve problems at the workplace makes a positive impression in an interview.

(d) It is not important to know the name of the person who is interviewing you.

(e) Ladies must wear makeup and wear jewellery so that they look good at an interview.

2. Answer the following questions. You may also include your own views if required.

(a) What do you think are some of the generic questions that are commonly asked at interviews? List four such questions. *(2 Marks)*

(b) Keeping the suggestions given in the section on **attire** how would you dress for an interview? *(2 Marks)*

(c) Give an appropriate title to the passage. *(1 Marks)*

3. Give the opposite of the following words. You will find these words in the passage. *(6 Marks)*

(a) Peaceful

(b) Previously

(c) Specific

(d) unusual/unique

(e) success

(f) rude

4. Find the meaning of the following words/phrases and use them in sentences of your own: *(4 Marks)*

(a) build your credibility

(b) caught off guard

(c) etiquette

(d) refrain from

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

(a) Although we……..(invest) a lot of money in the project, we …….. (decide) to pull out of it.

(b) When his father……..(die), he ……..(run) the business.

(c) Arjun Sembale……..(be) in charge of the shop in Gurgaon before he ……..(take) over the company.

(d) While my father……..(build up) the business in the North, I ……..(do) the same in the South.

(e) While Natalia……..(talk) to the Manager, the workers…….. (pack) the garments ready for dispatch.

6. Fill in the blanks with suitable articles (*a/an*, *the* or no article *Ø*): *(10 Marks)*

(a) ……..people often say that ……..writer's life is unimportant, and all that matters is in ……..books. That is usually ……..exaggeration. Books are important but ……..lives are important too.

(b) ……..mangoes are selling at Rs. 40 ……..kilo.

(c) Is this ……..book you were telling me about? Yes, it is about ……..life of ……..Ambedkar.

7. As a warden of Jamuna hostel, you have noticed that some of the students residing in this hostel smoke and drink in the night. This is against the rules. Write a memo to the students: *(10 Marks)*

(a) Clearly forbidding them from smoking and drinking

(b) Stating the punishment that will be meted out to them if they are caught smoking/drinking in the hostel premises

8.

(a) Discuss the different styles of communication. What kind of style do you prefer and Why? *(20 Marks)*

9. Imagine that you attended one of the following courses during the summer vacation last year:

(10 Marks)

- A course in spoken English
- A course in Personality Development

Write a report on the course mentioning:

(a) Factual details

(b) Effectiveness and limitations of the course

10. Write a dialogue in about 200 words on the following: *(20 Marks)*

Two friends are discussing whether being able to communicate effectively is more important than academic brilliance. Give both the views in your discussion. Take about 10 turns.

Course Code	**:**	**BCSL-056**
Course Title	**:**	**Network Programming and Administration Lab**
Assignment Number	**:**	**BCA(V)/L-056/Assignment/2015**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2015 (For July 2015 Session)** **15th April, 2016 (For January 2016 Session)**

This assignment has two questions. Answer all the questions. These questions carry 40 marks. Rest 10 marks are for viva voce.

1. Write a TCP client and TCP server program in C language on UNIX operating system. The client program begins by sending a request, after accepting the client request; server program sends back a confirmation and its clock time to the client. Client program displays the server clock time on its screen. The maximum concurrent clients this server can handle are four. Display necessary messages, wherever necessary. *(20 marks)*

2.

(a) Write the step by step procedure to configure a remote server and transfer a Directory to Remote Server in Linux. *(10 marks)*

(b) Write a step by step procedure to create and configure samba Server in Linux. Also, transfer files from client side. *(10 marks)*

Course Code	**:**	**BCSL-057**
Course Title	**:**	**Web Programming Lab**
Assignment Number	**:**	**BCA(V)/L-057/Assignment/2015**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2015 (For July 2015 Session)** **15th April, 2016 (For January 2016 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.

1. Create a website for a Bank having the following features (you must use CSS *preferably as a separate file*):

(a) The website should consists of four different areas - TOP area, BOTTOM area, LEFT area and RIGHT area.

(b) All the pages of this web site should have common TOP area consisting of the Bank Name, logo, and branch address. You must use CSS to format this area.

(c) All the pages should have BOTTOM area that must contain the message from Bank to its customers on safe use of the website. It should also contain the date and time of last update of the website.

(d) All the pages of the website must have same TOP area.

(e) The LEFT area of the website should contain a drop down menu consisting of following menu items:

Home, Bank Services, Bank Branches, Customer Complaints, Feedback

Please note that the TOP, LEFT and BOTTOM areas should be visible in all the web pages. You should create a webpage that should related to one item of the Menu as shown above.

(f) The RIGHT area of *Home* page should contain the information about the size of the Bank and its spread in India. It should also show latest news related to Bank.

(g) The RIGHT area in *Bank Services* page should display various types of deposit and loan schemes of the Bank. These schemes should be in tabular form with alternate rows in different shading.

(h) The RIGHT area of the *Bank Branches* page should provide a search facility on branch address. This page should ask for the name of the city and list all the branches of that City. You must implement this feature using a database.

(i) The RIGHT area of *Customer Complaints* page asks the user about his/her account number and details of complaints. The complaint is then registered in database and a complaint ID is shown to the complainer.

(j) The *feedback* form should get the following information –

(i) Name of the person giving feedback and his/her account number, if any

(ii) Use JavaScript to check that all the fields of feedback form are duly filled. Store the feedback in a database.

Course Code	**:**	**BCSL-058**
Course Title	**:**	**Computer Oriented Numerical Techniques Lab**
Assignment Number	**:**	**BCA(V)/L-058/Assignment/2015**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2015 (For July 2015 Session)** **15th April, 2016 (For January 2016 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 programmes are to be written in C/C++ and/or in MS-Excel/Any spread sheet.

1. Write a programme that implements (non-pivoting) Gaussian elimination method for solving *n* linear equations in *n* variables, that calls procedures *(5 Marks)*

(i) lower-triangularisation and
(ii) back substitutions
(*codes of procedures are also to be written*).

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

$$2x+ 3y+z= 9$$
$$5x+ 4y+2z=15$$
$$3x+y+ 4z =9$$

2. Write a programme that approximates a root of the equation $f(x) = 0$ in an interval [a, b] using **Newton-Raphson method**. The necessary assumptions for application of **Newton-Raphson** method should be explicitly mentioned. Use the method to find a root of the equation $2x^2 + 5x + 3=0$. *(5 Marks)*

3. Write a programme that approximates a root of the equation $f(x) = 0$ in interval [a, b] using **Gauss-Elimination method**. Use the method to solve the system of linear equations given in Q. No. 2 above. *(5 Marks)*

4. Write a programme that constructs Lagrangian polynomials, for which at most four nodes are given (hence interpolating polynomial will be at most cubic). Using the programme, find Lagrangian polynomial that approximates $f(x) = x^4$ and the nodes given are $x_0 = 1$, $x_1 = 2$, $x_2 = 3$, $x_3 = 4$,. Use the polynomial to approximate value at $x = 3.5$. *(5 Marks)*

5. Repeat Problem No. 4 for constructing Newton's Interpolating polynomial (in stead of Lagrangian Polynomial). *(5 Marks)*

6. Write a programme that approximates the derivative of a given (differentiable) function *f (x) at x = x_0*, using backward–difference formula. Using the programme find the derivative of $f(x) = e^x$ *at* $x = 1$. *(5 Marks)*

7. Write a programme that approximates the value of a definite integral $\int_z^b f(x)dx$ using Simpson's $(1/3)$ Rule, with M sample points. *(5 Marks)*

Find an approximate value of the integral of 2 +sin (2 √x) using the programme with 11 points over the interval [1, 6].

8. Write a programme 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**. Using the programme, approximate the solution of the initial value problem: *(5 Marks)*

s $y' = (t - y)/2$ with $y(0) = 1$