

VIKRAM DEB AUTONOMOUS COLLEGE JEYPORE, KORAPUT, ODISHA

## COURSE OF STUDIES OF BACHELOR OF COMPUTER APPLICATION

Subject: BACHELOR OF COMPUTER APPLICATION

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# VIKRAM DEB AUTONOMOUS COLLEGE

#### Jeypore, Koraput, Odisha

# COURSE OF STUDIES FOR THE BACHELOR OF COMPUTER APPLICATION

1st	Semester Examination	: 2017-18
2nd	Semester Examination	: 2017-18
3rd	Semester Examination	: 2018-19
4th	Semester Examination	: 2018-19
5th	Semester Examination	: 2019-20
6th	Semester Examination	: 2019-20

BCA Course shall consist of twenty -four papers of three hours duration of 100 marks out of which 20 % shall be earmarked for internal Assessment and a project carrying 200 marks in the 3rd year.(VI Sem).

#### **SEMESTER-I**

1.1	English for Technical Communication	80+20	
1.2	Computer Fundamental	80+20	
1.3	Application Softwares	80+20	
1.4 L	AB-1(Appication of Softwares)	100	
SEM	ESTER-II		
2.1	Mathematic-1	80+20	
2.2	'C' Langauge	80+20	
2.3	Operating System (CUL,GUI)	80+20	
2.4	Lab-II(C-Language)	100	
SEW			
3.1 N	Numerical Analysis & Statistical Methods(Ma	ath-II)	80+20
3.1 N 3.2 E	Numerical Analysis & Statistical Methods(Ma Date Structure	ath-II) 80+20	80+20
3.1 N 3.2 E 3.3 I	Numerical Analysis & Statistical Methods(Ma Date Structure ntroduction to Relational	ath-II) 80+20 80+20	80+20
3.1 N 3.2 [ 3.3   Data	Numerical Analysis & Statistical Methods(Ma Date Structure ntroduction to Relational base Management System	ath-II) 80+20 80+20	80+20
3.1 N 3.2 [ 3.3   Data 3.4.	Numerical Analysis & Statistical Methods(Ma Date Structure ntroduction to Relational Ibase Management System LAB-I(RDBMS)	ath-II) 80+20 80+20 100	80+20
3.1 N 3.2 [ 3.3 ] Data 3.4. SEM	Numerical Analysis & Statistical Methods(Ma Date Structure ntroduction to Relational Ibase Management System LAB-I(RDBMS)	ath-II) 80+20 80+20 100	80+20
3.1 N 3.2 [ 3.3 ] Data 3.4. <b>SEM</b> 4.1 (	Numerical Analysis & Statistical Methods(Ma Date Structure Introduction to Relational Ibase Management System LAB-I(RDBMS) IESTER-IV Computer Organisation	ath-II) 80+20 80+20 100 80+20	80+20
3.1 N 3.2 [ 3.3 ] Data 3.4. <b>SEM</b> 4.1 ( 4.2 (	Numerical Analysis & Statistical Methods(Ma Date Structure Introduction to Relational Ibase Management System LAB-I(RDBMS) IESTER-IV Computer Organisation DOPS Language Using C++	ath-II) 80+20 80+20 100 80+20 80+20	80+20

100 4.4 LAB-II (C++) **SEMESTER-V** 5.1 Operation Research (Math-III) 80+20 5.2 Data Communication & Computer Network 80+20 5.3 VB, Internet & Web Development 80+20 100 5.4 LAB-I (VB, HTML) **SEMESTER-VI** 6.1 System Analysis & Design 80+20 6.2 Computer Oriented Accounting System 80+20 6.3 Object Oriented Programming Language(JAVA) 80+20 6.4 LAB-II(JAVA) 100 2400 6.5 PROJECT 200 **Total Marks** 2600

#### **PROGRAMME OUTCOMES (BCA):**

BCA program has been designed to prepare graduates for attaining the following specific outcomes:

• An ability to apply knowledge of mathematics, computer science, and management in practice.

• An ability to enhance not only a comprehensive understanding of the theory but its application too in diverse fields.

• The program prepares the young professional for a range of computer applications, computer organization, techniques of Computer Networking, Software Engineering, Web Development, Database management, and Advance Java.

• An ability to design a computing system to meet desired needs within realistic constraints such as safety, security, and applicability in multidisciplinary teams with a positive attitude.

• An ability to communicate effectively.

• In order to enhance the programming skills of the young IT professionals, the program has introduced the concept of project development in each language/technology learned during the semester.

#### **PROGRAMME SPECIFIC OUTCOMES (BCA):**

• Focuses on preparing students for roles pertaining to computer applications and the IT industry.

• Start from the basics and in every semester learn everything about computers.

• Develop programming skills, networking skills, learn applications, packages, programming languages, and modern techniques of IT.

• Get skill and info not only about computer and information technology but also in common, organization and management.

• Learn programming languages such as Java, c++, HTML, SQL, etc...

• Information about various computer applications and the latest development in IT and communication systems is also provided.

• Gives an overview of the topics in IT like networking, web development, troubleshooting, and hardware and software skills.

• Bachelor in computer applications (BCA) gives a number of opportunities to individuals to go ahead and shine in their lives.

• A few of them being like software programmers, system and network administrators, web designer faculty for computer science and computer applications.

# SEMESTER-I ENGLISH FOR TECHNICAL COMMUNICATIONS

#### BCA-1.1

#### Full Mark-100

#### (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

- Develop the student's ability to use the English language accurately and effectively by enhancing their communication skills.
- Mastering the art of a professional business presentation.
- Distinguish different communication processes and their practical application.
- More effective written communication.
- Study the personality development of individuals from the micro perspective.
- Provide employability skills.
- Provide the skills of comprehension writing.
- Develop Formal correspondence writing skills.
- Learn the language skills grammatically.
- Understand the need, benefits, and forms of communication.
- Use the English language accurately and effectively in real-life situations.
- Mastering the art of Formal correspondence writing.
- Actively participate in oral and written communication in practical applications.
- Understand the language and its use grammatically and proficiently.

## UNIT-I

Grammar : Articles, tenses, voice, preposition.

## UNIT-II

**Vocabulary & Usages**, Pairs and groups of words, synonyms; antonyms; idioms and phrases, one-word sunstitution.

## UNIT-III

Reading & Comprehension: Correct pronounciation, note marking, reporting

## UNIT-IV

Letter Writting

## UNIT-V

## Composition Writing(of not more than 250 words).

#### **Books Recommended**

1) A practical English grammar By A.J. Thomson & A.N. Martinet (Oxford University Press)

- 2) Strengthen your writing By V.R.Narayan Swamy.(Orient Longman)Chapters-2,3,6,9.
- 3) Spoken English Highery By V. Sasikumar & P.V. Dhamija(Tata McGraw Hill).

4) Higher Secondary practical English Grammar By R.N. Panda (Banirupa, Buxi Bazar, Cuttack)Chapter-3,4,5,10,12,14,15,16.

# COMPUTER FUNDAMENTALS

## BCA-1.2

#### Full mark-100

#### (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

- Impart knowledge about the structure, components, and functions of a computer system.
- Understand the working of basic input and output devices.
- Learn about the binary number representation along with its operations.
- Familiarization with the meaning of Software and Hardware.
- Understand different computer languages.
- Familiarization with the terms like Operating System, peripheral devices, networking, multimedia, internet, etc.

• Bridge the fundamental concepts of computers with the present level of knowledge of the students.

#### UNIT -I

**Introduction :** Basic anatomy of computer; input and Output, Control unit; ALU and memory; working of a computer History of computer; classification of computer; working of microcomputer, Input and Output devices and secondary storage devices.

### UNIT -II

**Data Respresentation:** Number system; decimal, octal, hexadecimal and binary, conversions 01 number system, Binary arithmetic, BCD, ASCII, EBCDIC codes.

#### UNIT -III

**Computer Software and Hardware :** Meaning of computer software hardware;m difference between software and hardware, types omf software, firmware, computer language, Machine level, assembly language and high level language. Translators, assemblers, interpreters and compilers.

#### UNIT -IV

**Operating System :** Definition and function; Batch processing, Spooling; Multiprogramming Multiprocessing; Time sharing; Online and real time processing; Library and Utility programs.

#### UNIT -V

**Data Communication & Computer Networks :** Element of a communication system, Data transmission modes; media and speed; digital and analog transmission; communication processors, Asyncronous and synchronous transmission; Switching technique; Network technologies; LAN & WAN; Communication protocols; Distributed Data Processing.

- 1. Computer Fundamental By P.K. Sinha Chapters: 1-5,7-10,12,14-16
- 2. Computer for Begineer By V.P. Jaggi and S.Jain. Chapters: 1,2,3,5,7.

## **APPLICATION SOFTWARES**

#### BCA-1.3

## Full mark-100 (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

• Learn basic word processing skills with Microsoft Word, such as text input and formatting, editing, cutting, copying and pasting, spell check, margin and tab control, keyboard shortcuts, printing, as well as how to include some graphics such as pictures and charts.

• In general, develop an intuitive sense of how that software works and how it can be used to make your academic work more efficient.

• Skill to work with MS Word, Excel, and PowerPoint.

• Initiation into the process of writing business letters or job applications, tabulating data, preparing PPTs, etc. using MS Office.

#### UNIT-I

**Word Processing (MS-Word):** Basics of word processing, text selection, opening document and creating document, sharing document, quiting document, cursor control, printing documents, using the interface(menu, toolbar),editing text(copy,delete,moves etc.)finding and replacing text, spell check feature, auto correct feature, grammar facility, auto text, character formatting, page formatting, page formatting, document enhancement,creating tables and news paper columns adding multiple columns, sorting blocks, adjusting margins and hypehenating document creating master documents, creating data source, merging documents using mail merge feature for labels and envelopes, graphics, using documents and wizards introduction to desk publishing (PM 7)

#### UNIT-II

**Spreadsheeet(MS-Excel):** Work sheet basics, data entry cells, entry of numbers, text and formulae, moving data in worksheet, moving around the work sheet, selecting data range using the interface(tool bar, menus)Editing bacics, Working with workbooks, saving & quitting, call referencing, formatting and calculations, calculations and worksheet using auto fill, working with formulae, efficient data display with data formatting(number formatting, date formatting etc.)working with ranges, worksheet printing, working with graphics & charts, adding formatting text data with auto format, creating embedded chart using chart wizard, sizing and moving parts, updating charts, changing chart types creating separate chart sheets, adding titles, legened and grid lines, printing charts intro to Macros.

## UNIT -III

**Introduction to MS-Power Point:** How to create a simple presentation in power point and present the power point show through power point view.

## UNIT -IV

**MS-Access:** Introduction to Database, Generating tables & Forms, Query & Report, Forms & Query. Single column report, Group/totals reports, summary reports, Tabular reports Customizing report.

## UNIT -V

**MS-Access:** Creating forms without using wizard, customizing forms, Modifying forms, How to Import & Exports, using condition in a Macro, Data transfer using macro Introduction to Access Basic, Event procedure, Access basic Constructs etc.

- 1) Microsoft Office by Dinesh Maidisani
- 2) Microsoft Office by Ramesh Bangia

# BCA-1.4 Full mark-100 Lab-I

#### Learning outcomes :

Upon completion of this course, students will be able to:

- To give detailed knowledge of MS-Office.
- Student will be able to compose, format and edit a word document, ppt, excel.
- Demonstrate the basic technicalities of creating Word documents for office use.
- Create and design a spreadsheet for general office.
- Demonstrate the basic technicalities of creating a PowerPoint presentation.
- Demonstrate the practices in data & files management.

Applicationf Softwares: Practical using MS-Word, MS-Excel, MS Power Point and MS-Access

## DISCRETES MATHEMATICS - I BCA-2.1 Full mark-100 (Internal-20, Term End-80)

#### Learning outcomes :

Upon successful completion of this course, students should be able to:

- Apply knowledge of discrete mathematics appropriate to the discipline.
- Understand the basic concepts of Sets, Relations Functions, Matrices, Mathematical logic, and Group theory.

• Impart knowledge regarding relevant topics such as set theory, basic logic, graphs, trees, or discrete probability.

- Develop analytical ability to solve real-world problems using these methodologies.
- Develops formal reasoning.
- Creates habit of raising questions.
- Knowledge regarding the use of Discrete Mathematics in Computer Science.
- Helpful in formulating questions.

• Ability to communicate knowledge, capabilities, and skills related to the computer engineer profession.

### UNIT -I

Propositions and logical operaters, constraction of Truth Table, Tantology, contradiction, implication, NAND and NOR, principle of induction.

Partial ordered set, Laltices, ocncept of Boolean Algeraic, Basic lows and experession Tranformulations of experssion as sum of product forms.

#### UNIT -II

Normal forms, set operation, Relation, properties and operations on relation, Function, direct type of function.

#### UNIT -III

Defination of matrix, Types, Operation and Properties of matrix, Univers and rules of matrix, Solution of system of equation, Eigen values vectors and characteristics, equation of matrix, simple problems of premulation and combinations.

#### UNIT -IV

Recursion, Recursion, Binary operators, Algebric, Group and its properties, Semi-group cyclic, permulation group, cosets, Lagrange's Theorem, Normal semi-group.

#### UNIT -V

Basic concept of Graph Theory, connectedness and directed graphs, Balerian and Hamiltonios.

#### Books Recommended

1) Discrete mathematics by N.CH, S.N. Lyengar, V.M. Chandra sekhar, K.A. Venkatesh and P.S. Arunchaloum, (Vikas publishing House, New delhi Chapter:1,2,3,4,5,6 & 7)

2) Fundamental Approch to Discrete mathematics by D.P. Acharya Sree kumar (New age int. publishers New Delhi)

- 2) A text book of Algebra and theory of Equation by Chandrika Prasad(Pathasala Private Limited; Allahabad Chapter;7(7.1-7.6) & II)
- 3) Higher Calculus By G. Samuel, U.K.Mohapatra, S.C.Jena & T.Biswal, (Vidyapuri, Balu Bazar) Chapter : 1-9, 11 & 12 (12.1-12.5).

# 'C' LANGUAGE

#### BCA-2.2

## Full mark-100 (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

• Learn advanced structured and procedural programming and improve C programming skills.

• Understand the basic structure of a C program.

• Gain knowledge of various programming errors.

• Enable the students to make flowcharts and design an algorithm for a given problem.

- Enable the students to develop logic and programs.
- Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers, and their usage.
- Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures.
- Students must be able to define union and enumerate user-defined data types. Develop

confidence for self-education and ability for life-long learning needed for Computer language.

• Understanding a functional hierarchical code organization.

## UNIT-I

Introduction of 'C' Basic structure of 'C' Programs Programming style & Executing C program. Introduction to character Set, C' Tokens, Keywords & Identifiers, Constants, variables & Data type uses & declaration. Introduction of operators, Type conversions in expressions, operator procedure and associavity mathematical functions.

## UNIT-II

Introduction to decision making with IF statement, The if else statement, Nesting of a if else statement and the Else...if ladder. The switch statement, the ?: Operators and go to statement. Introduction to while statement, the Do statement, The for statement and Jump in loops.

## UNIT-III

Introduction to Arrays, declaration and initialization of one dimension Array, Dynamic Arrays and more about Array. Declaring and Initalizing string variables, Reading strings from Terminal, writing to string, string handling functions and table of strings.

## **UNIT-IV**

Introduction of user-defined function definition of function and its declaration Nesting of functions. Passing Arrays tofunction and passing strings to function. Introduction of structure variables and its declare and initialization. Accessing structure members. Array

of structures, within structures and structure & functions, Unions, Size of structure and Bit field.

### UNIT -V

Introduction to pointers, Declaring Pointer variables Initialization Pointer variables, chain of pointer, pointer expression, Array of pointers, pointers to function, pointer and structures. Introduction to defining and opening a file: Closing a file, Input/Output operation on file Error handling during I/O operations and Random access to files.

#### Books Recommended

1) ANSI C by E. Balaguruswamy.

# **OPERATING SYSTEM(CUI,GUI)**

## BCA-2.3

#### Full Mark-100

#### (Internal-20, Term End-80)

#### Learning outcomes :

• Upon completion of this course, students will be able to:

• Deliver a detailed knowledge of integral software in a computer system – Operating System.

- Understand the working of the operating system as a resource manager.
- Familiarize the students with Process and Memory management.
- Describe the problem of process synchronization and its solution.
- Ability to apply CPU scheduling algorithms to manage tasks.

• Initiation into the process of applying memory management methods and allocation policies.

• Knowledge of methods of prevention and recovery from a system deadlock.

## UNIT-I

Evolution of operationg system, Resident monitor, batch processing, multiprogramming, multiprocessing time sharing, realtime System, I/O interrupts, DMA, dualmode operation operating system services.

### UNIT-II

File System, File concepts, file Attributes, File operation File type, File Structure, access methods, sequential access, index sequential access and direct access, directory structure, structure, single level, two level, tree structure, file protection and access control.

#### UNIT-III

Process concepts, process state transition diagram procee control block, process scheduling schedulers, CPU scheduling.

#### UNIT-IV

CPO/IO brust cycle, scheduling algorithms; FCFS, SJF, Priority, round robin. Deadlock, resource allocation graph, deadlock preventation, detection and recover.

#### **UNIT-V**

Logical verses physical address space, overlays, swapping, contiguous allocations single partition and multiple partition, internal and external memory fragmentation, non-contiguous allocation, paging, demand paging, concept of virtual memory, page replacement algorithms FIFO, Optimal and LRU.

- 1. Operating system concept By A sibernchatz and Peter B. Galvin (Addition Wesly) Chapter: 1-5,7-10
- 2. Operating system By Andrews S. Tanenbaum (PHI)
- 3. An Introduction to operating system By H.M Dietel (AdditionWesly)

## BCA-2.4

## Full Mark-100

### Learning outcomes :

Upon successful completion of the course, a student will be able to:

- Understand the basic terminology used in computer programming.
- Write, compile and debug programs in Language.
- Create programs involving decision structures, loops, strings and functions.
- Design programs involving structures and pointers.

Lab-II(C-Language)

# NUMERICAL ANALYSIS AND STATICAL METHOD (MATH-II)

## BCA-3.1

## Full Mark-100

#### (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

- Learn how to perform error analysis for arithmetic operations.
- Demonstrate working of various numerical methods.

• Provide a basic understanding of the derivation and use of methods of interpolation and numerical integration.

• Impart knowledge of various statistical techniques.

• Develop students' understanding through laboratory activities to solve problems related to the above-stated concepts.

• Skill to choose and apply appropriate numerical methods to obtain approximate solutions to difficult mathematical problems.

• Ability to apply various statistical techniques such as Measures of Central Tendency and Dispersion.

• Understanding of the relationship between variables using the method of Correlation and Trend Fit Analysis.

• Skill to execute programs of various Numerical Methods and Statistical Techniques for solving mathematical problems.

## UNIT-I

Error and interpolation; numerical diffentiation and integration.

#### UNIT-II

Solution of algebra and transcendental equation, solution of system of linear equations, numerical solution of ordinary differential equations.

#### UNIT-III

Measures of central value, moments, measures of dispersion and skewness and kurtosis

## **UNIT-IV**

Probability and expected values, theoretical distribution, binomial; poission and Normal Distribution.

## UNIT-V

Tests of Hypothesis : x<sup>2</sup>-test, t-test, f-test, Analysis of variance.

- 1. Numerical Analysis by Dutta & Jena : Chapter. 1,2(2.1-2.14), 3(3.1-3.3 & 3.7-3.14), 4(4.14-4.6), 5(5.1-5.4) & 6(6.1-6.3)
- 2. Statical methods by S.P Gupta (S.Chand & Sons)

# DATA STRUCTURE

#### BCA-3.2

## Full Mark-100 (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

• Introduce the fundamental concept of data structures and emphasize the importance of data structures in developing and implementing efficient algorithms.

- Familiar with basic techniques of algorithm analysis.
- Familiar with writing recursive methods.
- Master the implementation of linked data structures such as linked lists and binary trees.

• Familiar with several sub-quadratic sorting algorithms including Selection sort, Insertion sort, etc.

• Master analyzing problems and writing program solutions to problems using the above techniques.

• Describe how arrays, records, linked structures, stacks, queues, and trees are represented in memory and used by algorithms.

• Describe common applications for arrays, records, linked structures, stacks, queues, and trees.

• Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs.

- Demonstrate different methods for traversing trees.
- Compare alternative implementations of data structures with respect to performance.
- Describe the concept of recursion, give examples of its use, describe how it can be

implemented using a stack.

• Discuss the computational efficiency of the principal algorithms for sorting and searching.

## UNIT-I

Data, Data Structure, Algorithmic notation. Complexity (Fundamental Idea Only). Operations on data structure Linear array (Representation, traveral, insertion, deletion, reverse), Two-dimensional array (representation only) record, record structure, representation of records in memory, parallel array.

#### UNIT-II

Stack, operation on stack, few application of stack linerqueue, circular queue, priority queue.

## UNIT-III

Single linked list. Memory representation of linked list traversing linear list, searching a linked list, insertion into and deletion from linked list, Reverting a linked list, Circular list.

#### **UNIT-IV**

Tree, Binary tree, Representation of Binary tree in memory, Binary tree traversal. Binary search tree. Threaded binary tree, AVL tree(Idea only).

## UNIT-V

Searching Linear and Binary Search Sorting:- selection, Bubble, Insertion, Quick.

Books Recommended.

1. Data Structure by S. Lipshutz(Tata McGraw Hill)

2. An Introduction to the Data Structure with application by. JP. Tremblay & P.G. Sorenson(McGraw Hill)

# INTRODUCTION TO RELATION DATABASE MANAGEMENT SYSTEM (RDBMS)

## BCA-3.3

#### Full Mark-100

#### (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

- Introduce the students to the database system.
- Learn how to design a database by using different models.
- Enable the students to understand the database handling during the execution of the transactions.
- Understand the handling of databases by concurrent users.
- Gain complete knowledge of SQL.
- Familiarization with Database Management System.
- Comprehensive knowledge of database models.
- Ability to code database transactions using SQL.
- Skill to write SQL programs.

#### UNIT -I

**Basic concept of database system:** Advantages of DBMS, 3 level architecture for DBMS, Data independence, Database access, DDL, DML. Database administrator. Data modelling, E-R diagram.

#### UNIT -II

**Database file structure:** Sequential, indexed-sequential and direct access files, indexed and hashing techniques.

#### UNTI -III

Relation Model: Structure of relation database, Base table, view.

#### UNIT -IV

Relation algebra, set operation, relation operation, selection, projection, join and division operations, Normal forms.

#### UNIT -V

Hierarchical data model: Tree structure diagrams, physical and logical database records, data retrival, virtual records. Internal representation like HSAM, HISAM, HDAM and HIDAM. Network data model: Data Structure diagrams, DBTG CODASYL MODEL, DBTG retrieval and update facilities.

- 1. An Introduction to database system By. C.J. Date(Naros) Chapters 1-6, 12, 14, 16-19, 24-26.
- 2. An Introduction to database system By. B.C. Deasi (Golgatia) Chapter: 2,4.

## BCA-3.4

# Full Mark-100 LAB-I (RDBMS): Practical Using Unit-I, Unit-II, Unit-III, Unit-IV & Unit-V 3.3

#### Learning outcomes :

Upon completion of this course, students will be able to:

• Understand the different issues involved in the design and implementation of a database system.

• Study the physical and logical database designs, database modeling, relational, hierarchical, and network models.

• Understand and use data manipulation language to query, update, and manage a database.

• Develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency

• Explore programming language and operating system facilities essential to implement real-time, reactive, and embedded systems

• Discuss limitations of widely-used operating systems, introduce new design approaches to address challenges of security, robustness, and concurrency

- Give an understanding of practical engineering issues in real-time and concurrent systems; and suggest appropriate implementation techniques
- Populate and query a database using SQL DML/DDL commands.

# COMPUTER ORGANISATION

## BCA-4.1

## Full Mark-100

## (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

- Understand about concepts of Computer Organization and design.
- Understand and implement Instruction codes and op-codes.
- Understand Registers, Computer Instructions, timing and control.
- Gain complete knowledge about combinational and sequential circuits, boolean algebra,

truth table, and logic gates.

- Understanding about flip-flops, multiplexers etc.
- Understand CPU basics, Stack Organization, Instruction format, Addressing formats.
- An in depth understanding of how different hardware components are related and work

in coordination.

• An ability to understand computer buses and input/output peripherals.

## UNIT-I

#### **Combinational and sequential circuits**

Boolean algebra, truth tables, synthesis of logic functions using AND, OR, NOT, NAND, NOR, XOR gates, minimization of logical expressions, karnough maps, flip-flops, master slave and edge triggered flip-flops, registers and shift registers, counters, decoders, multiplexers.

## UNIT-II

**Arithmetic and logical organization:** Addition and substraction using 1's and 2's complement, binary adder, Parallel adder, carry look ahead adder, multiplication, Booth's algorithm, Division, floating point operations.

## UNIT -III

**CPU Organisation:** Instruction and Instruction sequencing, Instruction formats(Zero, one and two address Instruction).

## UNIT -IV

Addressign modes (Register, Absolute, Immediate, Indirect, Indexed, Auto increment and auto decrement) Stack queue and subroutine.

## UNIT-V

Input-Output Organisation input-Output devices. Interrupts, handling multiple devices, Vector Interrupts Simultaneous Request, Direct memory access (DMA). Channels.

## **Books Recommended**

1. Computer Organization By Hamacher (Tata McGraw Hill)

2. Computer System Architecture 3/ed (PHI)

# OOPS Language Using C++

## BCA-4.2

## Full Mark-100

## (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

- Give an overview of benefits of Object-Oriented Programming (OOP) approach over the Traditional Programming approach.
- Deliver comprehensive view of OOP concept.
- Impart detailed knowledge of a powerful object-oriented programming language -C++.
- Familiarization with a widely used programming concept Object Oriented Programming.
- Develop logical thinking.
- Skill to write codes in C++ by applying concept of OOP, such as Objects, Classes,

Constructors, Inheritance etc., to solve mathematical or real-world problems.

• Ability to isolate and fix common errors in C++programs.

## UNIT-I

Introduction, data types,keyword, operators, expression conditional, iterative, braching statements, function, pointer, stucture.

## UNIT-II

OOP in C++, Objects, Class

## UNIT-III

Constructor, Destructor, Operator, Overloading and type coversion.

## UNTI-IV

Inheritance, Functional Overloading

## UNIT-V

Virtual function, input-output files.

- 1. Object Oriented programming with C++ By E. Balagutuswamy (TMH).
- 2. OOP in Trubo C++ By Robert Lafors (Galgotia publication)

## HUMAN RESOURCE MANAGEMENT

## BCA-4.3

## Full Mark-100 (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

• Understand the nature and scope of human resource management with its proper meaning and definition.

• Impart detailed knowledge of human resource planning including its importance, factors, and process.

• Give an overview about job and selection process.

• Familiarization with different kinds of concepts like Performance appraisal/Merit relating concepts, wage and salary administration and incentive payment.

• Understand the importance of human resource management in industrial relations and trade union.

## UNIT-I

Nature and Scope of Human Resources Management, meaning and Defination, Scope, Function and objective, Evoluation of Human Resource planning.

Meaning and Defination, Importance of Human Resource planning, Factor aspecting Human Resource, planning, Human Resource planning process, Requirment for successful Human Resource planning, business to Human Resource planning.

#### UNIT-II

Job analysis : Meaning, process, methods of collecting job data, problems with job analysis.

Job Design : concept, Factors affecting process, constraints, Sources.

Selecting : Meaning, Role, Process, Business to selection.

#### UNIT-III

Performance Approisal/Merit Relating concept, Meaning, Defination, Objective, Process, Methods, Merits and procedures pf performance, Appraisal/Merit Relating.

Job Evaluation : Concept, scope, Process job Evaluation, Methods, Advantages, and Limitations of job.

## UNIT-IV

Wage and salary administration : Concept, principles, objectives, Theories of wagesiron low, Wages feend, Residual climate, Marginal productivity, Bargaining theory, Morden theory, Types of wages-time wage and piece wage system.

Incentive payment : Meaning and Difination, Merits, Demerits, pre-for on effective incentive system. Scope, types of incentives, Schemes, incentives, Schemes is indian industries, Non-financial incentives.

## UNIT-V

Industrial Relations : Concept, Nature, Importance, Approaches, practices to IR, IR strategy, Role of HRM.

Trade Union : Concept. Nature, Why do employess join union? Strategic choices beofre unions, Trade union movement in india.

Disputes and their Resoluation : watrse of disputes, cause, settlement of disputes, collective bargaining, code of discipline, grievance procedure.

- 1) HRM : K. Aswaltappa
- 2) Hrm : P. Subba Rao

## BCA-4.4

#### Full Mark-100

# LAB-II C++ Practical using Unit-I, Unit-II, Unit-III, Unit-IV & Unit-V of 4.2

#### Learning outcomes :

Upon completion of this course, students will be able to:

- Practically familiar with basic techniques of algorithm analysis.
- Practically isolate and fix common errors in C++programs
- Identify and practice the object-oriented programming concepts and techniques
- Practice the use of C++ classes and class libraries, arrays, vectors, inheritance and file

I/O stream concepts.

- Creating simple programs using classes and objects in C++.
- Implement Object Oriented Programming Concepts in C++.

# **OPERATION RESEARCH**

#### BCA-5.1

#### Full Mark-100

## (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

- Formulate a real-world problem as a mathematical programming model.
- Understand the theoretical workings of the simplex method for linear programming and perform iterations of it by hand.
- Understand the relationship between a linear program and its dual, including strong duality and complementary slackness.

• Solve specialized linear programming problems like the transportation and assignment problems.

## UNIT-I

Linear Programming Problems, Simplex method.

## UNIT-II

Duality, Integer Programming.

## UNIT-III

Assignment and transporation methods.

UNIT-IV

Elements of Game Theory, PERT; C.P.M

## UNIT-V

Sequencing.

**Books Recommended** 

1. Operation Research By S.D. Sharma (Kedar Nath Ram Nath & Co.) Chapter 1-3, 5-10 of Unit-II % 1, 6 & 7 of Unit-IV

## DATA COMMUNICATION AND COMPUTER NETWORK

## BCA-5.2

Full Mark-100 (Internal-20, Term End-80)

#### Learning outcomes :

It will help students in understanding of various types of computer networks, technologies behind networks and application protocols, e-mail and communication protocols will be introduced to students through this subject.

Upon completion of this course, students will be able to:

- Become familiar with the basics of computer networks.
- Become familiar with network architectures.
- Become familiar with fundamental protocols.
- Become familiar with basic network computing techniques.
- Explain how communication works in computer networks and to understand the basic terminology of computer networks.
- Explain the role of protocols in networking and to analyze the services and features of the various layers in the protocol stack.
- Understand design issues in Network Security and to understand security threats, security services and mechanisms to counter.
- Administer and maintain a computer network.
- Demonstrate basic understanding of network principles.
- Demonstrate understanding of how computers communicate with each other and the methods employed to assure that the communication is reliable.

• Have a good understanding of the OSI Reference Model and in particular have a good knowledge of Layers 1-3.

#### UNIT-I

**Introduction to computer networks:** Advantages of networks, structure of the communication network, point-to-point and multi drop circuit, data flow and physical circuits, Network topologies and design goals, switched and non-switched options, channel speed and bit rate, voice communication and analog wave forms, bandwidth and frequency spectrum, digital signals, modem, synchronous and aynchronous transmission Communication among computers.

**Traffic control and accoutability:** WAN and LAN, connection oriented and connection less networks, classification for communication protocols. Time Division Multiple Access (TDMA), Time Division Multiplexing (TDM), Carrier sence (Collision) system, token passing, (priority system).

UNIT-II

Layered Protocols, Network and OSI model: Goals of layered protocols, network design problems, communication between layers, layers of OSI, OSI Status, Pooling/Selection Protocols; Character and bit protocols, binary synchronous control (BSC) formats and control cedes HDCL, HDLC Options HDLC frame format code Transparency and synchronization, HDLC control field, commands and responses, HDLC, transmission process, HDLC subsets.

#### UNIT -III

Local Area Network & Primary attributes of LAN: Broadband and baseband LAN,IEEE LAN Standard, Relationship of 802 standards to the ISO/CCITT Model; Connection options with Lans LLC and Mac protocols, data Units. LAN topologies and protocols, CSMA/CD and IELE 805.3 collisions, token Ring (Priority). IEEE 802.5 Priority scheme, token bus and IEEE 802.4, Switching & Routing.

#### UNIT -IV

TCP/ IP, TCP/IP and internetworking, TCP/IP operations and sockets IP address structure, major features of IP, IP datagram, Major IP services. IP source routing value of transport layer, TCP major features of TCP; passive and active opens.

#### UNIT -V

Transmission control blocks (TCP), TCP segments, user datagram protocols(UDP) Route discovery protocol. Application layer protocol, Personnel computer as a server. Linked the PC to main frame computer, file transfer in personnel computers, personnel computers and Local Area Network.

- 1. Computer Networks 2/e by U. alack (PHI Publication) Chapter. 1-4,6,10,11.
  - 1. 2. Computer Networks By A.S. Tranebum (PHI Publication) Chapter: 1,2 (Excluding 2.1 and 1.6),3.

# VISUAL BASIC, INTERNET AND WEB DEVELOPMENT

## BCA-5.3

## Full Mark-100 (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

- Understand the concepts of windows Programming.
- Develop applications using Visual Basic.
- Creating dialogs, menus, windows and use Windows common dialogs.
- Developing modular, reusable Visual Basic code and forms.
- Demonstrate knowledge of programming terminology and how applied using Visual.
- Develop a Graphical User Interface (GUI) based on problem description.
- Develop an Event Planning Chart based on problem description so as to define the processing that is to occur based on specific event.
- Develop programs that retrieve input from a file as opposed to input only provided by user.
- Understand website development in a user friendly manner.
- Improve the visual design and content structuring.
- Understand the concept of HTML to develop their web development skill.
- Understanding the use of HTML tags.
- Designing and Developing web pages using HTML.

## UNIT-I

Introduction of Visual Basic- What's it All about: culture shock2 Basic toolbar, functions of the bottons & Visual Basic ToolBox. ASTROLL-Project Window, Form Window & Properties Window & Toolbox. Objects, events, properties & methods, Learning Visual Basic. 32 Bit and 16 Bit application. Naming Conventions, Design Consideration.

Forms and Controls (Part one) Form Objects, Picture box object, Command botton object & menu object. Listing code & safeguarding Project.

Forms and Control (Part Two)- Text box object, List box objects & properties, Events & methods. Timer objects, frame object, option botton object, check box object, Line object, Image Object, Shape Object, Drive List box object Directory List Box objects & File list Box Object.

## UNIT-II

Creating Modules & Procedures, Private and public sub procedures, passing parameters to procedures, function procedures, variables, Array & constants, Various types Arrays & constants. Print & Print form methods, Saving & Reading data, data control & database files, Sequential files. Control Arrays, Error Trapping. Help files, Mouse & Keyboards Events, Dynamic & Pre-defined dialogs. Database in Visual Basic, Table & Queriesm Modifying table etc.

#### UNIT-III

**Internet:** Introduction to Internet, Understanding Internet, Hardware and Software requirement of internet, internet service providers, protocols (HTTP, FTP, TCP/IP)IP address, URL, World Wide, Web Browser, Web Page.

#### UNIT-IV

**HTML:** Standard text formatting tags, color, linking image loading, table frame set ,form.

#### **UNIT-V**

**DHTML:** Java script, Data types, programming logic, functions, use of functions in HTML code, objects in Java script.

- 1. The Internet Complete Reference By Hartey Hann (TMH).
- 2. HTML 4.0 By E.Stephen Mark, Jaaen Plaff BPB Pub.
- 3. HTML 4.0 By E.Holzschalg. Techmedia.
- 4. Visual Basic By Mandeep S.Bhatia.
- 5. Visual Basic By Ramesh Bangia.

## BCA-5.4

### Full Mark-100

## UNIT-I

## LAB-I; VB, HTML Practical Using

## Unit-I, Unit-II, Unit-III, Unit-IV, & Unit-V of 5.3

## Learning outcomes :

Upon completion of this course, students will be able to:

- Design, create, build, and debug Visual Basic applications.
- Apply arithmetic operations for displaying numeric output.
- Apply decision structures and loop structures for determining different operations.
- Write and apply procedures, sub-procedures, and functions to create manageable code.
- Create one and two dimensional arrays for sorting, calculating, and displaying of data.
- Write Visual Basic programs using object-oriented programming techniques including

classes, objects, methods, instance variables, composition, and inheritance, and polymorphism.

• Write Windows applications using forms, controls, and events

# SYSTEM ANALYSIS AND DESIGN

## BCA-6.1

#### Full Mark-100

#### (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

• Understand both the nature of 'information systems analysis and design' and its various components.

• Demonstrate knowledge on the different phases of Systems Development Life Cycle (SDLC).

• Appreciate the use of systems design techniques, methodologies, and tools.

• Identify various types of information systems concepts and terminologies.

• Explain the types of business needs that can be addressed using information technology based solutions.

• Discuss the initial phases of the System Development Life Cycle (SDLC) using analytical tools and quantitative techniques used to identify problems.

• Define problems and opportunities that initiate projects.

• Write clear and concise business requirements and convert them into technical specifications.

## UNIT-I

**Overview of system analysis and design:** Business system concept System development life cycle, project selection, Feasibillity study, analysis, design, Implementation testing and maintanance.

## UNTI-II

**Project selection:** Source of project request, managing project reveiw and selection, preliminary investigation.

Unit-III

Feasibillity Study: Technical and Economical feasibillity cost and benefit analyasis.]

## UNIT-IV

System requirement specification and analysis, fact finding technique, data flow diagrams, data dictionary, process organization and integrations.

## UNIT-V

Decision tree and tables, structured English detailed design; Modularization, module specification, file organization and data base design.

- 1. Analysis and Design of Information System By James A.S.
- 2. System Analysis and Design By Award EH.
- 3. System Analysis and Design By Lee B.S (NCC)

## COMPUTER ORIENTED ACCOUNTAING SYSTEM

## BCA-6.2

#### Full Mark-100

## (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

- Understanding the meaning of book keeping and accounting concept.
- Gain knowledge about trail balance and final accounts, depreciation.
- Introduces financial management goals and relationship of finance to accounting.
- Familiarization with different terms like long term financing, retaining earnings, equity,

preference and debenture capital.

• Understanding the working of capital management, credit management, inventory

management and working capital financing.

## UNIT -I

**Book Keeping and Accounting:** Meaning to book keeping and accounting, accounting concept and convention accounting equation, accounting procedure.

practical system of books keeping Journal, Ledger, Cash book, banking transaction and reconcilliation statement.

## UNIT -II

Trial balance and final accounts, depreciation.

## UNIT -III

Introduction to financial management goals and key activities relationship of finance to accounting. Long term financing, Retaining earnings, equity, preference and debenture capital.

## UNIT -IV

Element of working capital management, cash management, credit management, inventory management and working capital fiancing.

## UNIT -V

Entry of fiancial transactions and preparation of ledges, trial balance, facial accounts by using Tally package.

# OBJECT ORIENTED PROGRAMMING LANGUAGE (JAVA)

## BCA-6.3

## Full Mark-100

### (Internal-20, Term End-80)

#### Learning outcomes :

Upon completion of this course, students will be able to:

- Covers software design, implementation, and testing using Java.
- Understands fundamentals of basic java programming.
- Introduces object-oriented design techniques and problem solving.
- Emphasizes development of secure, well-designed software projects that solve practical real-world problems.
- Be able to use the java SDK environment to create ,debug, & run simple java program.
- Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.
- Read and make elementary modifications to Java programs that solve real-world problems.
- Validate input in a Java program.
- Identify and fix defects and common security issues in code.
- Document a Java program using Javadoc.
- Use a version control system to track source code in a project.

## UNIT -I

**Application Program:** Overview of Java Language, Constants, Variable, Data types, Operators, Expressions, Decision making, Branching, Loops.

## UNIT-II

OOP in Java, class, object and methods, Array, String, String buffer, Vectors, Interfaces.

#### UNIT-III

Package.

## UNIT-IV

Multi thereaded, Managing errors, Exception.

#### UNIT-V

APPLET PROGRAM: AWT, SWING, JDBC.

**Books Recommended** 

1. Java Completed Reference TMI PUBLICATION.

2. Programming with Java a Primer By E.Balaguruswamy.

# BCA-6.4 Full Mark-100 LAB-II: JAVA Programs using in Unit-I, Unit-II, Unit-II, Unit-IV & Unit-V of 6.3

#### Learning outcomes :

Upon completion of this course, students will be able to:

- Programs using classes and methods
- Programs using one dimensional and two dimensional arrays.
- Programs using strings and inheritance.
- Programs using interfaces and Packages.
- Programs to implement the exception handling mechanism
- Programs using multithreading

## BCA-6.5

#### Full Mark- 200

(Project Report-150, Viva & Presentation on Dessertation-50)

#### Learning outcomes :

By completing their Major Qualifying Project (MQP), WPI students will achieve the following

learning outcomes at a level at least equivalent to that of any entry level professional or graduate

student.

Students who complete a Major Qualifying Project will:

• Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal areas of study.

• Demonstrate skill and knowledge of current information and technological tools and

techniques specific to the professional field of study.

• Use effectively oral, written and visual communication.

## PROJECT

Each student has to under go a summer placement training of four weeks at the end of their second year course in an Industry/Business Organisation to gain first hand experience and knowledge of Practice and prepare a project report at his own cost and has to submit a report within four weeks from the completion of such training to the principal of the concerned institution. The Report shall be examined Jointly by an internal and an external and an external examiner in which the minimum pass marks shall be 50 %.