BANGALORE UNIVERSITY

REGULATIONS, SCHEME AND SYLLABUS

For the course

I to VI Semesters

BACHELOR OF COMPUTER APPLICATIONS
(BCA)

(Choice Based Credit System (Semester Scheme) – Y2K14 Scheme)

Revised w.e.f.

Academic Year 2014-2015 and onwards
Regulations, Scheme of study and Examination for BCA Degree Course
Under Choice Based Credit System - Semester System (Y2K14 SCHEME)
(Revised w.e.f. 2014-2015)

R 1. a) Title of the course: Bachelor of Computer Applications
b) Duration of the Course: Durations of the undergraduate programmes shall extend over FOUR semesters (TWO academic years) for the Associate Degree(Advance Diploma), SIX semesters (Three academic years) for the regular Bachelor Degree.
c) Scheme of study:
i) There shall be five theory papers and two practical from first semester to fourth semester.
ii) There will be five theory, two practical and one project in fifth semester. There will be four theory, one practical and one project in sixth semester.
iii) The project work shall be carried out either independently or jointly (maximum of three students)
iv) Medium of Instruction: The medium of instruction shall be English.
d) Scheme of Examination:
At the end of each semester there be University Examination of three hours duration in each of the theory paper/practical.
R. 2. Each semester shall be of 4 months duration
R. 3. Attendance: As per Bangalore University regulations In force for science degree courses.
R. 4. A Candidate is allowed to carry over all the previous uncleared (failed) theory papers/Practical to subsequent semesters as per Bangalore University regulations in force for science degree courses.
R. 5. The maximum period for completion of the course shall be six years form the date of admission.
R. 6. Eligibility for admission:
a) A candidate who has passed the two years Pre-University Examination conducted by the Pre-University Education Board in Karnataka
b) A candidate who has passed JODC / Three years Diploma in Engineering of Government of Karnataka or any other examination considered as equivalent thereto shall be eligible for admission.

a) Any student who has passed PUC –II Science, Arts or Commerce securing a minimum of 35% OF MARKS

Or

b) Any student who has passed JODC or Diploma in Engg. (of three year duration of Govt. of Karnataka) with minimum of 35% of marks in aggregate in all the semester /years.

R. 7. Admission Procedure:

a) Through Counseling in respective colleges
b) 50% weight age for entrance test in respective colleges
c) 50% weight age for performance at qualifying examination.
d) Merit list shall be prepared based on item No, 7(b) and 7(c)
e) Reservation: As per the notification /Govt. orders form the University /Govt. from time to time.
f) Tuition and other fees: As fixed by the University from time to time

R8. The total number of students to be admitted to the course shall be decided by the University.

R9. Results: Results of candidate shall be declared and the classes awarded as per the procedure followed by the University for B.Sc. Courses.

R10. POWER TO REMOVE DIFFICULTIES

1) If may difficulty arises in giving effect to the provisions of these regulations, the Vice-Chancellor may be order make such provisions not inconsistent with the Act, Statutes, Ordinances or other Regulations, as appears to be necessary to expedient to remove the difficulty.

2) Every order made under this shall be subject to rectification by the appropriate University Authorities.
# Title of Papers and Scheme of Study & Examination for BCA (Bachelor of Computer Applications) Under Choice Based Credit System - Semester System

(Revised w.e.f. 2014-2015)

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FIRST SEMESTER BCA

BCA101T : INDIAN LANGUAGE
Syllabus as per the one prescribed for science courses of Bangalore University.

BCA102T : ENGLISH
Syllabus as per the one prescribed for science courses of Bangalore University.

BCA103T : PROBLEM SOLVING TECHNIQUES USING C
Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

[12 Hours ]

Unit - II
Managing Input and Output Operation: Formatted and Unformatted I/O Functions, Decision making, branching and looping: Decision Making Statements - if Statement, if–else statement, nesting of if-else statements, else–if ladder, switch statement,?: operator, Looping - while, do-while, for loop, Nested loop, break, continue, and goto statements. Functions: Function Definition, prototyping, types of functions, passing arguments to functions, Nested Functions, Recursive functions.

[12 Hours ]

Unit - III
Arrays: Declaring and Initializing, One Dimensional Arrays, Two Dimensional Arrays, Multi Dimensional Arrays - Passing arrays to functions. Strings: Declaring and Initializing strings, Operations on strings, Arrays of strings, passing strings to functions. Storage Classes - Automatic, External, Static and Register Variables.

[12 Hours ]

Unit-IV

[ 12 Hours ]

Unit-V
Files - File modes, File functions, and File operations, Text and Binary files, Command Line arguments. C Preprocessor directives, Macros – Definition, types of Macros, Creating and implementing user defined header files.

[ 12 Hours ]

TEXT BOOKS

REFERENCES BOOKS

BCA104T: DIGITAL ELECTRONICS

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I
Introduction to network theorems and AC fundamentals: Ohm’s law: Statement, explanation. Kirchhoff’s law: Statement & explanation of KCL and KVL. Mesh/loop analysis (up to 2 loops) and node voltage method, Numerical problems. Delta/star and star/Delta transformation: No derivation for Interco version equations, introduction of network, port of network (one port network, two port network), unilateral network, bilateral network, linear network. Need for application of network theorems. (DC Circuits only). Superposition theorem: statement, (only with TWO voltage sources) steps to apply the theorem explanation by considering a simple resistive network and problems. Thevenin’s theorem: Statement, (Only with ONE voltage source) Steps to apply the theorem, explanation by considering a simple resistive networking and problems. Norton’s theorem: Statement, (Only with ONE voltage source) steps to apply the theorem, explanation by considering a simple resistive network and problems. Maximum power transfer theorem: Statement, explanation of theorem by considering a simple resistive network, expression for maximum power deliver (P L (max) =Vth2/4Rth) (no derivation), graph of Vs Pl, numerical problems and applications. Reciprocity theorem, Statement, explanation using resistive network with dc source and numerical problems. AC Fundamentals: Representation of ac sine wave, instantaneous value, peak value, peak to peak value, average value, r.m.s value cycle, time period, frequency. (No derivations, only mention the expressions) Representation of non sinusoidal waves.

[ 12 Hours ]

Unit - II
Semiconductor Devices: Introduction, atomic structure, energy level, energy band diagram in solids, classification of conductors, insulators and semiconductors. Semiconductor, properties, crystal structure of semiconductor, types – intrinsic and extrinsic semiconductor. Intrinsic semiconductor: Crystal structure (Ge& Si), thermal generated charges (electron and holes) carriers the effect temp on their motion. Extrinsic semiconductor: Doping, donor acceptor impurities, c-type, p-type semiconductor, majority and minority carriers, their currents, concept of immobile ions. Semiconductor devices : PN junction diode, formation of pn junction layer, potential barrier, energy level diagram of pn junction, Biasing of pn junction, behaviour of pn junction under forward and reverse biasing, break down in pn junction, avalanche and zener break down. Diode characteristics; V-I characteristic, forward and reverse bias, diode parameters, bulk resistance, knee voltage, static and dynamic resistance, PIV. Application of diode; As a rectifier, as logic gate, as a switch, etc. Rectifier, types, Half wave Full wave. Half wave rectifier: Circuit, working, wave forms and expression for ripple factor and efficiency (no derivation), advantages & disadvantages. Bridge wave rectifier: Circuit, working, wave forms and expressions for ripple factor and efficiently (no derivation), advantages & disadvantages. Logic families: Scale of integration, Digital IC’s, classifications, DTL, TTL, ECL, MOS, CMOS, Mention of features: speed of operation, power dissipation, propagation delay, fan-in, fan-out. [ 12 Hours ]
Unit – III
Number Systems: Introduction to number systems – positional and non-positional, Base /Radix. Decimal number system-Definition, digits, radix/base, Binary number system – Bit Byte, Conversions: Binary to Decimal and Decimal to Binary. Octal number system-Conversion from Octal to Decimal to Octal, Octal to Binary and binary to Octal. Hexadecimal number system –Conversion : Decimal to Hex, Hex to decimal, Hex to Binary, Binary to Hex, Octal to Hex, Binary to Octal, Binary arithmetic –binary addition, subtraction, multiplication and division (only Integer part). 1’s and 2’s compliment: 2’s complement subtraction. Binary code: BCD numbers, 8421 code, 2421 code- examples and applications. Gray code –Conversions-Gray to binary and Binary to Gray, application of gray code (Mention only). Excess-3 code – self complimenting property and applications. Definition and nature of ASCII code. Introduction to error detection and correction code, parity check. Boolean algebra:-Laws and theorems. AND, OR, NOT Laws, Commutative law, associative law, distributive law, Duality theorem. Demorgan’s theorems-Statements, proof using truth tables; Simplification of Boolean expressions using Boolean laws. Definition of product term, sum term, minterm, maxterm, SOP, standard POS and Standard POS. Conversion of Boolean expression to Standard SOP and Standard POS forms. Karnaugh maps-Definition of Karnaugh map, K- map for 2, 3 and 4 variables. Conversion of truth tables into k-map grouping of cells, redundant groups and don’t care conditions Karnaugh map technique to solve 3 variable and 4 variable expressions. Simplification of 3 and 4 variable Boolean expression using K-maps (SOP only)

Unit - IV

Unit - V
Text Books:
1) Thomas L. Floyd, ”Digital Fundamentals”, Pearson Education Inc, New Delhi, 2003

Reference Books:

BCA105T: DISCRETE MATHEMATICS
Total Teaching Hours: 65
No of Hours / Week: 05

Unit – I

[ 13 Hours ]

Unit - II
Matrices: Review of fundamentals: Definition of matrix, order, Types of matrices: zero, row, column, square, diagonal, scalar, unit, symmetric, skew-symmetric. Determinant: Value of determinant of order 2x2, 3x3, minors, cofactors, adjoint, inverse of a matrix. Solutions of linear equations: Cramers rule and matrix method involving two and three variables. Eigen values and Eigenvectors: Characteristic equation, characteristic roots, characteristic vectors (without any theorems) only 2x2 order. Cayley Hamilton theorem. (Only statement), verification of Cayley Hamilton theorem (only 2x2 matrices), using the same finding the powers of A (A^4, A^5, A^-1, A^-2), Inverse of a Matrix using Cayley-Hamilton theorem.

[ 13 Hours ]

Unit - III
Logarithms: Definition of Logarithm, Indices leading to Logarithms and vice versa, Laws of Logarithms with proofs, Problems, Common Logarithm: Characteristic and Mantissa, Use of Logarithmic Tables, Problems. Permutation and Combination: Fundamental Principle of Counting, Factorial n, Permutations: Definition, Examples, Derivation of Formula \(^nP_n\), Permutation when all the objects are not distinct, Problems, Combinations: Definition, examples, Proving \(^nP_r = n!\), \(^nP_r = \binom{n}{r}\), \(^nP_r + \binom{n}{r-1} = \binom{n+1}{r}\), Problems based on above formulae.

[ 13 Hours ]

Unit - IV
Groups: Binary operation, Define of group, properties (only statement), problems (both finite and infinite groups), subgroup, theorems (no proof), problems. Vectors: Definition of vector and scalar, vector addition, dot and cross product, projection of a vector on the other (no geometrical meaning), area of parallelogram, area of a triangle, scalar triple product, volume of parallelepiped, co planarity of three vectors, vector triple product.

[ 13 Hours ]
Unit - V
Analytical Geometry in Two Dimensions: Coordinates, Distance formula, Section Formula, Area of the Triangle formula (no derivation), Locus of point. Straight Line: Slope of a line and angle between two lines, Various forms of equations of lines – Derivation and Problems. Equation of family of lines passing through the point of intersection of two lines, Distance of a point from line (only problems).

[ 13 Hours ]

Text Books

Reference Books

BCA103P: C PROGRAMMING LAB
PART – A
1) Write a C Program to find the roots of the given quadratic equation using if-else if statement.
2) Write a menu driven C program using switch-case to find: (a) Sum of the digits of number (b) Factorial of N.
3) Write a C program to find cos (x) using series \( \cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \ldots \ldots \frac{x^n}{n!} \]
4) Write a Program to find whether a given number is prime number are not
5) Write a C program to arrange the given set of numbers in ascending and descending order.
6) Write a C program to find product of two N x M matrices.
7) Write a C program to calculate NCR= N!/ R! * (N-R)! Using function.
8) Write a C program to display Fibonacci series using recursive function.
9) Write a C program to concatenate two strings using pointers.
10) Write a C program to copy content of one file to another file.

PART – B
During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :
 a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:
   - Writing two programs - 10 Marks
   - Execution of one program - 10 Marks
   - Formatting the Output - 05 Marks
   - Viva - 05 Marks
   - Record - 05 Marks
   - Total - 35 Marks

BCA104P: DIGITAL ELECTRONICS LAB
1. Study of Logic Gates–AND, OR, NOT, NAND, NOR XOR (Using respective ICs)
2. Realization of AND, OR and NOT gates using Universal Gates.
5. Design and Realization of 4 bit Adder/Subtractor using IC 7483.
6. Design and Realization of BCD Adder using IC 7483.
7. Realization of J-K flip flop using IC 7400 and 7410.
8. Realization of T and D flip flop using IC 7476.
10. Design and implementation of odd and even parity checker Generator using IC 74180.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).
Note :
 a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:
   Writing two programs - 10 Marks
   Execution of one program - 10 Marks
   Formatting the Output - 05 Marks
   Viva - 05 Marks
   Record - 05 Marks
   Total - 35 Marks

SECOND SEMESTER BCA

BCA201T: INDIAN LANGUAGE
Syllabus as per the one prescribed for science courses of Bangalore University.

BCA202T: ENGLISH
Syllabus as per the one prescribed for science courses of Bangalore University.

BCA203T: DATA STRUCTURES
Total Teaching Hours : 60
No of Hours / Week : 04

Unit-I

[ 12 Hours ]

Unit-II
Arrays: Definition, Linear arrays, arrays as ADT, Representation of Linear Arrays in Memory, Traversing Linear arrays, Inserting and deleting, Sorting: Bubble sort, Insertion sort, Selection sort, Searching: Linear Search, Binary search, Multidimensional arrays,
Matrices and Sparse matrices.

Unit-III
Linked list: Definition, Representation of Singly linked list in memory, Traversing a Singly linked list, Searching a Singly linked list, Memory allocation, Garbage collection, Insertion into a singly linked list, Deletion from a singly linked list; Doubly linked list, Header liked list, Circular linked list.

Unit-IV

Unit-V

TEXT BOOKS

REFERENCES BOOKS

BCA204T : DATA BASE MANAGEMENT SYSTEMS
Total Teaching Hours : 60
No of Hours / Week : 04

Unit - I
Introduction: Database and Database Users, Characteristics of the Database Approach, Different people behind DBMS, Implications of Database Approach, Advantages of using DBMS, When not to use a DBMS. Database System Concepts and architecture: Data Models, Schemas, and Instances. DBMS Architecture and Data Independence., Database languages and interfaces. The database system Environment, Classification of DBMS.

Unit - II
Records (Sorted files), Hashing Techniques, and Other Primary file Organization.

[ 12 Hours ]

**Unit - III**

[ 12 Hours ]

**Unit – IV**
Relational Database Language: Data definition in SQL, Queries in SQL, Insert, Delete and Update Statements in SQL, Views in SQL, Specifying General Constraints as Assertions, specifying indexes, Embedded SQL. PL /SQL: Introduction.

[ 12 Hours ]

**Unit - V**

[ 12 Hours ]

**Text book:**

**References:**

[ 13 Hours ]

Unit – IV

[ 13 Hours ]

Unit - V
Random variable and Expectation: Discrete and continuous random variables, expectation of random variables, theorems on expectation, illustrative examples. Probability Distribution: Probability function, Probability mass/density function, Discrete Distribution – Bernoulli, Binomial Distribution, Continuous distribution – Normal Distribution, applications and problems.

[ 13 Hours ]

Text Books:

References

BCA203P : DATA STRUCTURES USING C LAB

PART - A
1. Write a menu driven C program to perform the following string operations without using string functions: (i) String Length (ii) String Concatenation (iii) String Reverse
2. Write a C program to search for an element in an array using Binary search
3. Write a C program to sort a list of N elements using Selection Sort Algorithm.
4. Write a C program to construct a singly linked list and perform insertion, deletion and Display operations.
5. Write a C program to demonstrate the working of stack using liked list.
7. Write a C program to find GCD of two numbers using recursion
8. Write a C program to convert infix arithmetic expression to post fix expression.
9. Write a C program to simulate the working of Circular Queue using an array.
10. Write a C program to create and traverse a binary search tree.

PART – B
During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :
a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:

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BCA304P: DATABASE MANAGEMENT SYSTEM LAB
PART - A

1. The STUDENT detail databases has a table with the following attributes. The primary keys are underlined. STUDENT(regno: int, name: string, dob: date, marks: int)
   i) Create the above table.
   ii) Remove the existing attributes from the table.
   iii) Change the date type of regno from integer to string.
   iv) Add a new attribute phoneno to the existing table.
   v) Enter five tuples into the table.
   vi) Display all the tuples in student table.
2. A LIBRARY database has a table with the following attributes.
   LIBRARY(bookid:int, title:string, author:string, publication:string, yearpub:int, price:real)
   i) Create the above table.
   ii) Enter the five tuples into the table
   iii) Display all the tuples in student table.
   iv) Display the different publishers from the list.
   v) Arrange the tuples in the alphabetical order of the book titles.
   vi) List the details of all the books whose price ranges between Rs. 100 and Rs. 300
3. The SALARY database of an organization has a table with the following attributes.
   EMPSALARY(empcode:int, empname:string, dob:date, department:string, salary:real)
   i) Create the above table.
   ii) Enter the five tuples into the table
   iii) Display all the number of employees working in each department.
   iv) Find the sum of the salaries of all employees.
   v) Find the sum and average of the salaries of employees of a particular department.
   vi) Find the least and highest salaries that an employee draws.
4. Consider the insurance database given below. The primary keys are underlined and the data types are specified.

PERSON(driver-id-no: string, name: string, address: strong)
CAR(regno: string, model: string, year: int)
ACCIDENT(report-no: int, date: date, location: String)
OWNS(driver-id-no: string, regno: string)
PARTICIPATED(driver-id-no: string, regno: string, report-no: int, damage-amount: int)

i) Create the above tables by properly specifying the primary keys and the foreign keys

ii) Enter at least five tuples for each relation.

iii) Demonstrate how you

a) Update the damage amount for the car with a specific regno in the accident with report no 12 to 25000.

b) Add a new accident to the database.

iv) Find total number of people who owned cars that were involved in accidents in 2002

v) Find the number of accidents in which cars belonging to a specific model were involved

5. Consider the following database of students enrollment in courses and books adopted for each course.

STUDENT(regno: string, name: string, major: strong, bdate: date)
COURSE(course-no: int, cname: string, dept: string)
ENROLL(reg-no: string, course-no: int, sem: int, marks: int)
BOOK-ADOPTION(course-no: int, sem: int, book-isbn: int)

i) Create the above tables by properly specifying the primary keys and the foreign keys

ii) Enter at least five tuples for each relation.

iii) Demonstrate how you add a new text book to the database and make this book be adopted by some department.

iv) Produce a list of text books (include Course-no, book-isbn, book-title) in the alphabetical order for courses offered by the ‘Compute Science’ department that use more than two books.

v) List any department that has all its adopted books published by a specific publisher.

6. The following tables are maintained by a book dealer

AUTHOR(author-id: int, name: string, city: string, country: string)
PUBLISHER(publisher-id: int, name: string, city: string, country: string)
CATLOG(book-id: int, title : string, author-id: int, publisher-id: int, category: int, year: int, price: int)

CATEGORY(category-id: int, description: string)

ORDER-DETAILS(order-no: int, book-id: int, quantity: int)

i) Create above tables by properly specifying the primary keys and the foreign keys.

ii) Enter at least five tuples for each relation.

iii) Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after 2010.

iv) Find the author of the book which has maximum sales.

v) Demonstrate how to increase price of books published by specific publisher by 10%

7. Consider the following database for BANK.

BRANCH(branch-name: string, branch-city: string, assets: real)

ACCOUNT(accno: int, branch-name: string, balance: real)

DEPOSITOR(customer-name: string, accno: int)

CUSTOMER(customer-name: string, customer-street: string, customer-city: string)

LOAN(loan-no: int, branch-name: string, amount: real)

BROWNER(customer-name: string, loan-no: int)

i) Create the above tables by properly specifying the primary keys and foreign keys.

ii) Enter at least five tuples for each relation.

iii) Find all the customers who have at least two accounts at the main branch.

iv) Find all customer who have an account at all the branches located in a specific city.

v) Demonstrate how to delete all account tuples at every branch located in specific city.

8. Consider the following database for ORDER PROCESSING.

CUSTOMER(cust-no: int, cname: string, city: string)

ORDER(orderno: int, odate: date, ord-amt: real)

ORDER_ITEM(orderno: int, itemno:int, qty: int)

ITEM(itemno: int, unitprice: real)

SHIPMENT(orderno: int, warehouseno: int, ship-date: date)

WAREHOUSE(warehouseno: int, city: string)

i) Create the above tables by properly specifying the primary keys and the foreign keys

ii) Enter at least five tuples for each relation.

iii) List the order number and ship date for all orders shipped from particular warehouse.
iv) Produce a listing: customer name, no of orders, average order amount
v) List the orders that were not shipped within 30 days of ordering

PART – B
During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 8 Programs has to be prepared).

Note :

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 8 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:

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THIRD SEMESTER BCA

BCA301T: INDIAN LANGUAGE

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA302T: ENGLISH

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA303T: OBJECT ORIENTED PROGRAMMING USING C++

Total Teaching Hours : 60  No of Hours / Week : 04

Unit - I
Introduction : Procedure Languages, definition of OOP, Basic concept of OOP, Object Class, Data Abstraction, Data Encapsulation, Data Hiding member functions, Reusability, Inheritance, Creating new Data Types, Polymorphism, Overloading, Dynamic binding and Message passing. C++ Features: The iostream class, C++ Comments, C++ Keywords, Variable declaration, The Const Qualifier. The Endl, Set Waste precision, Manipulators, The scope resolution operator, The new & delete Operations. Functions: Simple Functions, Function declaration, calling the function, function definition, Passing argument to, returning value from function, passing constants, Variables, pass by value, passing structure variables, pass by reference, Default arguments, return statements, return by reference, overloaded functions; Different number of arguments, Different Kinds of argument, inline function.

[ 12 Hours ]

Unit - II
Objects & Classes: Classes & Objects, Class Declaration, Class member; Data Constructions, Destructors, Member functions, Class member visibility, private, public, protected. The scope of the class objects constructions, Default Constructor. Constructor with argument, constructor with default arguments, Dynamic constructor, copy constructor, Overloaded constructor, Objects as arguments returning objects from
functions, class conversion, manipulation private Data members, Destructors classes, object & memory, arrays as class member data: Array of objects, string as class member.

Unit - III
Operator Overloading : Overloading unary operator: Operator Keyword, Operator arguments, Operator return value, Nameless temporary objects, limitations of increment operator, overloading binary operator, arithmetic operators, comparison operator, arithmetic assignment operator, data conversion; conversion between objects of different classes. Inheritance : Derived Class & Base Class: Specifying the Derived class accessing Base class members, the protected access specifier, Derived class constructor, Overriding member functions, public and private inheritance; Access Combinations, Classes & Structures, Access Specifiers, Level of inheritance; Multilevel inheritance, Hybrid inheritance, Multiple inheritance; member functions in multiple inheritance, Constructors in multiple inheritance, Containership; Classes, within classes, Inheritance & Program development.

Unit - IV
Virtual functions: Normal member function accessed with pointers, Virtual member functions accessed with pointers, Dynamic binding, pure virtual functions, Friend function; Friends for functional notation, friend classes, the pointer; Accessing Member Data with this, using this for returning values. Templates & Exception Handling: Introduction, Templates, Class Templates, function templates, Member function templates, Template arguments, Exception Handling.

Unit V
Streams: The Stream class Hierarchy, Stream classes Header file, string I/O: Writing strings, reading strings, character I/O, Detecting End – of – file, Object I/O; writing an object to disk, reading an object from disk, I/O with multiple objects; the ofstream class, The open function, File Pointers; Specifying the position, Specifying the offset. The tellg Function, Disk I/O with Memory Functions; Closing Files, Error Handling, Command Line Arguments.

Text books:

Reference:

BCA304T: ACCOUNTING AND FINANCIAL MANAGEMENT
Total Teaching Hours : 60
No of Hours / Week : 04

Unit - I

**Unit - II**
Financial Accounting Process: Classification of accounting transaction and accounts, rules of debit and credit as per Double Entry System. Journalisation and Ledger position

**Unit - III**

**Unit - IV**
Preparation of Final accounts: Meaning, need and classification, Preparation of Manufacturing, Trading, Profit and loss account and Balance-Sheet of sale –traders and partnership firms.

**Unit V**
Accounting Package like Tally

**Text Book**
1. S.Ramesh, B.S.Chandrashekar, a Text Book of Accountancy.

**References**
3. B.S.Raman, Accountancy, (United Publishers, Mangalore)

**BCA305T: OPERATING SYSTEMS**
Total Teaching Hours : 65 No of Hours / Week : 05

**Unit - I**

**Unit - II**
Process Synchronization and deadlocks: The Critical Section Problem, Synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, monitors, Dead locks – system model, Characterization, Dead lock prevention, avoidance and detection, Recovery from dead lock, Combined approach to deadlock handling.
Unit - III
Memory Management: Logical and Physical address space, Swapping, Contiguous allocation, Paging, Segmentation, Segmentation with paging in Mastics and Intel 386, Virtual memory-Demand paging and it’s performance, Page replacement algorithms, Allocation of frames, thrashing, page size and other considerations. Demand Segmentation.

[ 13 Hours ]

Unit - IV

[ 13 Hours ]

Unit - V
Case Study of Windows and Linux Operating System

[ 13 Hours ]

Text Books:

Reference Books:

BCA303P : C++ PROGRAMMING LAB
PART-A
1. Write a program to prepare a shopping lists
2. Write a program to perform bank transactions.
3. Write a program to swap numbers using friend function.
4. Write a program to calculate area and circumference of circle using inline function
5. Write a program to perform multiplication of two matrices using operator overloading.
6. Write a program to implement operation on queue.
7. Write a program to create a student report using inheritance technique.
8. Write a Program to find the area and volume of respective figures using function overloading.
9. Write a program to show returning current object, accessing member data of current object and returning values of object using this pointer
10. Write a program to sort elements using template.

PART - B
During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 8 Programs has to be prepared).

Note :
a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

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**BCA304P: ACCOUNTING PACKAGE LAB**

**FOURTH SEMESTER BCA**

**BCA401T: INDIAN LANGUAGE**

Syllabus as per the one prescribed for science courses of Bangalore University.

**BCA402T: ENGLISH**

Syllabus as per the one prescribed for science courses of Bangalore University.

**BCA403T: VISUAL PROGRAMMING**

Total Teaching Hours : 60  
No of Hours / Week : 04

**Unit - I**

Introduction to Visual Programming: The intergrated Development Environment – menu bar, tool bar, from designer, project explorer, properties window, from layout window, The Visual Programing editor. The form object: Properties, events and methods pf forms; Properties – Name, Captain, Backcolor, Borderstyle, controlbox, maxbutton, minbutton, moveable, startup position, height, width, left, top, scalemode, window, state; Events – load, unload, Clerk, Activate, Deactivate, Resize, methods – Show, hide, cls, Unload, print, Controls – Properties and events of different controls such as command buttons, labels, textboxes image controls, timer, horizontal and vertical scroll bars, option buttons, check boxes, frames lists and combo boxes. Predefined Dialog Boxes – MsgBox and InputBO

[ 12 Hours ]

**Unit - II**

Programming: Data types, variables; declaration and scope arithmetic operations, Study of form and code modules, private and public procedures, Main o procedure, Suba and Functions. Mathematical and string Functions; Branching and Looping Statement; If – Then, if –Then –Else and Nested If Statements; Select Case –different forms; For – Next, While – Wend and Do – Loops statements; Arrays- declaration. Static and dynamic arrays. Array and Function, menus and toolbars-Creating menus and toolbars, Working with the menu editor, Designing Multiple Document interface forms. Microsoft common controls.

[ 12 Hours ]
Unit - III
OOP methods and properties of an object, class Modules, Encapsulation and Inheritance characteristics Dynamic Link Libraries (DLLs) and Windows API; Designing Help files; File handling – Sequential, Random access and Binary files, Database connectivity – DAO and ADO Tables and Queries, ActiveX Data objects.

[ 12 Hours ]

Unit – IV

[ 12 Hours ]

Unit – V

[ 12 Hours ]

Text Books:

Reference Books:

BCA404T : UNIX PROGRAMMING

Total Teaching Hours : 60
No of Hours / Week : 04

Unit - I

[ 12 Hours ]

Unit - II
Secondary Storage Management: Formatting, making file system, checking disk space, mountable file system, disk partitioning, file compression. Special Tools and Utilities: Filters, Stream editor SED and AWK, Unix system calls and library functions, Processes, signals and Interrupts, storage and compression facilities.

[ 12 Hours ]

Unix - III
Shell Programming: Vi editor, shell types, shell command line processing, shell script features, executing a shell script, system and user-defined variables, expr command, shell screen interface, read and echo statement, command substitution, escape sequence characters, shell script arguments, positional parameters, test command, file test, string test, numeric test.

[ 12 Hours ]

Unit – IV
Conditional Control Structures-if statement, case statement Loopying Control Structure-while, until, for, statements. Jumping Control Structures – break, continue, exit. Shell Programs covering the above concepts.

[ 12 Hours ]
Unit – V

[ 12 Hours ]

Text Books:

Reference Books:

BCA405T: OPERATIONS RESEARCH
Total Teaching Hours : 65
No of Hours / Week : 05

Unit - I

[ 13 Hours ]

Unit - II
Transportation Problem: Mathematical formulation of transportation problem, Initial basic Feasible solution, North West corner rule, Matrix minima method, Vogel’s approximation method, MODI method to find optimal solution.

[13 Hours ]

Unit - III
Assignment Problem: Mathematical formulation of an Assignment problem, Assignment algorithm, Hungarian Method to solve Assignment Problem.

[ 13 Hours ]

Unit - IV

[ 13 Hours ]

Unit - V
Theory of Games: Two – person Zero – sum Games, the maximin and Minimax principle, Saddle point and value of the Game. Game without saddle points, mixed strategies, solution for 2X2 games, Graphical method Dominance property.

[ 13 Hours ]

Text books:

References Book:
Unit – I

Unit - II

Unit – III

Unit - IV
Local Area Networks and Medium access Control Protocols:- Multiple access communications; Local Area network – LAN Structure, MAC Sublayer, Logical link control layer, Random Access protocols ALOHA , Slotted ALOHA, CSMA, CSMA/CD, Scheduling approaches to medium access control – Reservation Systems, polling , Token passing rings, comparison of Random access & Scheduling access control Comparison of Radom access & SCHEDULING MEDIUM access controls; Channelization – FDMA, TDMA, CDMA;

Unit - V
LAN Standard –Ethernet and IEF, 802.3 LAN Standard ; Token Ring and IEEE 8025 LAN standard , FDDI, Wireless LAN’s and IEEE 802.11 Standards; LAN Bridges – Transparent Bridges , Source Routing Bridges , Mixed – media Bridges. Packet Switching Networks :- Network services & Internal Network Operation; Packet Network Topology; Datagrams & VIRTUAL circuits ; structure of switch/ Router, Connectionless packet switching ; Virtual – Circuit packet switching ; Overview of Routing and congestion in packet networks – Routing algorithms classification , Routing tables,
shortest path routing algorithms, Flooding, Hierarchical routing , Distance vector routing, Link state routing, congestion control algorithms. [12 Hours]

Text Books:

Reference Books:

BCA502T : SOFTWARE ENGINEERING
Total Teaching Hours : 60  No of Hours / Week : 04

Unit - I

Unit - II

Unit - III

Unit - IV
Software Reliability and reusability: Software reliability metrics, Software reliability Specification, Statistical testing, Reliability Growth modeling, Fault avoidance & tolerance, Exception handling & defensive programming, Software development with reuse, Software’ development for reuse, Generator based reuse, Application System Portability. [12 Hours]

Unit - V
Software Verification and Validation: The testing Process, Test Planning & Strategies, Black Box, Structural, interface testing, Program inspections, Mathematically based verification, Static analysis tools, Clean room software development. Management Issues: Project management, Quality management, Software cost estimation, Software maintenance. [12 Hours]
Text book

Reference Books

BCA503T: COMPUTER ARCHITECTURE
Total Teaching Hours : 60
No of Hours / Week : 04

Unit - I
DIGITAL LOGIC CIRCUITS: Logic gates Boolean algebra, map simplification, combinational circuits, flip-flop, sequential circuits. INTEGRATED CIRCUITS AND DIGITAL FUNCTIONS: Digital integrated circuits, IC flip-flops and registers, decoders and multiplexers, binary counters, shift registers, random –access memories (RAM) read –only memories (ROM).

[ 12 Hours ]

Unit - II
DATA REPRESENTATION: Data types, fixed-point representation, floating – point representation, other binary codes, error detection codes.
DATA TRANSFER OPERATIONS: Register Transfer, Memory Transfer and I/O Transfer.

[ 12 Hours ]

Unit – III
BASIC COMPUTER ORGANISATION AND DESIGN: Instruction codes, computer instruction, timing and control, execution and instruction, input-output and interrupt, design of computer.

[ 12 Hours ]

Unit - IV
CENTRAL PROCESSOR ORGANIZATION : Processor bus organization, arithmetic logic unit (ALU) instruction formats, addressing modes, data transfer and manipulation , program control, microprocessor organization.

[ 12 Hours ]

Unit – V
INPUT-OUTPUT ORGANISATION: Peripheral devices . asynchronous data transfer , direct memory access (DMA) ,priority interrupt, input –output processor (IOP).
MEMORY ORGANIZATION : Auxiliary memory, microcomputer memory hierarchy , associative memory , virtual memory, cache memory.

[ 12 Hours ]

Text Books

References
1. Heuring and Jordan, Computer systems design and Architecture , Peason Edition
BCA504T: OBJECT ORIENTED PROGRAMMING USING JAVA

Total Teaching Hours : 60
No of Hours / Week : 04

Unit - I

[ 12 hours ]

Unit - II

[ 12 Hours ]

Unit - III

[ 12 Hours ]

Unit - IV

[ 12 Hours ]
Unit - V

[ 12 Hours ]

Text Books:

Reference Books:

BCA505T : MICROPROCESSOR AND ASSEMBLY LAGUAGE
Total Teaching Hours : 60  No of Hours / Week : 04

Unit - I
Architecture and Operation: Introduction to 8085, Microprocessor organization/ architecture & its operation Microprocessor based system, memory interfacing , basic interfacing concepts ,interfacing I/O devices

[ 12 Hours ]

Unit - II
Programming the 8085: Programming model, instruction classification , Instruction format, addressing modes, writing assembly level programs-overview of instruction set, timing diagrams data transfer, Arithmetic, Logic branch operations.

[ 12 Hours ]

Unit - III
Programming techniques- Looping Counting and Indexing , 16 bit arithmetic operations , logic operations Compare and rotate operations , Counters and Time delays , Generation of pulse waveforms. Stacks and subroutines- conditional CALL and RETURN instructions. Advanced subroutine concepts. BCD to Binary and Binary to BCD conversions, BCD to 7 segment conversion , Binary to ASCII and ASCII to Binary code conversion, BCD addition and subtraction , multiplication and division.

[ 12 Hours ]

Unit – IV
Memory Interface: Memory and I/O mapping and interfacing concepts. Interrupts : 8085 vectored interrupts , Restart as Software instructions, additional I/O concepts and processes.

[ 12 Hours ]

Unit – V
Interfacing of peripherals (I/Os) and applications: Interfacing Keyboard (linear and matrix) and 7 segment display including multiplexes, 8279 programmable keyboard/display interface, 8255 PPI , 8259 PIC , DMA and 8257 DMA controller , Serial communication using 8251, D to A converters and interfacing, RS323 serial
communication standards.

Text books
1. R.S.Gaonkar – Microprocessor Architectutre, Programming and Application with 8085. Penram Int. 3rd Edn.

References
1. Douglas V.Hall- Microprocessors and digital systems, MH.
3. Aditya P. Mathur- Introduction to Microprocessors, 3rd Edn. TMH
4. Antonakos: Introduction to Intel family of Microprocessors Pearson Education

BCA504P : JAVA PROGRAMMING LAB
PART - A
1. Write a program to find factorial of list of number reading input as command line argument.
2. Write a program to display all prime numbers between two limits.
3. Write a program to sort list of elements in ascending and descending order and show the exception handling.
4. Write a program to implement all string operations.
5. Write a program to find area of geometrical figures using method.
6. Write a program to implement constructor overloading by passing different number of parameter of different types.
7. Write a program to create student report using applet, read the input using text boxes and display the o/p using buttons.
8. Write a program to calculate bonus for different departments using method overriding.
9. Write a program to implement thread, applets and graphics by implementing animation of ball moving.
10. Write a program to implement mouse events and keyboard events.

PART – B
During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :
(a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
(b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
(c) Scheme of Evaluation is as follows:

Writing two programs - 10 Marks
Execution of one program - 10 Marks
Formatting the Output - 05 Marks
Viva - 05 Marks
Record - 05 Marks
Total - 35 Marks
BCA505P: ASSEMBLY LANGUAGE PROGRAMMING LAB

PART - A

1. Exchange of two 16-bit numbers.
2. Addition & Subtraction of two 8–bit HEX numbers.
4. Two n-byte Number addition.
5. Block Transfer.
6. ‘N’ Decimal Number addition.
7. 4-Digit BCD addition.
8. Subtraction of 16–bit number.
10. Multiplication of 2 digit BCD

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing two programs</td>
<td>10</td>
</tr>
<tr>
<td>Execution of one program</td>
<td>10</td>
</tr>
<tr>
<td>Formatting the Output</td>
<td>05</td>
</tr>
<tr>
<td>Viva</td>
<td>05</td>
</tr>
<tr>
<td>Record</td>
<td>05</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
</tr>
</tbody>
</table>

BCA506P : PROJECT

Students can develop a project in team (maximum three members). They should implement their project in college in any RDBMS package or any language available in the college. The students have to collect data outside practical hours. Project may be taken outside but must be implemented in the college. Internal marks can be awarded by the guide by evaluating the performance of the students during the course of project work. In viva-voce the questions must be directed only on the project work to access the involvement and understanding of the problem by the students.

The project carries 100 marks is distributed as follows:

- Demonstration and Presentation: 65 Marks
- Viva-voce: 25 Marks
- Project Report: 10 Marks

SIXTH SEMESTER BCA

BCA601T : THEORY OF COMPUTATION

Total Teaching Hours : 60  No of Hours / Week : 04

Unit - I

Introduction to Finite Automata: The central concepts of Automata theory; Deterministic finite automata; Nondeterministic finite automata. An application of finite automata,
Finite automata with Epsilon transitions.  

Unit - II  
Regular Expressions: Finite Automata and Regular Expressions Applications of Regular Expressions. Regular languages; Proving languages not to be regular languages; Closure properties of regular languages; Decision properties of regular languages; Equivalence and minimization of automata.  

[ 12 Hours ]

Unit - III  
Context-free grammars: Parse trees; Applications; Ambiguity in grammars and Languages. Definition of the Pushdown automata; the languages of a PDA; Equivalence of PDA’s and CFG’s.  

[ 12 Hours ]

Unit - IV  
Deterministic Pushdown Automata:Normal forms for CFGs; The pumping lemma for CFGs; Closure properties of CFLs. Problems that Computers cannot solve.  

[ 12 Hours ]

Unit – V  
The Turing machine:Programming techniques for Turing Machines. Undecidability, A Language that is not recursively enumerable; An Undecidable problem that is RE; Post’s Correspondence problem.  

[ 12 Hours ]

Text Book:  

BCA602T: SYSTEM PROGRAMMING

Total Teaching Hours : 60  
No of Hours / Week : 04

Unit - I  

[ 12 Hours ]

Unit - II  
Assemblers: General Design Procedure, Design of assembler, Statement of Problem, Data structure, Format of databases, algorithm, look for modularity, Table Processing: Searching and Sorting. The Problem, Searching a table, linear Search, binary Search, Sorting, interchange sort, Shell Sort, Bucket Sort, Radix Exchange Sort, address calculation sort, comparison of sorts, hash or random entry searching.  

[ 12 Hours ]
Unit - III
MACRO LANGUAGE AND THE MACRO PROCESSOR: Macroinstruction, Features of macro Facility, Macro instruction arguments, conditional macro Expansion, macro calls within macros, macro Instructions defining macros, Implementation, Statement of problem, implementation of a restricted facility, A two pass algorithm. A single pass algorithm, implementation of macro calls within macros. Implementation within an assembles.

[ 12 Hours ]

Unit - IV

[ 12 Hours ]

Unit - V

[ 12 Hours ]

Text Books:

Reference Books:
1. Dhamdhere: System programming and Operating System TMH

BCA603T: CRYPTOGRAPHY AND NETWORK SECURITY
Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

[ 12 Hours ]

Unit – II

[ 12 Hours ]

Unit III

[ 12 Hours ]
Unit - IV

Unit - V

Text Book:

Reference Books:

BCA604T: WEB PROGRAMMING
Total Teaching Hours : 60
No of Hours / Week : 04

Unit - I

Unit - II
HTML and XHTML: Forms, Frames in HTML and XHTML, Syntactic differences between HTML and XHTML. CSS: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The Box model, Background images, The <span> and <div> tags, Conflict resolution. [12 Hours]

Unit -III
Java Script: Overview of JavaScript; Object orientation and JavaScript; General syntactic characteristics; Primitives, Operations, and expressions; Screen output and keyboard input; Control statements; Object creation and Modification; Arrays; Functions; Constructor; Pattern matching using expressions; Errors in scripts; Examples. [12 Hours]

Unit - IV
Java Script and HTML Documents: The JavaScript execution environment; The Document Object Model; Element access in JavaScript; Events and event handling; Handling events from the Body elements, Button elements, Text box and Password elements; The DOM 2 event model; The navigator object; DOM tree traversal and modification. [12 Hours]
Unit - V
Dynamic Documents with JavaScript: Introduction to dynamic documents; Positioning elements; Moving elements; Element visibility; Changing colors and fonts; Dynamic content; Stacking elements; Locating the mouse cursor; Reacting to a mouse click; Slow movement of elements; Dragging and dropping elements. XML: Introduction; Syntax; Document structure; Document Type definitions; Namespaces; XML schemas; Displaying raw XML documents; Displaying XML documents with CSS; XSLT style sheets; XML Processors; Web services.

[ 12 Hours]

Text Books

Reference Books

BCA604P : WEB PROGRAMMING LAB

PART -A
1. Write a program to find factorial of list of number reading input as command line argument.
2. Write a program to sort list of element in ascending and descending order and show the exception handling.
3. Write a program to implement all string operations.
4. Write a program to find area of geometrical figures using method overloading.
5. Write a program to implement constructor overloading by passing different number of parameter of different types.
6. Write a program to create student report using applet, read the input using text boxes and display the o/p using buttons.
7. Write a program to implement an apply by passing parameter to HTML.
8. Write a program to implement thread, applets and graphics by implementing animation of ball moving.
9. Write a program to implement mouse events.
10. Write a program to implement keyboard events.

PART – B
During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :
  a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
  b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
  c) Scheme of Evaluation is as follows:
     Writing two programs - 10 Marks
     Execution of one program - 10 Marks
BCA604P : WEB PROGRAMMING LAB

PART - A

1. Create a form having number of elements (Textboxes, Radio buttons, Checkboxes, and so on). Write JavaScript code to count the number of elements in a form.

2. Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textbox has been left empty, popup an alert indicating which textbox has been left empty.

3. Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluates the expression and Displays the result.

4. Create a page with dynamic effects. Write the code to include layers and basic animation.

5. Write a JavaScript code to find the sum of N natural Numbers. (Use user-defined function)

6. Write a JavaScript code block using arrays and generate the current date in words, this should include the day, month and year.

7. Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade.

8. Create a form for Employee information. Write JavaScript code to find DA, HRA, PF, TAX, Gross pay, Deduction and Net pay.

9. Create a form consists of a two Multiple choice lists and one single choice list
   (a) The first multiple choice list, displays the Major dishes available
   (b) The second multiple choice list, displays the Starters available.
   (c) The single choice list, displays the Soft drinks available.

10. Create a web page using two image files, which switch between one another as the mouse pointer moves over the image. Use the on Mouse Over and on Mouse Out event handlers.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

<table>
<thead>
<tr>
<th>Writing two programs</th>
<th>- 10 Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Execution of one program</td>
<td>- 10 Marks</td>
</tr>
<tr>
<td>Formatting the Output</td>
<td>- 05 Marks</td>
</tr>
<tr>
<td>Viva</td>
<td>- 05 Marks</td>
</tr>
<tr>
<td>Record</td>
<td>- 05 Marks</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>- 35 Marks</strong></td>
</tr>
</tbody>
</table>
BCA605P : PROJECT WORK

Students should individually develop a project. They should implement their project in college in any RDBMS package or any language available in the college. The project should be web-based. The students have to collect data outside practical hours. Project may be taken outside but must be implemented in the college. Internal marks can be awarded by the guide by evaluating the performance of the students during the course of project work. In viva-voce the questions must be directed only on the project work to access the involvement and understanding of the problem by the students.

The project carries 200 marks is distributed as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstration and Presentation</td>
<td>130 Marks</td>
</tr>
<tr>
<td>Viva-voce</td>
<td>50 Marks</td>
</tr>
<tr>
<td>Project Report</td>
<td>20 Marks</td>
</tr>
</tbody>
</table>

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