# BACHELOR OF COMPUTER APPLICATIONS (BCA)

# (Revised Syllabus)

BCA(Revised Syllabus)/ASSIGN/SEMESTER-III

**ASSIGNMENTS**

**(July - 2016 & January - 2017)**

**(MCS-014, MCS-021, MCS-023, BCS-031, BCSL-032, BCSL-033, BCSL-034)**

**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.

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| **Course Code** | **:** | **MCS-014** |
| **Course Title** | **:** | **Systems Analysis and Design** |
| **Assignment Number** | **:** | **BCA(3)/014/Assignment/16-17** |
| **Maximum Marks** | **:** | **100** |
| **Weightage** | **:** | **25%** |
| **Last Dates for Submission** | **:** | **15th October, 2016 (For July 2016 Session)**<br>**15th April, 2017 (For January 2017 Session)** |

**This assignment has three questions of 80 marks. Rest 20 marks are for viva voce. 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.**

**1.** Develop SRS for **Grade Card Generation System** for a University**.** SRS should be as per IEEE standard SRS template. Make necessary assumptions. *(30 Marks)*

**2.** Draw the DFDs upto 3rd level for **Grade Card Generation System** for a University. *(30 Marks)*

**3.** Draw ERD for **Grade Card Generation System** for a University. Make necessary assumptions. *(20 Marks)*

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| **Course Code** | **:** | **MCS-021** |
| **Course Title** | **:** | **Data and File Structures** |
| **Assignment Number** | **:** | **BCA(3)/021/Assignment/16-17** |
| **Maximum Marks** | **:** | **100** |
| **Weightage** | **:** | **25%** |
| **Last Dates for Submission** | **:** | **15th October, 2016 (For July 2016 Session)**<br>**15th April, 2017 (For January 2017 Session)** |

**This assignment has four questions which carry 80 marks. Answer all the questions. Each question carries 20 marks. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide. All the implementations should be in C language.**

**1.** Write an algorithm for the implementation of a Tree. *(20 Marks)*

**2.** Implement multiple stacks in a single dimensional array. Write algorithms for various stack operations for them. *(20 Marks)*

**3.** Write a note of not more than 5 pages summarizing the latest research in the area of "Searching Techniques". Refer to various journals and other online resources. Indicate them in your assignment. *(20 Marks)*

**4.** What is a B-Tree? Write a short note on its applications. *(20 Marks)*

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| **Course Code** | **:** | **MCS-023** |
| **Course Title** | **:** | **Introduction to Database Management Systems** |
| **Assignment Number** | **:** | **BCA(3)/023/Assignment/16-17** |
| **Maximum Marks** | **:** | **100** |
| **Weightage** | **:** | **25%** |
| **Last Dates for Submission** | **:** | **15th October, 2016 (For July 2016 Session)**<br>**15th April, 2017 (For January 2017 Session)** |

**This assignment has five questions of 80 marks. Rest 20 marks are for viva voce. Answer all questions. You may use illustrations and diagrams to enhance your 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.**

**1.** List and describe briefly all the possible applications of a database management system in any IGNOU's Regional Centre? *(15 Marks)*

**2.** Identify all the associated entities for a ***Regional Centre Management System***, their corresponding attributes, relationships and cardinality and design an Entity-Relationship (ER) diagram for it. *(20 Marks)*

**3.** Consider the E-R diagram of ***Question 2*** and design the tables. Perform and show the Normalization till the required normal form. Implement the database using MS-Access and submit the screenshots along with your assignment response for this question. *(20 Marks)*

**4.** Consider a "Library Management System" which has the following tables**:** *(15 Marks)*

***Book(isbn_no, book_title, author1, author2, author3, publisher, edition, year_of_copyright, cost)***
***Book_Accession(accession_no, isbn_no, date_of_purchase)***
***Member(m_id, m_name, m_address, m_phone)***
***Issue_return (accession_no, m_id, expected_date_of_return, actual_date_of_return)***

Please note that a member can be issued a book for a period of 15 days. The actual_date_of_return is kept blank for the books that have not been returned. Write and run the following SQL queries on the tables:

(i) Find the m_id and m_name of the members who have got maximum number of un_returned books.

(ii) List the book details whose year_of_copyright is 2014.

(iii) Find the names of all those students who have got all the books issued to him of the author named "ABC" .

(iv) Find the books whose cost is less than Rs.500/- and date_of_purchase is 2014.

(v) Find those members who have not got any book issued to him/her during last six months.

Note: Make suitable assumptions, if any.

**5.** Consider the Relation R={A, B, C, D, E, F, G, H } and the set of functional dependencies. *(10 Marks)*

A→C B→CG AD→EH C→DF A→H

What is the key for R? Decompose R into 2NF, 3NF and finally in BCNF relation.

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| **Course Code** | **:** | **BCS-031** |
| **Course Title** | **:** | **Programming in C++** |
| **Assignment Number** | **:** | **BCA(3)/031/Assignment/16-17** |
| **Maximum Marks** | **:** | **100** |
| **Weightage** | **:** | **25%** |
| **Last Dates for Submission** | **:** | **15th October, 2016 (For July 2016 Session)**<br>**15th April, 2017 (For January 2017 Session)** |

**This assignment has five 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. Wherever required, you may write C++ program and take its output as part of solution.**

**1.** (a) What is Object Oriented Programming ( OOP) paradigm? Explain basic concepts OOP. *(7 Marks)*

(b) Explain different data types available in C++ programming. *(5 Marks)*

(c) Explain the use of followings in C++ programming with an example program for each. *(2 Marks)*
(i) while
(ii) for

(d) Explain use of any two I/O formatting flags in C++ with example. *(2 Marks)*

**2.** (a) What is constructor? Define Book class with the basic features of a book. Define the default constructor, parameterised constructor, member functions display_book_details() for displaying the details of book. Use appropriate access control specifiers in this program. *(7 Marks)*

(b) Explain the following in detail with the help of examples, in context of C++ programming. *(9 Marks)*
(i) Destructor
(ii) Virtual Function
(iii) Inline function

**3.** (a) What is concept of reusability? How it is achieved in C++? Explain with the help of an example. *(6 Marks)*

(b) Write a C++ program to overload '+' operator to find the sum of two complex numbers. *(6 Marks)*

(c) Explain different visibility modes in C++, in context of inheritance. *(4 Marks)*

**4.** (a) What is function overloading? Explain how overloaded functions are called with the help of an example. *(6 Marks)*

(b) What is dynamic binding? Explain with the help of an example. *(4 Marks)*

(c) What is an abstract class? Explain with an example. Also explain features of an abstract class. *(6 Marks)*

**5.** (a) What is template? Write appropriate statements to create a template class for Stack data structure in C++. *(5 Marks)*

(b) What are containers? Explain use of List container class with the help of an example. *(6 Marks)*

(c) What is exception handling? Write C++ program to demonstrate exception handling with multiple catch statements. *(5 Marks)*

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| **Course Code** | **:** | **BCSL-032** |
| **Course Title** | **:** | **C++ Programming Lab** |
| **Assignment Number** | **:** | **BCA(3)/L-032/Assignment/16-17** |
| **Maximum Marks** | **:** | **50** |
| **Weightage** | **:** | **25%** |
| **Last Dates for Submission** | **:** | **15th October, 2016 (For July 2016 Session)**<br>**15th April, 2017 (For January 2017 Session)** |

**This assignment has two questions. Answer both the questions. These questions carry 40 marks. Rest 10 marks are for viva-voce. Write C++ program and take its output as part of solution. Please go through the guidelines regarding the assignments given in the programme guide for the format of presentation.**

**1.** (a) Write a C++ program to find the followings related to the students in a class of C++ Programming course. *(10 Marks)*

(i) Average marks
(ii) Difference between highest marks obtained and the lowest marks obtained

(b) Write a C++ program to create **shape** class having abstract method **area()**. Derive **circle** and **rectangle** classes from it. Override **area** method in **circle** and **rectangle** class to find the area of the respective shape. *(10 Marks)*

**2.** (a) Write a C++ program to demonstrate exception handling in a program for matrix addition. Matrix addition function should notify if the order of the matrix is invalid, using exception. *(10 Marks)*

(b) Write C++ program to read the contents of a given file and display in on console. *(10 Marks)*

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| **Course Code** | **:** | **BCSL-033** |
| **Course Title** | **:** | **Data and File Structures Lab** |
| **Assignment Number** | **:** | **BCA(3)/L-033/Assignment/16-17** |
| **Maximum Marks** | **:** | **50** |
| **Weightage** | **:** | **25%** |
| **Last Dates for Submission** | **:** | **15th October, 2016 (For July 2016 Session)**<br>**15th April, 2017 (For January 2017 Session)** |

**This assignment has two questions, each of 20 marks.10 marks are for viva-voce. Attach input and output of the program to the assignment. Write programs in 'C' language.**

**1.** Write algorithm and program that accepts any Tree as Input and Converts it into Binary Tree. *(20 Marks)*

**2.** Write algorithm and program that accepts a list of integers and outputs the name of Sorting Method that needs to be used to sort the list based on best, average and worst case complexities. *(20 Marks)*

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| **Course Code** | **:** | **BCSL-034** |
| **Title** | **:** | **DBMS Lab** |
| **Assignment Number** | **:** | **BCA(3)/L-034/Assignment/16-17** |
| **Maximum Marks** | **:** | **50** |
| **Weightage** | **:** | **25%** |
| **Last Dates for Submission** | **:** | **15th October, 2016 (For July 2016 Session)**<br>**15th April, 2017 (For January 2017 Session)** |

**This assignment has only one question. Answer the question. This question carries 40 marks. Rest 10 marks are for viva voce. You may use illustrations and diagrams to enhance the explanation. Please go through the guidelines regarding the assignments given in the programme guide for the format of presentation.**

**1.** A **Event Management Company** requires a computerized system to automize its front office operations that support the following functionalities:

**Perform the following tasks:**

- Query support
- Report generation
- Easy input facility for new data
- Update necessary details about the available facilities, charges for various category of events, event details, equipment required for each event, transportation, hiring the venue, scheduling of staff, other logistics etc..

(i) Draw the ER diagram by identifying the entities, relationships and cardinality by using any of the drawing tools like smartdraw, dia, visio, conceptdraw etc.. to manage this Dental Clinic. Follow proper conventions. *(10 Marks)*

(ii) Create suitable database to support/accommodate all the functionalities referred above. Perform Normalization till required NF and prepare Normalized tables**.** *(10 Marks)*

(iii) Using MS-Access, design various forms to support the front office operations such as enquiry form, available facilities, charges for various events, event details, equipment required, hiring the venue, logistics, staff scheduling, communication details etc.. *(10 Marks)*

(iv) Report generation like daily reports of the costumers visited on day to day basis, consolidated report on events available with details, events booked, charges collected on a particular day, schedule of booked events, contact list etc.. *(10 Marks)*

***Note: Along with the above said tasks you must also provide screenshots of the layouts, database design, sample inputs and outputs along with the necessary documentation for this practical question. Assumptions can be made wherever necessary and list them.***