OFFICE OF THE REGISTRAR : DIBRUGARH UNIVERSITY : DIBRUGARH

Ref. No. DU/DR-A/6-1/17/1639 Dated:19.09.2017

NOTIFICATION

As recommended by the 117th Meeting of the Under Graduate Board (Emergent), held on 18.09.2017 vide Resolution No.02, the Hon'ble Vice Chancellor is pleased to approve the drafts of the ***Programme Project Report*** of the ***B.C.A. Programme*** conducted in ***Open and Distance Learning mode*** by the ***Directorate of Open and Distance Learning***, Dibrugarh University under report to the Academic Council, Dibrugarh University giving effect from the Academic Session 2018-2019. The same is available with this notification in the Website: ***www.dibru.ac.in.***

Issued with due approval.

Sd/-Dr. B.C. Borah
Deputy Registrar (Academic)
Dibrugarh University.

Copy to:

1. The Vice-Chancellor, Dibrugarh University.
2. The Deans, Dibrugarh University.
3. The Registrar, Dibrugarh University.
4. The Controller of Examinations, Dibrugarh University.
5. The Director, Directorate of College Development Council, Dibrugarh University.
6. The Director, Directorate of Open and Distance Learning, Dibrugarh University for information and needful.
7. The Programmer, Dibrugarh University with a request to upload the Notification in the Dibrugarh University website.
8. File.

Sd/-Dr. B.C. Borah
Deputy Registrar (Academic)
Dibrugarh University.

Programme Project Report (PPR) of Bachelor of Computer Application (BCA) Programme

Directorate of Open and Distance Learning (DODL)

Dibrugarh University

Programme Project Report (PPR) of Bachelor of Computer Application (BCA) Programme
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Programme's mission &objectives:

The basic objective is to open door of admission for computing courses for students, who have done the 10+2 and are interested in taking computing/IT as a career. After completing BCA programme , a student should be able to get entry level job in the field of Information Technology both in government and private sector.

Relevance of the program with HEI's Mission and Goals:

Dibrugarh University is one of the educational centres of excellence, seeking to amalgamate multi-disciplinary fields with numerous theoretical perspectives, the realm of cultural diversity with the praxis of knowledge, and region-specific issues with a global horizon.
It is one of the premier institutes of North-East-India imparting computer education. Dibrugarh University initiated its journey of imparting computer education by establishing a Computer Centre in 1976. The Computer Centre was established with the objective of creating Computer awareness among the teachers, research scholars and employees of the University. It started Computer education by introducing a "Six-months Certificate Course on Computer Programming".

BCA course was introduced in the Parent Department in the year 2004. Considering the necessity of enabling the youths who wants to pursue a career in Computer Applications andwho are either employed orself-employed and are unable to pursue higher education due to economic or otherreasons, the Directorate of Open and Distance Learning(DODL) has set the mission of introducing BCA programme and taking IT Education to the doorsteps of the learners. And likewise BCA programme was introduced in the year 2011

Nature of prospective target group of learners:

The target group is Higher Secondary or a 10+2 level passed candidate from aHigher Secondary Examinations (10+2) of theAssam Higher Secondary Education Council or anequivalent examination (10+2) recognized as suchby the university .

Appropriateness of programme to be conducted in Open and Distance Learning mode to acquire specific skills and competence:

In today's 'Digital World' , knowledge about computers is very important. It helps a student excel over others who do not have a degree in Computer Application. The domain is growing

at a rapid pace. In the 1990's with the advent of globalization computers grew in prominence and slowly started to replace the paper and files in office.

BCA is a three year degree program. Students will be taught subjects which are related to the technological applications that are required intoday's practical work field. Students who opt for BCA will get skills and information not only about Computer and information Technology but also in communication organization and management.

The opportunities available for people doing BCA are galore.They can become software programmer , Network and System Administrator , Web designer etc. Mobile app design can also be done by them . Having a BCA degree will definitely give them a distinct upper hand above the others in the field.

Instructional Design:

Bachelor of Computer Application (BCA) is a three year degree programme spread across six semesters in which learners will be exposed to various areas of computer applications including the latest developments in IT. The basic objective of the programme is to open a channel for admission to computing courses for learners who have done 10+2 and are interested in taking computing as a career. It comprises of 30 courses including practical and project work. The learners, who successfully complete all the six semesters will be awarded the degree of Bachelor in Computer Application (BCA).

The methodology of instruction in DODL will be different from that of the conventional universities.Distance Education system is more learner-oriented, and the student has to be an active participantin the teaching-learning process. Most of the instruction is imparted through a distance with only asmall component of face-to-face communication. DODLfollows a multi-channel approach forinstruction. It comprises a suitable mix of:

- self-instructional printed material
- audio / video cassettes and CDs
- face-to-face counselling at Study Centres by academic counsellors
- reference library at study centre
- practicals
- teleconferencing
- Gyan- Malini

Course Structure for BCAprogramme under Distance Mode in Credit System:

Syllabus of BCA First Semester

Course code	Course Title	No. of assign-ments	Practical / Tutorial	No of Counselling sessions	Study Input	Credit
BCA - 101	Computer Fundamentals	3	120 hours	12	120 hours	4
BCA - 102	Mathematics - I	3	90 hours	9	90 hours	3
BCA - 103	Business Communication	3	120 hours	12	120 hours	4
BCA - 104	Grooming	3	120 hours	12	120 hours	4
BCA - 105	Digital Design	3	120 hours	12	120 hours	4
BCA - 106	Programming in C (Practical)	3	60 hours	6 hours	60 hours	2

Syllabus of BCA Second Semester

Course code	Course Title	No. of assign-ments	Practical / Tutorial	No of Counselling sessions	Study Input	Credit
BCA - 201	Mathematics - II	3	60 hours	6hours	60 hours	**2**
BCA - 202	Discrete Mathematics	**3**	90 hours	9 hours	90 hours	**3**
BCA - 203	Data Structure Using C & ++	**3**	120 hours	12 hours	120 hours	**4**
BCA - 204	Accounting & Financial Management	**3**	90 hours	9 hours	90 hours	**3**
BCA - 205	Computer Architecture & Organization	**3**	120 hours	12 hours	120 hours	**4**

Syllabus of BCA Third Semester

Course code	Course Title	No. of assign-ments	Practical / Tutorial	No of Counselling sessions	Study Input	Credit
BCA - 301	Mathematics - III	3	90 hours	9 hours	90 hours	3
BCA - 302	Theory of Computing	3	120 hours	12 hours	120 hours	4
BCA - 303	Internet and Web Programming Technology	3	120 hours	12 hours	120 hours	4
BCA - 304	Computer Graphics	3	120 hours	12 hours	120 hours	4
BCA - 305	Design and Analysis of Algorithms	3	120 hours	12 hours	120 hours	4
BCA - 306	Uses of Internet and its Application (Practical)	3	60 hours	6 hours	60 hours	2

Syllabus of BCA Fourth Semester

Course code	Course Title	No. of assign-ments	Practical / Tutorial	No of Counselling sessions	Study Input	Credit
BCA - 401	Numerical Analysis & Scientific Computing	3	90 hours	9 hours	90 hours	3
BCA - 402	Database Management System	3	120 hours	12 hours	120 hours	4
BCA - 403	Operating Systems	3	120 hours	12 hours	120 hours	4
BCA - 404	Programming Paradigms	3	120 hours	12 hours	120 hours	4
*BCA - 405	Environmental Studies					
BCA - 406	RDBM Using Oracle (Practical)	3	60 hours	6 hours	60 hours	2

***Compulsory paper in any degree course .Only Grade is given.**

Syllabus of BCA Fifth Semester

Course code	Course Title	No. of assign-ments	Practical / Tutorial	No of Counselling sessions	Study Input	Credit
BCA - 501	Data Communication & Computer Network	3	4	12hours	120 hours	4
BCA - 502	Operation Research	3	90 hours	9 hours	90 hours	3
BCA - 503	Software Engineering	3	120 hours	12 hours	120 hours	4
BCA - 405	Project Work (Minor)					2

Syllabus of BCA Sixth Semester

Course code	Course Title	No. of assignmen	Practical / Tutorial	No of Counselling sessions	Study Input	Credit
BCA – 601	Ethics in Information Technology	3	4	12	120 hours	4
BCA - 602	System Software	3	120 hours	1	120 hours	3
BCA - 603	Project Work (Major)					4

Total 30 courses and 99 credits

Detail Syllabi for
Bachelor of Computer Application (BCA)

Detailed Syllabus of BCA 1st Semester

BCA – 101 : Computer Fundamentals (4 credits ; Total no of units : 14)

Block - 1

Introduction to Computer Fundamental and Information Technology

Brief history of development of computers, computer system concepts, capabilities and limitations, type of computers :Analog, Digital, Hybrid, General, special purpose, Micro, Mini, Mainframe, Super Computers.

Complete Elaboration of Computer generation, Personal Computers, Types of Personal Computers - Laptop, Palmtop etc.

Block - 2

Computer Organisation and Working

Computer System

Basic Components of Computer System

Input Devices

Output Devices

Storge Devices

Block - 3

Computer Software

Need & Types of Software

Need of software, Types of Software, System Software and application software, Programming Languages, machine, Assembly, High level 4 GL, their Merits and Demerits. Application Software - Word processing, spread sheet, Presentation Graphics, Database Management Software.

Computer Virus

Introduction to Computer Virus

Disadvantages of Computer Virus

Types of Computer Virus

Introduction to opearting systems.

2. BCA – 102 :MATHEMATICS – 1 (3credits ; Total no of units : 9)

Block - 1

Mathematical Logic & Discrete Structures

Logic

Prepositional Logic - Syntax, Scmantics, Laws of deduction normal forms, Resolution, theorem proving, First Order logic - Universal & existential Quantifiers, syntax, terms of Predicate.

Combinatories& Discrete Structures
Permutations, Combinations, Counting & summation, sets, Cartesian Product relations, their types, Functions Partial Orders & Lattices.

Block - 2
Mathematical Statistics & Matrix Algebra
Collection of data, frequency distribution, measures of central tendency and dispersion, probability - concepts, Baye's theorem, concepts on Discrete & continuous random variables & distributions - binomial, Poisson and normal distributions.

Complex Numbers & Matrix Algebra
Complex number as an ordered pair, operations on complex numbers, DeMoivere's Theorems, roots of complex numbers. Elementary concepts, Matrix operations, rank and inverse of a matrix, solution of algebraic equations - consistency conditions, Determinants and their properties.

3. BCA – 103 : BUSINESS COMMUNICATION (3credits ; Total no of units : 9)

Block - 1
Business communication and self development

Introducing Business Communication
Basic Forms of Communication, Communication models and processes
Effective Communication, Theories of Communication, Audience analysis

Self-Development and Communication
Development of positive personal attitudes
SWOT analysis, Vote's model of interdependence
Whole Communication

Corporate Communication
Formal and Informal Communication Networks
Grapeving, Miscommunication (Barriers)
Improving Communication

Block - 2
Principles of Effective Communication

English Grammar
The Noun, The Pronoun, Articles,
The Adjectives, the Verb
Practices in Business Communication
Group Discussions
Mock Interviews, Seminars, Effective Listening Exercises.
Individual and Group Presentations and Reports Writing

Writing Skills
Planning Business Messages, Rewriting and Editing.
The First Draft, Reconstructing the Final Draft, Business Letters and Memo Formats.
Appearance Request Letters, Good News and Bad News letters, Persuasive Letters, Sales Letters, Collection Letters, Office Memorandum.

Block -3
Report Writing and Presentation Skills

Report Writing
Introduction to a proposal, Short Report and Formal Report,
Report Preparation

Oral Presentation
Principles of Oral Presentation, Factors Affecting Presentation,
Sales Presentation, Training Presenrtation, Conducting Surveys,
Speeches to Motivate, Effective Presentation Skills,
Interview Skills -
Appearing in Interviews, Conducting Interviews, Writing Resume
And Letter of Application.

4. BCA - 104 : GROOMING(4 credits ; Total no of units : 2)

Block -1
Personality Development

Personality and its Characteristics
Theoretical Perspectives of Personality
Personality Traits,
Personality Development,
Stages of Childs Personality Development,
Role of relationships in Personality Development,
Challenges in Childs Personality Development.

Biological and Physical Aspects of Personality Development

Biological and Physical Aspects of Personality,
Impact of Physical Appearance.

Personality & Interpersonal Skills
Leadership of Personality,
Leadership Framework
Influence of leadership
Personal Skills,
Inter Personal Skills,

Block-2
Communication Skills & Other Factors of Personality

Communication Skill
Communication Barriers,
Importance of Non-Verbal Communication,
Enhancing your Communications,
Better Public Speaking and Presentation Writing Skills.

Discipline and the Management
Building of Self Discipline
Key Ingrained of Self Discipline
The Pareto Principle
Time Management Tools

Types of Self Assessment
Self Assessment Tools
Habits of highly effective people,
Under Standing Yourself,
Secrets of Happiness,
Balancing our life.

5. BCA – 105 : DIGITAL DESIGN (4 credits ; Total no of units : 14)

Block - 1
Representation of Information
Number System, Arithmetical Operations
Binary, Octal and Hexadecimal, Positive and negative numbers, fixed and floating point, Addition, substraction, Multiplication and division of numbers, ASCII Codes for error detection and correction, concept of Hamming Distance.

Block - 2

Logic Design & Circuits
Boolean Algebra & Switching function, Minimisation and realization using logic gates, Multiplexers, decorders, encoders
Flip flops, registers and Counters.

6. Programming in C (Practical) **(2credits)**

This lab course is completely based on C. The basic objective of the course is to provide the hands on experience on C Programming and improve the practical skill set. Also to apply all the concepts of C programming. The learner will try to apply the alternate ways to provide the solution to a given problem. The learner will be able to develop the logic for the given problem, recognize and understand the syntax and construction of C code, gains experience of C , know the steps involved in compiling, linking and debugging C code, feel more confident about writing the C functions, write some complex programs .

Detailed Syllabus of BCA 2nd Semester

BCA – 201 : MATHEMATICS –II (2credits ; Total no of units : 6)

Block - 1
Differential Calculus

Limitations, Theorems & Lagrange's Multiplier
Limits, Continuity and differentiability, Rolle's Theorem, MTVs, Taylor's and Maclauriu's Theorems with remainders, indeterminate forms, partial derivatives and differentials, Euler's Theorems or homogeneous functions, maxima and minima of single Multiple variables Language's Multiplier.

Block - 2
Integral & Differential Calculus

Integral Calculus
Indefinite integral, Elementary methods of integration, definite integrals reduction formulae, application of integral calculus - length, area, volume Idea of multiple integrals.

BCA – 202: DISCRETE MATHEMATICS (3credits ; Total no of units : 9)

Block - 1
Algebric Structures

Fundamental Concepts & Vectors
Groups, Rings, Fields, spaces - linear
Dependence of Vector, linear transformation, bilinear forms, eigen values and eigen vectors.

Block - 2
Graph Theory

Fundamental Concepts, algorithms & applications
Basic terminologies of graph theory, Multigraphs and weighted graph, paths and circuits, planar graphs, trees and rooted trees, spanning trees and cut sets, colouring covering and portioning directed graphs, enumeration of graphs, ideas on graphs theoretic algorithm and applications.

BCA – 203 : DATA STRUCTURE USING C & C++ (4 credits ; Total no of units : 14)

Block - 1
Basic Concepts

Fundamental
Data Structures, Algorithms and types of applications,

Basic Data Types
Stack, Queues, Lists & Recursion

Block -2
Trees & Sets

Trees
Definition and implementation binary tree, tree traversal, postfix, prefix notations, heap.

Definition and implementation of hash table, priority queues

Block -3
Algorithms & File Structure

Sorting Algorithms
Quick sort, insertion sort, Bubble sort, merge sort.

Searching Algorithms
Linear search, Binary search, depth first search and Breadth first search techniques.

File Structure
Sequential, Index Sequential Files Structure.

BCA – 204 : ACCOUNTING AND FINANCIAL MANAGEMENT
(3 credits ; Total no of units : 9)

Bock -1
Fundamental of Accounting & Final Accounting

Accounting
Principles, concepts and convention, double entry system of accounting, introduction of basic books of accounts of sole proprietary concern, control accounts for debtors and creditors, closing of books of accounts and preparation of trial balance.

Final Accounts
Trading, Profit and loss accounts and balance sheet of proprietary concern with normal closing entries, introduction to manufacturing account, final account of partnership firms, limited company.

Block -2
Financial Management & Ratio Analysis

Financial Management
Definitions, Role and their applications.

Role Analysis
Meaning, Advantages, Limitations, types of ratios and their usefulness.

Block-3
Fund Flow statement & Costing

Fund Flow Statement

Meaning of the terms - fund, flow of fund, working capital cycle, preparation and interpretation of the fund flow statement.

Costing
Nature, importance and basic principles, budget and budgetary control, nature and scope, importance, method of finalization of master budget and functional budgets.

Block-4
Marginal & standard costing and introduction to computerized Accounting system.

Marginal Costing
Nature, Scope and importance, break-even analysis, its uses and limitation, construction of break even chart, practical application of marginal costing.
Standard Costing
Nature and scope, computation and analysis of variances with reference to material cost, labour, labour cost and overhead cost, interpretation of the variances.

Introduction to computerized Accounting System
Coding logic and codes required, master files, transaction files, introduction to document used for data collection, processing of different files and outputs obtained.

BCA - 205 : COMPUTER ARCHITECTURE AND ORGANISATION

(4 credits ; Total no of units : 14)

Block-1
The Von Neumann Architecture & ALU Organisation
The Von Neumann Architecture
Details of Von Neumann Architecture
Simple ALU Organisation, Arithmetic Processor

Block-2
Control Unit & Memory Organization
Control Unit
Hardwired and Microprogrammed Control
Memory Organisation
Primary Memory, Secondary Memory, High Speed Memory, Virtual Memory.
Block-3
I/O Transfer, Peripherials& Assembly Language Programming
I/O Transfer
Program Controlled, interrupt Controlled and DMA
Peripherals & Assembly Language

Introduction to Computerbuses, Peripherials, performance bench marking and current trends in architecture/ Assembly language programming.

Detailed Syllabus of BCA 3rd Semester

BCA – 301 : MATHEMATICS - III(3credits ; Total no of units : 9)

Block - 1
Complex Variables

Limit & Continuity, differential Equation
Limit, Continuity, differentiability and analyticity of functions, Cauchy- Riemann equations, Laplace Equations, Cauchy Integral formulae.

Block-2
Advanced Topics & Transform Calculus

Advanced Topics
Infinite Sequences and series of real and complex numbers - their converegences, improper integrals, Power Series, radious of convergence, power series methods for solution of ordinary diffrential equations, legendre equations and legendre polynomials, Bessel equations and Bessel functions of first and second kind.

Transform Calculus
Laplace transforms, inverse transform, shifting on the s & t axes.

BCA – 302: THEORY OF COMPUTING(4 credits ; Total no of units : 14)

Block - 1
Regular Expression & Non-Deterministic Finite Automata

Regular Expression
Introduction, Kleene closure, formal definition, algebra of regular expression, regular languages.

Finite Automata
Finite Automata, Finite automata as output devices.

Non-Deterministic Finite Automata
Introduction to NFA, equivalance of NFA and DFA, Pumping lemma, closure properties.

Block-2
Context free Grammar & Turing Machine

Context Free Grammar
Grammar and its classification, Push down automata (PDA), Non Context Free Languages (CFL), pumping lemma for CFL, Equivalence of CFG and PDA.

Turing Machine
Formal definition, Transition, Diagram, construction of turing machine, language accepted and decided by turing machine Chomsky hierarchy.

BCA – 303 : INTERNET AND WEB PROGRAMMING TECHNOLOGIES
(4 credits ; Total no of units : 14)

Block - 1
Internet Technology and Protocol
Introduction to Internet
Internet, growth of Internet, structure of Internet, Internet History of world wide web, Basic Internet Terminology.
Internet Technology and Protocol
Internet Protocol : TCP/ IP, SLIP, PPP, Network and network devices
Addressing in Internet - DNS, domain name and their Organisation, Understanding the Internet Protocol address, Client - Server concept - architecture and application.

Block - 2
World Wide Web & b Browsers
World Wide Web
Evolution, of WWW, Basic features, servers http, URL, search Engine, Searching categories, Hypertext.
Browsers
Basic features, Book marks, customization of browsers, Netscape communicator and internet explorer.
Interactivity Tools
HTML, ASP, VB-Script, Java Script.

BCA – 304: COMPUTER GRAPHICS(4 credits ; Total no of units : 14)

Block - 1
Graphics System & Output Primitives

Graphics System

Introduction, Overview of Graphics System, Video display devices, input devices, hard copy devices, graphics software.

Output Primitives
Points and lines, live drawing alogorithms, circle and ellipse generating algorithms filled area primitives, attributes of output primitives.

Block - 2
Geometrical Transformation & Computer Animation

Geometrical Transformations

Basic transformations, translations, rotation and scaling viewing and viewing functions.

Clipping operations & Animation
Point clipping line clipping etc.Text clipping, Introduction to computer animation and Virtual reality.

BCA – 305 : DESIGN AND ANALYSIS OF ALGORITHMS
(4 credits ; Total no of units : 14)

Block - 1
Fundamental algorithmic analysis & Strategies

Basic Algorithmic analysis
Asymptotic analysis of upper and average complexity bounds, best, average and worst case behaviours, big-O, little -O, g and f notation, standard compexity closes, empirical measurements of performance, time and space tradeoffs in algorithms, using recurrence relations to analysis recure sine algorithms.

Fundamental Algorithmic Strategies
Brute-force, greedy divide and conquer, backtracking, branch and bound, heuristics, pattern matching and string text algorithms, numerical approximation.

Block - 2
Fundamental Data Structure
Strategies &Agorithms

Fundamental Data Structure
Implementation strategeis for graphs and trees, Performance, issues of Data Structures.

Algorithms
Classes, P, NP, Polynomials reducibility, NP-Completeness.

BCA –306 :Uses of Internet and its Application (Practical) 2 credits

Detailed Syllabus of BCA 4th Semester

BCA – 401 : NUMERICAL ANALYSIS AND SCIENTIFIC COMPUTING
(4 credits ; Total no of units : 14)

Block - 1
Overview & Roots of equation

Overview
FORTRAN Language Preliminaries, Floating - Point representation of numbers with finite Precision and its consequences, Concept of truncation and rounding - off errors, stability, consistency and convergence.

Root of Equations
Iterative Methods - bisection, false - position, Newton - Raphson, solution of Polynomial equations, solution of simultaneous linear equations - Gaussian Elimination, Pivoting.

Block - 2
Curve Fitting, Differentation& Integration

Curve Fitting & Interpolation
Methods of least Squares, finite differences, Newton's Interpolation Formulae, Languages' Formula for unequal intervals, Newton's divided difference for unequal intervals, Newton's divided difference formula.

Differentation and Integration
Differentiation by Polynomial fit, Integration by Newton's Quadrature formula, trapezoidal rule, Simpson's rules, Solution by Taylor's Series, Euler's Method, Picard's Method runge - Kutta Method.

BCA - 402 : DATABASE MANAGEMENT SYSTEM (4 credits ; Total no of units : 14)

Block - 1
Databases, Data modeling& Storage

Databases & Database Users
Database system concepts and architecture data Models, Schemas and instances architecture database languages and interfaces, classification of DBMS.

Data Modeling Using E-R model
A complete approach to E-R model Concept.

Record Storage & Primary File Organisation
Introduction, Secondary storage devices, buffering of blocks, operations of files, Files of unordered record (heap files, Files of ordered records (sorted files), hashing techniques, Index structures for files, Single level Ordered Indexes, Multilevel indexes, Dynamic multilevel indexes using B trees and B+ trees.

Block - 2
Data Models & Concepts

Relational Data Models
Relational model concepts, relational model constraints, update operations on relations, defining relations.
Relational Algebra
Relational Database languages : SQL

Conventional Data Models
Network data model
Hierarchical Data Model.

Block - 3
Database Design & Transaction Concept

Database Design
Functional Dependencies and Normalisation for Relational Database.

Transaction Processing Concept
Introduction, transaction and system concept, Properties, schedules and recoverability, serialability of schedules, concurrency Control, Errorrecovery and security.

BCA - 403 : OPERATING SYSTEM(3credits ; Total no of units : 9)

Block - 1
Process & Memory Management

Process Management

Process, thread, Scheduling Conccurrency, Mutual Exclusion, synchronization, Semaphores, Deadlocks

Memory Management
Allocation, Protection, Hardware Support, Paging segmentation

Block - 2
Virtual Memory &File System

Virtual Memory
Demand Paging, Allocation, replacement,
Swapping, Segmentation, TBLS.

File System
Allocation, Free Space Management, Directory Management, Mounting

I/O Management
Device Drivers, Disk Scheduling, Block I/O, Character I/O, Use of Unix/ Linux as a running example, Examples from Dos, NT.

BCA - 404 : PROGRAMMING PARADIGMS (4 credits ; Total no of units : 14)

Block - 1
Overview of Functional & relational

Overview of Functional Paradigm
Overview of the declarative style programming versus the imperative style Introduction to value-oriental programming in the functional style in the context of a language such as ml. local definitions and scope, block structure, principle of Qualification.

Functions
Principle of abstraction, call by name and call by value parameter passing mechanisms. Principle of correspondence, recursive functions and their implementation, type constructions such as products, sums function types, lists and user defined data types, Parametric polymorphism (ml style) and single programs using higher order functions,. Lists and other user defined types.

Block - 2
Relational Paradigm

Introduction to logic programming using a language such as PROLOG.

Imperative Paradigm

Variables declarations and allocation of space, impletation of simple control constructs such as sequencing, conditionals and loops, block structure, parameter passing mechanisms call by value, call by name, impletation of recursive procedures in a block structured language (call stacks & display records).

Object Oriented Paradigm
Data abstraction, classes, inheritance, dynamic, dispatch, derived classes, friends classes, Virtual functions, operator Overloading, Templates. Object oriented software architecture, introduction to UML.

BCA - 405 : ENVIRONMENT STUDIES

Block - 1
Study of Nature, Resources and Eco-System

Unit - 1
The Multidisciplinary Nature of Environment Studies-
Introduction
Objective,
Environment,
Multidisciplinary Nature of Environment Studies,
Scope
Importance of Environment
Need for Awareness.

Unit - 2
Natural Resources
Introduction,
Objective,
Forest Resources,
Water Resources,
Mineral Resources,
Food Resources,
Energy Resources,
Land Resources,

Unit - 3
Eco-System
Introduction
Objective,
Concept of a Ecosystem,
Structure and function of an Ecosystem,
Producers, Consumers and Decomposers,
Energy flow in the Ecosystem,

Ecological Succession,
Food Chains, Food webs and Ecological Pyramids,
Introduction, Types, Characteristic Feature, Structure and Function,

Block - 2
Bio-Diversity and Pollution Control

Unit - 1
Bio-Diversity & its Conservation
Introduction,
Objective,
Biographically Classification of India,
Value of Biodiversity, Consumptive Use, Productive Use, Social, Ethical, Aesthetic and Option Values,
Biodiversity at Global, National and Local Levels,
India go a Mega-Diversity Nation,
Hot-Spots of Biodiversity,
Threats to Biodiversity: Habital loss, poaching of Wildlife, Man-Wildlife Conflicts, Endangered and Endemic Species of India,
Conservation of Biodiversity : In-Situ and ex-situ and ex-situ conservation of biodiversity.

Unit - 2
Environment Pollution -
Introduction
Objective,
Casves, Effects and control,
Solid waste Management :Canves, Effects and control Measures of Urban and Industrial Wastes,
Rde of an individual in Prevention of Pollution,
Pollution Management : Floods, Farthquoakes, Cyclone and Land-Slides.

Unit - 3
Social Issues and the Environment
Introduction
Objective,
Unsustainable to Sustainable Development,
Water Conservation, Rain water harvesting, Watershed Management,
Resettlement and Rehabilitation of People its Problems and concerns, Case Studies,
Environmental Ethics; Issues and Possible Solution,
Climate Change, Global Warming Acid Rain, Ozone layer Depletion, Nuclear
Accidents and Holocaust, Case studies
Wasteland Reclamation
Consumerism and Waste Products,
Environment Protection Act,

Air (Prevention and Control of Pollution) Act.
Water (Prevention and Control of Pollution) Act.
Wild life Protection Act,
Forest Conservation Act,
Issues Invaded in enforcement of Environment Legislation,
Public Awareness.

Block - 3
Study of Population Growth and Case Studies

Human Population and Environment
Introduction,
Objective,
Population growth, Variation among Nations,
Population Explosion - Family Welfare Programme,
Environment and Human Health,
Human Rights,
Value Education,
HIV/AIDS,
Women and Child Welfare,
Role of Information Technology in Environment and Human Health, Case Studies.

Field Work
Introduction,
Objective,
Visit to a Local Area to Document Environmental Assets - River, Forest, Grassland, hill, Mountain,
Visit to a local Polluted Site - Urban/Rural/Industrial /Agricultural,
Study of Common Plants, Insects and Birds,
Study of simple Ecosystem -Pond, river, Hill, Slopes etc. (Field Work Equal to 5 Lea cure Hours).

BCA – 406: RDBM Using Oracle (Practical) 2 Credits

Detailed Syllabus of BCA 5th Semester

BCA – 501 : Data Communication and Computer Networks
(4 credits ; Total no of units : 14)

Block - 1
Computer Network, Communication & Transmission Errors

Computer Network

Introduction to Computer Networks, Types of Networks
Network Topologies.
Network reference Models
OSI reference Model
Tcp/IP reference Model

Communication
Introduction,
Mathematical basis of Data Communication,
Analog and digital Transmission,
Parallel and Serial Communication,
Asynchronous and synchronous Communication,
Multiplexing &Demultiplexing

Transmission Errors
Detection & Correction of transmission errors, Data compression & Encryption

Block - 2
Description of Layers, Protocols & Applications

Description of Layers
Physical Layer
Data link layer
Network layer Transport layer
Session layer
Presentation Layer
Application Layer

BCA - 502 : Operation Research(3credits ; Total no of units : 10)

Block - 1

Model Formulation

Introduction, Structure and assumption of an Linear Programming problem (LP), General mathematical model of linear programming problem.

Graphical Solution Method

Introduction, Definitions, graphical solution method of an LP problem, multiple optimal solution, unbounded solution, infeasible solution.

Block - 2

Simplex Method

Introduction, standard from of LP problem, simplex algorithm (maximisation case), Simple Algorithm (Minimization case), multiple optimal solution, Unbounded Solution.

Duality

Introduction, Formulation of dual linear problem, standard results on duality, advantage of duality.

Block - 3

Transportation problem

Introduction, Loops in transportation table and their properties, the transporation method, Linear programming formulation of the transportation problem, north west corner method for finding initial solution, Least cost method for finding initial solution. Vogel's approximation method for finding initial solution.

Test of optimality

Dual of transportation model, economic interpolation of U S and V S, step of MODI method.

BCA - 503 : Software Engineering(4 credits ; Total no of units : 14)

Block - 1

Introduction to Software Engineering & Project Management

Introduction to Software Engineering

Concept of a Software project, size factor, Quality and Productivity factor different phases of Software development life Cycle.

Software Project Management

P{planning scheduling, Monitoring, Controlling etc. Requirement Specifications Software design function Oriented, object oriented approaches, users interfaces Software Programming, Structured Coding Techniques, coding Styles, Standard.

Block - 2

Software Verification, Validation & Reliability

Software Verification & validation

Theoretical Foundation, Block box and white Box approaches, Integration & system Testing.

Software Reliability

Definition and Concept of reliability, software faults, Errors, Repair and availability.CASE Studies.

Test of Optimality

Dual of transportation Model, Economic interpolation of US & VS, step of MODI Method.

Protocols
Complete Description of Protocols used at each Layer of OSI reference Model

Applications
Description of applications at Each layers like Transmission Media, guided & Unguided Medial, repeaters, Hubs, Bridges, Switch IP addresses, Sub-netting, FTP, Telnet HTTP & Internet.

BCA - 504 Project Work (Minor) 2 credits

The main objective of this project course is to provide learners a platform to demonstrate their practical and theoretical skills gained during the last semesters of study in BCA Programme.

Students are encouraged to spend some time of the fifth semester working on a project preferably in a software industry or any research organization. Topics selected should be not be much complex. The courses studied by the students during the BCA Programme provide them the comprehensive background knowledge on diverse subject areas in computer science such as computer programming, data structure, DBMS, Computer Organization, SAD, Software Engineering, Computer Networks etc., which will be helping students in doing project work

Detailed Syllabus of BCA 6th Semester

BCA – 601 : Ethics in Information Technology (4 credits ; Total no of units : 14)

Block - 1
Objectives & Values of Ethics

Objectives
Meaning of Ethics, objectives of ethics, Nature and source of Ethics. Types of Ethics, Ethics Vs. Morals and values, Functions of Ethics.

Ethical Codes
Values of Ethics, Norma's, Beliefs, Moral Standards, Beliefs and their role, Morality, Moral Standards, Beliefs and their role.

Block - 2
Ethical conduct & Issues in IT

Ethical Conduct
Managing Ethics, Ethical Activities, Key Organisational & Program Design, Factors, Associated with Ethics Comptiance, code of Ethics, Lows Enforcing Ethical conduct

Ethical issues in IT
Ethical issues IT, Security threats Attacks on Computer systems, computer viruses, software packages, computer crime Prevention, Internet crime and computer abuse, Main Moral dimensions of our Information society, Whistle Blowing, Professional Ethics for IT, Code of Ethics, Conduct and Practices, IEEE etc. ethics at work place.

BCA – 602 : System Software (3credits ; Total no of units : 9)

Block - 1
System Software & Assembler

Overview
Definition & classification of System software

Assembler
Assemble language, Assemble process, Assembler Data structures, assemble Macros and Microprocessors.

Block - 2
Linker & Loaders
Basic Concepts, Static & Dynamic linking shared, Loaders, Overlays

Block - 3
Compilers
Introduction & phases of a compiler
Lexical Analysis : Parsing & Intermediate code generation.

BCA – 603: Project Work (Major) 4 credits

The objective of the BCA project work is to develop a quality software solution by following the software engineering principles and practices. During the development of the project the students should involve in all the stages of the software development life cycle (SDLC). The main objective of this project course is to provide learners a platform to demonstrate their practical and theoretical skills gained during five semesters of study in BCA Programme. During project development students are expected to define a project problem, do requirements analysis, systems design, software development, apply testing strategies and do documentation with an overall emphasis on the development of a robust, efficient and reliable software systems.

Students are encouraged to spend maximum time of the sixth semester working on a project preferably in a software industry or any research organization. Topics selected should be complex and large enough to justify as a BCA final semester project. The courses studied by the students during the BCA Programme provide them the comprehensive background knowledge on diverse subject areas in computer science such as computer programming, data structure, DBMS, Computer Organization, SAD, Software Engineering, Computer Networks etc., which will be helping students in doing project work

Faculty and support staff requirement:
One Assistant Professor
One office assistant
One peon
Identification of media and student support service

- **Research and Media Support Service**

The Research and Media Support Service wing has been established with a two fold objective to facilitate in house research Distance Education as well as supplement the distance learners with multi-media facilities.It includes information about the various events organized by the Directorate, assisting inadministrative works, support with ICT tools etc.

Media Support Service provides supplementary support to the Distance Learners by the meansof
Radio Programmes GYAN -MALINEE : On every Thursday at 8pm from All India Radio, DibrugarhCentre, (M/W- 521.1)
• **Multi-media CDs :**The Directorate has decided to provide its learners with course related Video CDs, which may give a good support to the learning process of the learners.
• **Bulk SMS:** The Bulk SMS to the learners providing information regarding Counselling programmes, Personal Contact programmes, Assignments, Date and Results of Examination, other Administrative and Examination related information and so on. (if DO NOT DISTURB service is NOT activated in the contact numbers.)
• Updating all the necessary information in the website www.ddedu.org
• Internet facility :
All enrolled students of the Directorate can avail various facilities by logging in the website - www.dde.du.org. Some of the facilities, apart from the general information are -
• Assignment questions.
• Important dates.
• Result.
• Already broadcasted Radio programmes.

Student Support Service System :

- **Study Materials**

The Directorate has prepared all the study materials in the Self learning material (SLM) format in coordination with the course writers and editors through the help of the workshops sponsored by Distance Education Council, IGNOU, New Delhi

- **Personal Contact Programes / Counselling Programmes**

Directorate conducts weekend counselling for its learners. Theses weekend counsellings can be availed by willing students on payment of minimal fees which will be notified by the directorate in the induction meeting The personal contact programmes for undergraduate courses shall be provided by the study centers and the coordinators will inform the schedules to the students enrolled at their respective study centers .

- **Induction Meet**
  The DODL organises one day Induction Meet for the learners before commencement of counselling Sessions of first semester to give a clear map of the open and distance learning . It is a two way interactive meet .
- **Learners Meet**

  The DODL organises one day learners meet to address their different problems in thr process of learning.
- **Assemblaze**

  The Cultural and Sports confluence of DODL Learners . Assemlaze is organised every year for the learners of DODL.

Procedure for admissions, curriculum transaction and evaluation:
Eligibility for Admission:

- Higher Secondary or a 10+2 level passed candidate from aHigher Secondary Examinations (10+2) of the Assam Higher Secondary Education Council or an equivalent examination (10+2) recognized as such by the university .
- Fee Structure: Rs 2500/-per semester
  Rs 500 /-Counselling fees per semester
- Duration of the programme : Minimum: 3 Years
  Maximum: 6 Years
- Counsellimg sessions : Saturdays and Sundays.
- Notification for admission into BCA programme shall be advertised about three months prior to the commencement of the programme.

- Application seeking admission into the BCA programme shall have to submit all documents in original for verification at the time of admission.

- The list of the admitted candidates shall be submitted by the approved study centres to the DODL, D.U. for approval with the roll number allotted to them for their enrolment in(BCA) programme.

Medium and Method of Instruction :-

- English shall be the medium of instruction both in the classroom as well as in the University Examination.

- The counselling sessions including laboratory for BCA programme shall be conducted at study centres approved by the DODL, D.U.

Examination and Evaluations:-

1. Setting of question papers, moderation of question papers, evaluation of answer scripts, scrutiny, tabulation of marks etc and announcement of results shall be governed by the Dibrugarh University Examination Ordinance 1972 (as amended upto date).
2. There shall be end Semester examination for each batch.
3. The Examination(s) for the BCA Programme shall be as follows -

(i) End Sem. Examination in each theory course (paper) in BCA shall be of three hours duration and shall carry a maximum of 70 marks. Each theory course shall carry objective type of questions i.e. multiple choice questions, of 40 marks and long answer type of 30 marks.

(ii) 30 marks will be assigned in each course for internal assessment. The internal assessment shall be evaluated through Sessional Test, written assignments and quizzes in counselling programmes.

(iii)A candidate shall have to obtain a minimum of 50% marks in each theory and laboratory course in the End Semester examination and internal assessment separately in order to pass the course.

(iv) At the end of each examination the marks of various internal assessments and the Project Work shall be submitted to DODL, D.U. by the Co-ordinator of the approved study centres.

4. Pass percentage for individual courses both in theory as well as project work shall be 50%.
5. The following shall be applicable to the candidates who fail in the examination.
    a) Failure in two courses shall entitle the student to take the examination of the failed courses along with the next batch while pursuing next academic year.
    b) Marks of assignments and project work will be carried over in case of failed students.
    c) Failure in three or more courses (theory or practical) shall be considered as failed and will not be promoted to the next semester. Students who have failed in one semester have to repeat examination along with the next batch while continuing in the next academic year.

d) The BCA programme must be completed within a maximum of 12 semesters or 6 years.

e) A candidate who fails to appear in an examination after obtaining eligibility for appearing in the same amounts to losing a chance.

6. Candidates who pass all the courses of the BCA shall be considered eligible for the award of the degree of the BCA. The classification of grades for BCA programme as under:

Sl.No.	Percentage	Grade
1	90 - 100%	A-1
2	80-89%	A-2
3.	70 - 79 %	B-1
4	60 - 69%	B-2
5.	50- 59%	C
6.	Below 50%	F

Cost estimate of the programme for three (3) years and the provisions:

Cost estimate of the program is as follows (in Rs) :

Heads	**Expenditure (Rs.) (App.) Per 100 learners (in Rs)**	**Income (Rs.) (App.) Per 100 learners (in Rs)**	**Benefit (in Rs)**
Course Development	**1300000.00**		
Course Delivery	**200000.00**		
Maintenance	**100000.00**		
Total	**1600000**	**1800000**	**2,00000**

Note: Development includes SLM writing, editing, review, printing cost etc. Delivery includes expenses like postage, courier, door delivery of SLM. Maintenance includes the syllabus revision, SLM revision committee expenses etc.

Some amount of money will be needed to spend on learner support like face-to-face counselling, advertisement, library, production of DVDs, radio programmes, counselling , salary and other related administrative expenses.

Minimum Configuration of Computers

Hardware Requirements

The Directorate have sufficient number of Computers of most recent configuration so that not more than two students have to share one computer initially and in 1:1 ratio afterwards.

Software requirements

The institute have all the licensed software those are required for the course the institute must have at least 3 classrooms for conducting theory classes. One laboratory and other physical facilities for efficient management of the course.

The University recommends use of learner oriented dynamic methods of imparting Teaching Use of various teaching aids like OHP, LCD projectors, multimedia presentations computer assistance instructions etc. for better teaching learning Process are recommended.

Library Resources:

The Directorate of Open and Distance Learning, Dibrugarh University has a Library for its learners with sufficient books to help them through their studies. It has provision for distance learners to read as well as borrow books. Moreover, there is a provision for the learners to access the Dibrugarh University main library, Lakshminath Bezboroa Granthagar, with a present holding of approximately 175815 books and rare publications, apart from 18718 back volumes of journals, 3030 theses and dissertations. There is also a small library at DODL, DU attached with a reading room for the distance learners. It has more than 5,500 textbooks and reference books regarding different subjects including Computer Science.

Quality assurance mechanism and expected programme outcomes:

Need assessment and tracer studies will be conducted for quality assurance. Moreover, revision and updating of material from time to time will be done by obtaining feedback from students and resource persons . Moreover revision and updating of material by obtaining feedback from students and resource persons will be done. A high powered committee constituted with the Deans, HODs , Subject Experts from the University departments, Centres and the Directorate will also monitor the syllabus up gradation , curriculum design and other pedagogical and academic aspects of all programmes of the Directorate of Open and Distance Learning, Dibrugarh University.