Bachelor of Computer Application (B. C. A.) Course

181

FIRST SEMESTER

Paper No.	Subject	Theory (working hours/week)	Programming Lab (working hours/week)	Duration of university exams (hours)	Maximum Marks	
					End semester	Sessional
Paper 1.1	FUNDAMENTAL OF COMPUTERS	3	~~	3	75	25
Paper 1.2	MATHEMATICS I	3	~~	3	75	25
Paper 1.3	COMMUNICATIVE ENGLISH	3	~~	3	75	25
Paper 1.4	DIGITAL DESIGN	3	~~	3	75	25
Paper 1.5	PERSONALITY DEVELOPMENT	3	~~	3	75	25
Paper 1.6	LABORATORY Computer Fundamentals PROGRAMMING IN C	~~	6	3	75	25

TOTAL Marks 600

(SYLLABUS — BCA Course.)

HEAD
Computer Science Department
Tinsukia College
TINSUKIA

FEB 2015

PAPER –1.1 FUNDAMENTAL OF COMPUTERS

Total Marks: 100
(In-semester Evaluation-25 marks & End Semester Evaluation -75 marks)

Unit 1: Introduction to computer and information technology.

Marks: 20

Brief history of development of computers, computer system concepts, capabilities and limitations, types of computers: Analog, Digital, Hybrid, general, special purpose, Micro, mini, mainframe, super computers, generations of computers, personal computers, types of personal computers – Laptop, Palmtop etc.

Unit 2: Computer organisation and working:

Marks: 15

Basic components of computer system, Input devices, output devices, storage devices.

Unit 3: Computer softwares:

Marks: 20

Need of softwares, types of software, system software and application software, programming languages, machine, assembly, high level, 4GL, their merits and demerits. Application software-word processing, spread sheet, presentation graphics, database management software

Unit 4:

Marks: 20

Introduction to Computer virus, Introduction to Operating Systems(Disk operating system, Windows, Linux, Unix etc.)

BOOKS:

1. Introduction of Computer Sc. ITL ESL Pearson Education India
2. Rajaraman, V.: Computer Fundamentals

PAPER –1.2 MATHEMATICS I

Total Marks: 100
 (In-semester Evaluation-25 marks & End Semester Evaluation -75 marks)

Unit I - Mathematical Logic: Marks: 10
Prepositional logic – syntax, semantics, laws of deduction, normal forms, resolution, theorem proving; First order logic – universal and existential quantifiers, syntax, terms of predicate

Unit II - Combinatorics: Marks: 10
Permutations; Combinations; Counting; Summation

Unit III - Discrete Structures: Marks: 10
Sets; Cartesian product, relations – their types; Functions; Partial orders; Lattices,

Unit IV - Mathematical Statistics: Marks: 15
Collection of data, frequency distribution, measures of central tendency and dispersion; Probabilty – concepts, Baye's Theorem; Concepts on Discrete and Continuous random variables and distributions – binomial, Poisson and normal distributions

Unit V - Complex Numbers: Marks: 10
Complex number as an ordered pair, operations on complex numbers, De-Moivre's Theorem, roots of complex numbers

Unit VI - Matrix Algebra: Marks: 20
Elementary concepts, matrix operations, rank and inverse of a matrix, solution of algebraic equations – consistency conditions; Determinants and their properties

BOOKS:

1. *Discrete Mathematical Structure*; Trembly, Manohar, TMH
2. *Engineering Mathematics*; H.K. Dass, S. Chand
3. *Higher Algebra(Classical)*; S.K. Mapa, Ashok Prakashan
4. *Fundamental of Mathematical Statistics*; Gupta & Kapoor, S. Chand.

PAPER –1.3   Communicative English

Total Marks: 100
(In-semester Evaluation-25 marks & End Semester Evaluation -75 marks)

Unit I: 18 marks
General Introduction:

Importance of English its Position, Communicating in English: Difference between the spoken and the written form, How to start dealing with hesitation and shyness.

Pronunciation:

English vowels and consonants (RP), Getting to know the IPA, Words generally mispronounced-she, see, seat, cheat, etc, Difference between spelling and pronunciation, Choice of a proper model, Practical exercises.

Unit II: Grammar: 9 marks

Determiners, Tense, Use of prepositions, Common errors, Practical exercises

Unit III: Modes of Communication: 13 marks

Request, Command, Permission, Wish, Practical exercises

Unit IV: Conversation: 13 marks

Starting a conversation, Things to be kept in mind while engaging in conversation-fluency, accuracy, appropriateness, Planning, Turn taking, Practical exercises.

Unit V: Situational Conversation: 13 marks

Facing an interview board, Telephone talk, Wishes etc., Conversation with elders, friends, strangers etc., Terms related to different professions (Banking, Travel agency, Business etc.), Public speaking (Addressing a meeting; Debate; Group Discussion etc.), Practical exercises.

Unit VI: Features of Good Writing   9 marks

Writing reports, Writing letters for business and office use, Writing complaints, Placing orders

Books Recommended:
1. Bansal, R.K. and J.B. Harrison. *Spoken English for India*. Orient Longman.
2. Hornby, A.S. *Advance Learner's Dictionary of Current English*. OUP
3. Thorat, Ashok et al. *Enriching Your Competence in English*. Orient Longman
4. Singh, Vandana. *The Written Word*. Oxford.
5. Forum for English Studies. *Twentieth Century Prose*. Oxford
6. Bhatia, Pravin S.R. & Sheikh, A.M.: *Professional Communication Skill*. S. Chand.

PAPER –1.4   DIGITAL DESIGN

Total Marks: 100
(In-semester Evaluation-25 marks & End Semester Evaluation -75 marks)

Marks: 20

Unit I: Representation of information:
Number system: binary, octal and hexadecimal; positive and negative numbers, fixed and floating point
Arithmetic operations: addition subtraction, multiplication and division of numbers
Character codes: ASCII, codes for error detection and correction, concept of hamming distance

Marks: 20

Unit II: Logic Design:
Boolean algebra & Switching function. Minimisation and realisation using logic gates.

Marks: 15

Unit III

Multiplexers , decoders, encoders.

Marks: 20

Unit IV: Sequential circuits:

Flip flops, registers, and counters.

Books:

1.Moris Mano, *Digital Design 2/e*, PHI 1995.
2.Kohavi.Z. *Switching Finite automata theory*, 2/e Tata Mcgraw Hill,1995.
3.Malvino.A.P. and Leach .D.K., *Digital principles and applications*, Mc Graw Hill.

PAPER –1.5 PERSONALITY DEVELOPMENT

Total Marks: 100

(In-semester Evaluation-25 marks & End Semester Evaluation -75 marks)

Unit –I: Personality Meaning
Marks: 15

Personality determinants, personality traits –theory of personality – development of personality from infancy to maturity, emotions and personality

Unit –II: Attitude
Marks: 15

Concepts of attitude, formation of attitude, types of attitude, change of attitude values: concepts of values, types of values and behaviour habits learning and unlearning of habits.

Unit –III Motivation
Marks: 15

Meaning of motivation, nature of motivation, need of motivation personality development self development steps of personality developments.

Unit –IV Communication
Marks: 15

Meaning of communication ,communication process communication barriers

Unit –V
Marks: 15

Oral communication steps to effective communication, written communication weakness in written communication preparing presentation, how to write curriculum vitae.

BOOKS:

1. Mohan Krishna & Banerjee, Meera, *Developing Communication Skills*, McMilan India Ltd.

Paper –1.6 (LABORATORY) PROGRAMMING IN C

Total Marks: 100
(In-semester Evaluation-25 marks & End Semester Evaluation -75 marks)

Marks: 15

Unit I:

Introduction to C: character set, constants, variables, keywords, instructions
Data types in C

Marks: 20

Unit II:

Decision control structures, loop control structures, case control structures
Arithmetic and logical operators, bit wise operators, Type casting
Storage classes in C

Marks: 20

Unit III:

Functions, C pre-processors, Arrays, String handling

Marks: 20

Unit IV:

Structures, array of structures, union
Pointers, Dynamic Data Structures in C
File Handling .

Books:
1. Let Us C, Y Kanetkar, BPB
2. Programming in C , Gottfried , Schaum series

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SECOND SEMESTER

Paper No.	Subject	Theory (working hours/ week)	Programming Lab (working hours /week)	Duration of university exams (hours)	Maximum Marks	
					End semester	Sessional
Paper 2.1	MATHEMATICS II	3	~~	3	75	25
Paper 2.2	DISCRETE STRUCTURE	3	~~	3	75	25
Paper 2.3	DATA STRUCTURE	3	~~	3	75	25
Paper 2.4	ACCOUNTING & FINANCIAL MANAGEMENT	3	~~	3	75	25
Paper 2.5	ARCHITECTURE & ORGANIZATION	3	~~	3	75	25
Paper 2.6	LABORATORY Data structure in C, C++, TALLY	~~	10	3	75	25

TOTAL Marks   600

PAPER – 2.1 MATHEMATICS II

Total Marks: 100

(In-semester Evaluation-25 marks & End Semester Evaluation -75 marks)

Marks: 30

Unit I - Differential Calculus:

Limits, continuity and differentiability, differentiation, Rolle's Theorem, MVTs, Taylor's and Maclaurin's theorems with remainders, indeterminate forms, partial derivatives and differentials, Euler's theorem on homogeneous functions, maxima and minima of single and multiple variables – Lagrange's multiplier

Marks: 25

Unit II - Integral Calculus:

Indefinite integral, elementary methods of integration, definite integrals – reduction formulae, application of integral calculus – length, area, volume. Idea of multiple integrals

Marks: 20

Unit III - Differential Equations:

Ordinary differential equations of the first order, exactness and integrating factors, variation of parameters, solutions of homogeneous equations

BOOKS:

1. *Engineering Mathematics*; H.K. Dass, S. Chand
2. *Advance Engineering Mathematics*; E. Kreyszig, Wiley Eastern.
3. *Differential Equation*; Piaggio.
4. *Mathematical Analysis*; C. Malik, Savita Arora.

PAPER –2.2 ADVANCED DISCRETE STRUCTURES

Total Marks: 100
(In-semester Evaluation-25 marks & End Semester Evaluation -75 marks)

Unit I - Algebraic Structures: Marks: 30
Groups, Rings. Fields - fundamental concepts; Vector spaces – linear dependence of vectors, linear transformations, bilinear forms, eigen values and eigen vectors

Unit II - Graph Theory: Marks: 45
Basic terminologies, multigraphs and weighted graphs, paths and circuits, shortest paths in weighted graphs, Eulerian paths and circuits, Hamiltonian paths and circuits, planar graphs, trees and rooted trees, spanning trees and cut sets, colouring, covering and partioning, directed graphs, enumeration of graphs, ideas on graph theoretic algorithms and applications

Books:
1. Lipschutz, Seymour; Lipson, Marc. *Discrete Mathematics*, Second Edition. Schaum's Outlines, Tata McGraw-Hill, 2003.
2. Deo, Narsingh, *Graph Theory*, Prentice-Hall of India Private Limited.
3. Hoffman and Kunz, *Linear Algebra; Pearson Education* (Singapore)
4. V.K.Khanna and S.K. Bhambri; *A Course in Abstract Algebra;* Vikash Publishing House.

PAPER –2.3 DATA STRUCTURE

Total Marks: 100
(In-semester Evaluation-25 marks & End Semester Evaluation -75 marks)

Marks: 15

Unit I
Basic concepts: Data structure, algorithms.
Basic data types, stack, queues, lists. Recursion

Marks: 15

Unit I I
Trees: definition and implementation: binary tree, tree traversal, postfix, prefix notations, Heap

Marks: 15

Unit III
Sets: definition and implementation hash table, priority queues

Marks: 10

Unit IV
Sort algorithms: Quick sort, insertion sort, Bubble sort, merge sort.

Marks: 10

Unit V
Searching algorithms: Linear search, Binary search, depth first search and breadth first search techniques

Marks: 10

Unit VI
File Structure: Sequential, Index sequential file structure.

Books:
1. Weiss. M.A. *Data structure and algorithm analysis in C*. Addison -Wesley,1993
2. Tanenbaum, A.S.Langsam.Y.and Augenstein.M.J., *Data structure using C*; PHI,1996
3. Aho A.H.Hopcroft.J.E and Ullman J. *Data Structures and Algorithms* . Addison-Wesley,1987.

PAPER –2.4 ACCOUNTING AND FINANCIAL MANAGEMENT

Total Marks: 100

(In-semester Evaluation-25 marks & End Semester Evaluation -75 marks)

Unit 1:   Marks: 15

Accounting: Principles, concepts and conventions, 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 preparations 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.

Unit II: Marks: 15

Financial Management: Meaning and role

Ratio Analysis: Meaning, Advantages, Limitations, types of ratios and their usefulness

Unit III: Marks: 15

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

Unit IV: Marks: 15

Marginal Costing: Nature, scope and importance. Break-even analysis, its uses and limitations, 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 cost and overhead cost, interpretation of the variances

Unit V: Marks: 15

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

BOOKS:
1. Bhattacharya A. K. *Financial Accounting for Managers*: PHI
2. Bhattacharyya S. K.: *Accounting for Managers*: Vikas Publishing House
3. Chandra P : *Financial Management* : Tata McGraw Hill-

PAPER –2.5 COMPUTER ARCHITECTURE & ORGANISATION

Total Marks: 100
(In-semester Evaluation-25 marks & End Semester Evaluation -75 marks)

Unit I   Marks :10

The Von Neumann Architecture

Unit II: Marks :10
ALU organisation: Simple ALU Organisation, Arithmetic Processor

Unit III   Marks :10
Control Unit: Hardwired and Micro-programmed Control

Unit IV   Marks :15
Memory Organization: Primary memory, secondary memory, high speed memory, virtual memory.

Unit V   Marks :15
I/O Transfer: Program controlled, Interrupt controlled and DMA

Unit VI   Marks :15
Introduction to computer buses, peripherals, performance bench marking and current trends in architecture.

Unit VII   Marks :10
Assembly language programming.

BOOKS:
1. Tanenbaum.A.S. *Structured Computer Organisation*,PHI,1994.
2. Hamacher.V.C.Vranestic. Z.G.and Zaky,S.G. *Computer Organisation*,2/e McGraw-Hill,1990.
3. J.P Hayes, *Computer Architecture and Organisation*, McGraw Hill.1988
4. Pal Chaudhuri,.P. *Computer organisation and design*, PHI, 1994.

PAPER –2.6 Laboratory Based On Data structure in C, C++, TALLY

Total Marks: 100
(In-semester Evaluation-25 marks & End Semester Evaluation -75 marks)

Unit I – Practical on Paper 2.3

Marks: 45

Unit II – practical on Paper 2.4

Marks: 30

Bachelor of Computer Application (B. C. A.) Course

THIRD SEMESTER

Course No.	Subject	Theory (working hours /week)	Programming Lab (working hours /week)	Duration of university exams (hours)	Maximum Marks	
					End semester	Sessional
Paper -3.1	MATHEMATICS III	3	~~	3	75	25
Paper-3.2	THEORY OF COMPUTING	3	~~	3	75	25
Paper -3.3	INTERNET & WEB PROGRAMMING	3	~~	3	75	25
Paper -3.4	COMPUTER GRAPHICS	3	~~	3	75	25
Paper -3.5	OBJECT ORIENTED PROGRAMMING WITH JAVA	3	2	3 .	75	25
Paper –3.6	LABORATORY INTERNET, COMPUTER GRAPHICS	~~	10	3	75	25

TOTAL Marks   600

PAPER –3.1 MATHEMATICS III

Total Marks: 100
(In semester evaluation -25 & end semester evaluation -75)

Unit I - Complex Variables: **Marks:25**
Limit, continuity, differentiability and analyticity of functions, Cauchy – Riemann equations, Laplace equations, Cauchy Integral formulae,

Unit II - Advanced Topics: **Marks:30**
Infinite sequences and series of real and complex numbers – their convergence, improper integrals; Power series, radius of convergence, power series methods for solution of ordinary differential equations; Legendre equations and Legendre polynomials; Bessel equations and Bessel functions of first and second kind

Unit III - Transform Calculus: **Marks:20**

Laplace transforms, inverse transform, shifting on the s and t axes; Fourier transform and Fourier series

BOOKS:
1. E. Kreyszig , *Advanced Engineering Mathematics* , 5th edition , Wiley Eastern, 1985
2. Spiegel; *Complex Variable;* Schaum Series
3. Malik, S. C.; *Mathjematical Analysis;* Savita Arora

PAPER –3.2 THEORY OF COMPUTING

Total Marks: 100
(In Semester Evaluation –25 & End Semester Evaluation-75)

Marks: 20

Unit I:

Regular Expression: Introduction, Kleene closure, Formal definition, Algebra of regular expression, Regular languages
Finite Automata: Finite Automata, Finite Automata as output devices

Marks: 15

Unit II:

Non-deterministic Finite Automata: Introduction to NFA, equivalence of NFA and DFA, pumping lemma, closure properties

Marks: 20

Unit III:

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

Marks: 20

Unit IV:

Turing Machine: Formal definition, Transition diagram, Construction of Turing Machine, language accepted and decided by Turing Machine, Chomsky Hierarchy.

BOOKS:

1. Lewis, H.R.Papadimitriou, C.h.; *Elements Of Theory Of Computation*, PHI, 1996.
2. Hopcroft, J.D. Ullman: *Introduction To Automata Theory, Language And Computation*, Addison -WEISLEY.

PAPER –3.3 INTERNET & WEB PROGRAMMING TECHNOLOGIES

Total Marks: 100
(In semester evaluation -25 & End semester evaluation -75)

Unit I: Marks: 15

Introduction to Internet: Internet growth of internet, structure of internet, Internet history of world wide web, basic internet terminology.

Unit II: Marks: 20

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

Unit III: Marks: 15

World Wide Web: Evolution of www, basic features, servers, http, URL, search engine, searching categories, hypertext.

Unit IV: Marks: 10

Browsers: Basic features, bookmarks, customisation of browsers.
E-mail, ftp, telnet

Unit V: Marks: 15

Interactivity tools
HTML, ASP, VB- script, Java script

BOOKS:
1. Hain, Harley; *The Internet*. PHI
2. Balaguruswami, E; *Programing with Java*. Tata McGraw Hill.

PAPER –3.4 COMPUTER GRAPHICS

Total Marks: 100
(In semester evaluation -25 & end semester evaluation -75)

Marks:20

Unit I:

Introduction: Overview of graphics system: Video display devices, input devices, hard copy devices, graphics software

Marks:20

Unit II:

Output primitives: Points and lines, line drawing algorithms, circle and ellipse generating algorithms. Filled area primitives, attributes of output primitives

Marks:20

Unit III:

Geometrical transformations: Basic transformations, translations, rotation and scaling viewing and viewing functions
Clipping Operations: Point clipping, line clipping etc. Text clipping

Marks:15

Unit IV:

Introduction to computer animation and virtual reality

BOOKS:
1. D. Hearn and M.P.Baker, *Computer Graphics*, 2/e, PHI, 1997.

PAPER 3.5 – OBJECT ORIENTED PROGRAMMING USING JAVA

Total Marks: 100
(In semester evaluation -25 & end semester evaluation -75)

Unit I:

Marks: 15

Data Abstraction: Class, Object, Constructors, Destructors, Member allocations for objects, New and Delete operators.

Inheritance: Single, multiple, multilevel inheritance, hierarchical inheritance

Unit – II

Marks: 25

Polymorphism: Compile time polymorphism, Runtime polymorphism, Abstract Class, Dynamic Method Dispatch, Final Members and Classes.

Unit – III

Marks: 35

Multithreading, Packages and Interfaces.
Exception handling, Autoboxing
Abstract Window Toolkit, Swing, Java Beans.
Applets.

Books:

1. Herbert Shield: The Complete Reference to Java, Tata McGraw Hill
2. Head First Java, O'Reilly Series.

PAPER –3.6 LABORATORY BASED ON INTERNET, COMPUTER GRAPHICS, OBJECT ORIENTED PROGRAMMING WITH JAVA

Total Marks: 100

(In-semester Evaluation-25 marks & End Semester Evaluation -75 marks)

Unit I – Practical on Paper 3.3 = Network   Marks: 25

Unit II – Practical on Paper 3.4 = Graphics   Marks: 25

Unit II – Practical on Paper 3.5 = Java   Marks: 25

4th

Bachelor of Computer Application (B. C. A.) Course

FOURTH SEMESTER

Course No.	Subject	Theory (working hours/ week)	Programming Lab (working hours /week)	Duration of university exams (hours)	Maximum Marks	
					End semester	Sessional
Paper- 4 1	NUMERICAL ANALYSIS & SCIENTIFIC COMPUTING	3	~ ~	3	75	25
Paper- 4 2	DATABASE MANAGEMENT SYSTEM	3	~ ~	3	75	25
Paper - 4 3	OPERATING SYSTEM	3	~ ~	3	75	25
Paper- 4 4	SYSTEM SOFTWARE	3	~ ~	3	75	25
Paper- 4 5*	ENVIRONMENTAL STUDIES	3	~ ~	3	90	10
Paper- 4 6	LABORATORY (DBMS, OPERATING SYSTEM , System Software)	~ ~	10		75	25

TOTAL Marks 600

* This Paper is common to all Under-Graduate courses and Grade will be awarded for this paper

PAPER –4.2 DATABASE MANAGEMENT SYSTEM

Total Marks: 100
(In Semester Evaluation-25 & End Semester Evaluation -75)

Unit I: Databases and database users   Marks:10
Database System Concepts and Architecture: Data models, schemas and instances, DBMS architecture, database languages and interfaces, classification of DBMS

Unit II: Data Modelling Using E-R Model: Marks:10
E-R model concept

Unit III: Record Storage And Primary File Organisation: Marks:15
Introduction, secondary storage devices, buffering of blocks, operations on 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

Unit IV: Relational Data Models: Marks:10
Relational model concepts, relational model constraints, update operations on relations, defining relations
Relational algebra
Relational database languages: SQL

Unit IV: Conventional Data Models: Marks:10
Network data model, hierarchical data model

Unit V: Database Design: Marks:10
Functional dependencies and normalisation for relational database

Unit VI: Transaction Processing Concept: Marks:10
Introduction, transaction and system concept, properties, schedules and recoverability, serializability of schedules, Concurrency control, error recovery and security.

Books

1. Silberschatz A., Korth H.F., Sudarshan S., *Database System Concepts*, 3/e, McGraw-Hill (IE), 1997.
2. Ramakrishnan R., Gehrke J., *Database Management System*, second edition, McGraw-Hill (IE), 2000
3. Elmasri R, Navathe S.B., *Fundamentals of Database Systems*, Benjamin Cummings Publishing Company, 1994
4. Ullman J.D. *Principles of Database and Knowledge-base Systems*, Vol - I & II, Computer Science Press, 1989.

PAPER –4.1 NUMERICAL ANALYSIS & SCIENTIFIC COMPUTING

Total Marks: 100
(In Semester Evaluation-25 & End Semester Evaluation -75)

Unit I - 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

Marks:15

Unit II - Roots of Equations:

Iterative methods – bisection, false-position, Newton- Raphson; Solution of polynomial equations, Solution of Simultaneous Linear Equations – Gaussian elimination, pivoting

Marks:15

Unit III - Curve Fitting and Interpolation:

Method of least squares, Finite differences, Newton's interpolation formulae, Lagrange's formula for unequal intervals, Newton's divided difference formula

Marks:15

Unit IV - Differentiation and Integration:

Differentiation by polynomial fit, Integration by Newton's Quadrature formula – Trapezoidal rule, Simpson's rules

Marks:15

Unit V - Numerical Solution of Differential Equations:

Solution by Taylor's Series, Euler's Method, Picard's Method, Runge-Kutta Method

Marks:15

BOOKS:

1. Grewal, B.S; *Numerical Methods;*
2. Krishnamurthy, E.V & Sen, S.K.; *Computer Based Numerical Algorithms;* East West Press
3. N. Oatta; *Computer Programming and Numerical Analysis;* University Press
4. Conte, S.D; *Elementary Numerical Analysis;* McGraw Hill

PAPER –4.3 OPERATING SYSTEM

Total Marks: 100
(In Semester Evaluation-25 & End Semester Evaluation -75)

Marks:20

Unit I:

Process Management: Process, Thread, Scheduling Concurrency, Mutual Exclusion, Synchronisation, Semaphores, Deadlocks.

Marks:20

Unit II:

Memory Management: Allocation, protection, hardware support, paging, segmentation.
Virtual Memory: Demand paging, allocation, replacement, swapping, segmentation, TBLs.

Marks:15

Unit III:

File systems: Allocation, free space management, directory management, mounting.

Marks:20

Unit IV:

I/O Management: Device drivers, Disk Scheduling, Block I/O; Characters I/O.
Use of Unix/Linux as a running example, examples from DOS, NT.

BOOKS:
1. Silberschatz A, Galvin P.B, *Operating System Concepts* 5/e , Addison-Wesley Publishing Company, 1998.
2. Deitel H.M. *Operating System* 2/e Addison-Wesley Publishing company 1990.
3. Stallings W. *Operating systems* 2/e, Prentice Hall, 1995.

PAPER –4.3 OPERATING SYSTEM

Total Marks: 100
(In Semester Evaluation-25 & End Semester Evaluation -75)

Unit I:

Marks:20

Process Management: Process, Thread, Scheduling Concurrency, Mutual Exclusion, Synchronisation, Semaphores, Deadlocks.

Unit II:

Marks:20

Memory Management: Allocation, protection, hardware support, paging, segmentation.
Virtual Memory: Demand paging, allocation, replacement, swapping, segmentation, TBLs.

Unit III:

Marks:15

File systems: Allocation, free space management, directory management, mounting.

Unit IV:

Marks:20

I/O Management: Device drivers, Disk Scheduling, Block I/O; Characters I/O.
Use of Unix/Linux as a running example, examples from DOS, NT.

BOOKS:

1. Silberschatz A, Galvin P.B, *Operating System Concepts 5/e* , Addison-Wesley Publishing Company, 1998.
2. Deitel H.M. *Operating System 2/e* Addison-Wesley Publishing company 1990.
3. Stallings W. *Operating systems 2/e*, Prentice Hall, 1995.

PAPER –4.4 SYSTEM SOFTWARE

Total Marks: 100
(In Semester Evaluation –25 & End Semester Evaluation –75)

Marks: 15

Unit I:
Overview: Definition and classification of system software.

Marks: 20

Unit II:
Assembler; Assembly language, assembly process, assembler data structures, assembler macros and microprocessors.

Marks: 20

Unit III:
Linkers and loaders: Basic concepts, static and dynamic linking, shared libraries, loaders, overlays.

Marks: 20

Unit IV:
Compilers: Introduction and phases of a compiler: Lexical Analysis, parsing & intermediate code generation

Books:

1. *Compiler Design* , Aho, Ullman, Sethi
2. *System Programming & Operating System*, Dhamdhere,Tata Mc Graw Hill

PAPER –4.5 ENVIRONMENTAL STUDIES

(FOR ALL UNDER GRADUATE COURSES OF DIBRUGARH UNIVERSITY)
(Grade will be awarded for this paper)
(Approved by the 81ˢᵗ meeting of the Under Graduate Board of Dibrugarh University held on 03.08.2004 giving immediate effect)
Internal: 10 End Semester: 90

Unit : The Multidisciplinary nature of environmental studies	(Total lectures - 2: Marks - 5)

Definition, scope and importance
Need for public awareness

Unit 2: Natural Resources:	(Total lectures -12; Marks - 20)

Renewable and non- renewable resources:
Natural resources and associated problems.
a) Forest resources: use and over-exploitation, deforestation. Timber extraction, mining, dams and their effects on forests and tribal people.
b) Water resources: use and over -utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.
c) Mineral resources: use and exploitation, environmental effects of extraction and using mineral resources, case studies.
d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer- pesticide problems, water logging , salinity.
e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.
f) Land resource: land as a resource, land degradation, man-induced landslides, soil erosion and desertification.

- Role of and individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Unit 3: Ecosystems	(Total lectures - 10; Marks - 15)

- Concept of and 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 features, structure and function of the following ecosystem:
  a. Forest ecosystem
  b. Grassland ecosystem
  c. Desert ecosystem
  d. Aquatic ecosystems (ponds, streams , lakes, rivers, oceans, estuaries)

PAPER –4.6 LABORATORY BASED ON DBMS, OPERATING SYSTEM

Total Marks: 100
(In-semester Evaluation-25 marks & End Semester Evaluation -75 marks)

Unit I – Practical on Paper 4.1	Marks: 10
Unit II – Practical on Paper 4.2	Marks: 25
Unit III – Practical on Paper 4.3	Marks: 15
Unit IV – Practical on Paper 4.4	Marks: 25

- Role of Information Technology in Environment and Human Health.

| Unit 8: Field work | (Marks- 10) (5 lecture hours) |

- Visit to a local area to document environmental asset- river/forest/grassland/hill/mountain.
  * Visit to a local polluted site- Urban/Rural/Industrial/Agricultural .
- Study of common plants, , insects, birds and fishes.
- Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours).

REFERENCES

1. Agarwal, K.C.2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad-380013, India Email: mapin @icenet.net (R).
3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc.480p.
4. Clark R.S., Marine Póllution, Clanderson Press Oxford (TB).
5. Cunningham, W.P.Cooper, T.H. Gorhani, E & Hepworht, M.T. 2001, Environmental Encyclopedia, Jacio Publ. House, Mumbair, 1196p.
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7. Down to Earth, Centre for Science and Environment (R).
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9. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R).
10. Heywood, V.H. & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
11. Jadav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284p.
12. Mckinney, M.L. & Schooh, R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition. 639p.
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16. Roa M.N.& Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co.Pvt. Ltd. 345p.
17. Sharma B.K., 2001. Environmental Chemistry. Goel Publ.. House, Meerut.
18. Survey of the Environment, the Hindu (M).
19. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB).
20. Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R).
21. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications(TB).
22. Wagner K.D., 1998. Environmental Management. W.B.Saunders Co. Philadelphia. USA 499p. (M) Magazine (R) Reference (TB) Textbook.

Unit 4: Biodiversity and its Conservation

(Total lectures- 10; Marks -15

- Introduction- Definition; genetic, species and ecosystem diversity.
- Biogeographical classification of India
- Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and option values
- Hot-spots of biodiversity - India.
- Threats to biodiversity; habits loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species.
- Conservation of biodiversity; In-situ Ex-situ conservation of biodiversity.

Unit 5: Environmental Pollution

Definition

(Total lectures - 10; Marks - 15)

- Causes, effects and control measures of:
  - a. Air pollution
  - b. Water pollution
  - c. Soil pollution
  - d. Noise pollution
  - e. Thermal pollution
  - f. Nuclear hazards
- Solid waste Management: Causes, effects and control measures of urban and industrial wastes- biodegradable and non biodegradable wastes.
- Role of an individual in prevention of pollution.
- Disaster management: Floods, earthquake, cyclone and landslides.

Unit 6: Social Issues and the Environment

(Total lectures- 10: Marks - 12)

- From Unsustainable to Sustainable development.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people: its problems and concerns.
- Environmental ethics.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
- Wasteland reclamation.
- Consumerism and waste products.
- Environmental Legislation.
- Public awareness.

Unit 7: Human Population and the Environment

(Total lectures - 8: marks -8)

- Population growth, variation among nations.
- Population explosion- Family Welfare Programme.
- Environment and human health and hygiene(including Sanitation and HIV/AIDS) etc.

Bachelor of Computer Application (B. C. A.) Course

FIFTH SEMESTER

Course No.	Subject	Theory (working hours/week)	Programming Lab (working hours /week)	Duration of university exams (hours)	Maximum Marks		
					End Semester	Sessional	Practical Exam
Paper - 5 1	DATA COMMUNICATION & COMPUTER NETWORK	3	~ ~	3	75	25	
Paper- 5 2	OPERATION RESEARCH	3	~ ~	3	75	25	
Paper- 5 3	SOFTWARE ENGINEERING	3	~ ~	3	75	25	
	MINOR PROJECT						
							200
	LABORATORY (NETWORKING AND SOFTWARE ENGINEERING)		10	3	75	25	

TOTAL Marks   600

PAPER –5.1 DATA COMMUNICATION & COMPUTER NETWORK

Total Marks: 100
(In Semester Evaluation –25 & End Semester Evaluation –75)

Unit 1:
Marks: 25
Introduction, mathematical basis of data communication, analog and digital transmission, parallel and serial communication,

Asynchronous and synchronous communication, multiplexing and demultiplexing.

Detection and correction of transmission errors, data compression and Encryption

Introduction to computer networks, types of networks, network topologies

Unit II:
Marks: 25
Network reference models, OSI reference model, TCP/IP reference model

Physical layer, transmission media, guided and unguided media, repeaters hubs s

Data link layer, flow control, access protocols, bridges and switches

Unit III:
Marks: 25
Network layer, routing protocols, Internet protocol, IP addresses, sub-netting

Transport layer, transmission control protocol, user datagram protocol

Session layer, presentation layer and application layer, FTP, telnet HTTP, the Internet

Books:
1. Stallings. W. *Data And Computer Communications*, 4th EDITION.PH.1996.
2. Ramteke. T: *Networks*: Prentice Hall Carrier & Technology.1994.
3. Tanenbaum. A.S.; *Computer Networks*, 3rd edition. PHI. 1995.

Paper –5.2   OPERATION RESEARCH

Total Marks: 100
(In Semester Evaluation –25 & End Semester Evaluation –75)

Unit – I   **Marks: 10**
Model Formulation: Introduction, Structure and assumption of an Linear Programming problem(LP), General mathematical model of linear programming problem.

Unit – II   **Marks: 15**
Graphical Solution Method: Introduction, Definitions, graphical solution method of an LP problem, multiple optimal solution, unbounded solution, Infeasible solution.

Unit – III   **Marks: 15**
Simplex Method: Introduction, standard from of LP problem, simplex algorithm (maximisation case), Simple Algorithm (Minimization case), multiple Optimal solution, Unbounded Solution

Unit – IV   **Marks: 10**
Duality: Introduction, Formulation of dual linear problem, standard results on duality, advantage of duality.

Unit – V   **Marks: 15**
Transportation Problem : Introduction, Loops in transportation table and their properties, the transportation 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.

Unit – VI   **Marks: 10**
Test Of Optimality: Dual of transportation model, economic interpolation of U S and V S, step of MODI method.

Books:
1. J. K. Sharma; *Operation Research   Theory and Application*, MacMillan India Ltd, New Delhi, 1997.
2. G. Hadley; *Linear Programming*, Narosa Publishing House, New Delhi
3. Richard Bronson; *Operation Research*; McGraw Hill

PAPER –5.3 SOFTWARE ENGINEERING

Total Marks: 100
(In Semester Evaluation –25 & End Semester Evaluation –75)

Unit I: Introduction To Software Engineering: **Marks: 20**
Concept of a software project, size factor, quality and productivity factor different phases of Software development life cycle

Unit II: **Marks: 20**
Software project management: Planning, scheduling, monitoring, controlling etc. requirement specifications
Software design: Function oriented , object oriented approaches, user interfaces.
Software programming: Structured coding techniques, coding styles, standard

Unit III: **Marks: 20**
Software verification and validation: Theoretical foundation, black box and white box approaches, integration and system testing
Software reliability: Definition and concept of reliability, software faults, errors, Repair and availability..
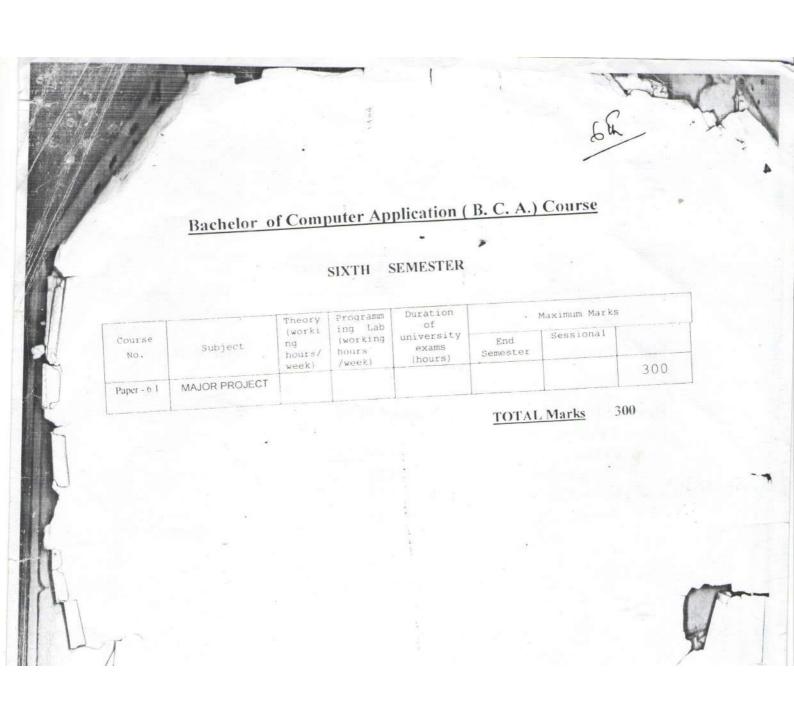
Unit IV: **Marks: 15**

CASE studies

BOOKS::
1. Jalote P. *An Integrated Approach To Software Engineering* .Narosa Publishing House. 1999.

REFERENCE BOOKS:
1. Pressman, R.S *Software Engineering: A practical Approach.* . McGraw-Hill,1997.
2. W.S. Humphery. *Managing software Procedures*. Addission-Wesley.1989

Bachelor of Computer Application (B. C. A.) Course

SIXTH SEMESTER

Course No.	Subject	Theory (working hours/ week)	Programming Lab (working hours /week)	Duration of university exams (hours)	Maximum Marks		
					End Semester	Sessional	
							300
Paper - 6.1	MAJOR PROJECT						

TOTAL Marks   300

PAPER –5.3   SOFTWARE ENGINEERING

Total Marks: 100
(In Semester Evaluation –25 & End Semester Evaluation –75)

Unit I: Introduction To Software Engineering: Marks: 20
Concept of a software project, size factor, quality and productivity factor different phases of Software development life cycle

Unit II: Marks: 20
Software project management: Planning, scheduling, monitoring, controlling etc. requirement specifications
Software design: Function oriented , object oriented approaches, user interfaces.
Software programming: Structured coding techniques, coding styles, standard

Unit III: Marks: 20
Software verification and validation: Theoretical foundation, black box and white box approaches, integration and system testing
Software reliability: Definition and concept of reliability, software faults, errors, Repair and availability..

Unit IV: Marks: 15

CASE studies

BOOKS::
1. Jalote P. *An Integrated Approach To Software Engineering* .Narosa Publishing House, 1999.

REFERENCE BOOKS:
1. Pressman, R.S. *Software Engineering*: A practical Approach. , McGraw-Hill,1997.
2. W.S. Humphery, *Managing software Procedures*, Addission-Wesley,1989