

**BACHELOR DEGREE PROGRAMME
IN
COMPUTER APPLICATIONS
(BCA)**

SCHEME & SYLLABUS

(Effective from 2009 Admissions onwards)

1. About the Course

Technology is defined as the applications of Basic Science. The past two revolutions, industrial and electronic, have transformed the society from agricultural to industrial and then to electronic. The electronically based technologies focused in information gathering, processing and distribution. The use of this technology in all sectors gave the birth to Computer Industry and its unprecedented growth launched another revolution in Communication.

Information, the basic raw material for the Decision Support System, can be derived from processing of huge database related with different sectors. Systematic storage and management with adequate security are essential for data retrieval and processing to generate information. The information technology plays an important role in all areas. But the main drawback is the technophobia of the people to adapt with the new technologies. This may be due to lack of awareness of the merits and advantages of new technologies. So our youths

have to be equipped with all kinds of knowledge tools to work with computers comfortably which are basic requirements to provide human resource to the industry. ❖

The radical changes in technologies, both hardware as well as software, and their ever increasing adaptation to newer areas of application, demand frequent updating of the academic curriculum so that the students can rise to the expectation of the Industry. The syllabus revision committee has considered all these factors thoroughly before venturing into the revision exercise.

The revised syllabus for BCA Programme provides a strong foundation to pursue post graduation programme in computer science / applications. The knowledge acquired by the students may also equip them to meet the industrial need, and get placed. ❖

The BCA programme of the MG University follows the choice based credit semester system as envisaged by the University Grants Commission and the Higher Education Council of Kerala. The Programme shall be completed in six semesters. Each semester is a minimum of 18 instructional weeks, comprising 90 working days with continuous internal evaluation and University examination at the end of each semester.

2. Course Objectives

The BCA Programme is designed with the following specific objectives.

- (a) To attract young minds to the potentially rich & employable field of computer applications.
- (b) To be a foundation graduate programme which will act as a feeder course for higher studies in the area of Computer Science/Applications.
- (c) To develop skills in software development so as to enable the BCA graduates to take up self-employment in Indian & global software market.
- (d) To Train & Equip the students to meet the requirement of the Industrial standards.

3. Admission

❖ The eligibility for admission to BCA Degree Programme under the Mahatma Gandhi University is a pass in Pre-degree, Plus Two or equivalent examinations in science stream with Mathematics/Computer Science as a compulsory subject.

4. Registration ❖❖

❖ All the candidates admitted for the course should register with the M.G University along with the original certificate of the qualifying examinations within 3 months from the date of commencement of the I semester programme.

5. Duration of Course

◆ The programme shall normally extend over a period of three academic years consisting of six semesters.

6. Requirement of Attendance and Progress

◆ A candidate shall normally be permitted to register and appear for the end semester university examinations if

◆ (a) He/She secured not less than grade C for attendance in each course of study in the semester, and

(b) His/Her progress is satisfactory in the internal assessment in each of the course.

7. Examination System



7.1. ◆ The evaluation of each course shall contain two parts

◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆ (i) Internal or In-Semester Assessment (ISA)

◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆ (ii) External or End-Semester Assessment (ESA)

◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆ The internal: external examinations ◆ ratio shall be 1:3

7.2. . The Internal and External examinations shall be evaluated using Direct Grading system based on 5-point scale as given below.

Letter Grade	Performance	Grade point(G)	Grade Range
A	Excellent	4	3.5 to 4.00
B	Very Good	3	2.5 to 3.49
C	Good	2	1.5 to 2.49
D	Average	1	0.5 to 1.49
E	Poor	0	0.00 to 0.49

7.3. The overall grade for a programme for certification shall be based on CGPA with a 7-point scale given below.

CGPA	Grade
3.80 to 4.00	A+
3.50 to 3.79	A
3.00 to 3.49	B+
2.50 to 2.99	B
2.00 to 2.49	C+
1.50 to 1.99	C
1.00 to 1.49	D

A separate minimum of D Grade for internal and external are required for a pass for a course. ◆ For a pass in a programme a separate minimum of Grade D is required for all

the courses and must score a minimum CGPA of 2.00 or an overall grade of C+ and above

7.4. Internal evaluation: is to be done by continuous assessments on the following components.

7.4.1. Components of the Internal evaluation and their weights are as below.

(i) Theory

Component	Weight
Attendance	1
Assignment	1
Seminar	1
Two test papers	2

(ii)

Practical

(iii)

Project

(iv) On-the Job

training

(v) Social service

activity

(vi) Co-curricular

activity

7.4.2. Attendance:

%age of Attendance	Grade
>90%	A
Between 85 and 90	B
Between 80 and 85	C
Between 75 and 80	D
< 75	E

7.4.3 Assignments: Best two assignments are considered per course

7.4.4. Seminar/Viva : The student has to take a minimum of 1 seminar per course.

7.4.5. Class test. A minimum of 2 class tests are to be attended. The grades of best 2 test are to be taken

7.4.6. The evaluation of all components are to be published and are to be acknowledged by the candidate. All documents of internal assessments are to be kept in the college for 2 years and shall be made available for verification by the university. The responsibility of evaluating the internal assessment is vested on the teacher(s) who teach the course.

In case a candidate fails to secure the minimum grade D in internal assessment, he/she may secure it by repeating the course altogether in a regular class or to take the course with a faculty member assigned by the Head

of the Department. But such improvement in internal in the same paper cannot be attempted more than once.

◆ The supplementary examinations will be conducted along with the next regular semester examinations.

8. PATTERN OF QUESTIONS

◆◆◆◆◆◆◆◆◆◆ Questions shall be set to assess knowledge acquired, standard application of knowledge, application of knowledge in new situations, critical evaluation of knowledge and the ability to synthesize knowledge. ◆ The question setter shall ensure that questions covering all skills are set. ◆ He/She shall also submit a detailed scheme of evaluation along with the question paper.

◆◆◆◆◆◆◆◆◆◆ A question paper shall be a judicious mix of objective type, short answer type, short essay type /problem solving type and long essay type questions.

◆◆◆◆◆◆◆◆◆◆ Weight: Different types of questions shall be given different weights to quantify their range as follows:

◆◆◆◆◆◆◆◆◆◆ ◆◆	Type of questions	Weight	Number of questions to be answered
1	A bunch of 4 objective type questions	1	4 bunches (no choice)
2	Short answer type questions	1	5 out of 8
3	Short essay/problem solving◆ type questions	2	4 out of 6
4	Essay type questions/Programs	4	2 out of 3

9. Requirement for the completion of Programme

◆ A candidate has to complete the Programme within a period of five years after the registration.

c) A candidate who does not complete the concerned semester with the minimum attendance requirement prescribed will not be permitted to attend the next semester.

◆ PROPOSED SCHEME FOR BCA PROGRAMME REVISED CURRICULUM

REVISED CURRICULUM - 2009

- 1.
2. **I Semester**
- 3.

116. Course 118. No.	119. 120. 121. Course	122. 125. Lect	123. o. of hours per week		124. Durn. of Exam in hours	124. Credits
			126. Lab.	127. Lect		
127. BCA301	128. Statistical Methods (Complementary)	129. 4	130. -	131. 3	132. 4	
133. BCA302	134. Design and Analysis Of Algorithms (Core)	135. 4	136. -	137. 3	138. 4	
139. BCA303	140. Computer Organization & Architecture. (Core)	141. 4	142. -	143. 3	144. 4	
145. BCA304	146. Computer Graphics (Core)	147. 4	148. -	149. 3	150. 4	
151. BCA305	152. Object Oriented Programming and C++ (Core)	153. 3	154. -	155. 3	156. 3	
157. BCA306	158. Software Lab III (Core)	159. -	160. 6	161. 3	162. 2	
163.	164. Total	165. 19	166. 6	167. 19	168. 21	

169. **IV Semester**

171. Course 173. No.	174. 175. 176. Course	177. 180. Lect	178. o. of hours per week		179. Durn. of Exam in hours	179. Credits
			181. Lab.	182. Lect		
182. BCA401	183. Operational Research (Complementary)	184. 4	185. -	186. 3	187. 4	
188. BCA402	189. Microprocessor & PC Hardware (Core)	190. 4	191. -	192. 3	193. 4	
194. BCA403	195. System Analysis & Design (Core)	196. 4	197. -	198. 3	199. 4	
200. BCA404	201. Database Management Systems (Core)	202. 4	203. -	204. 3	205. 4	
206. BCA405	207. Visual Programming Techniques (Core)	208. 3	209. -	210. 3	211. 3	
212. BCA406	213. Software Lab IV (Core)	214. -	215. 6	216. 3	217. 2	
218.	219. Total	220. 19	221. 6	222. 19	223. 21	

224. **V Semester**

225.
226.

227. Course No.	230. 231. 232.	233. Course 236. Lect	234. o. of hours per week		235. Durn. of Exam in hours	Credits
			237. Lab.	238.		
238. BCA501	239. Networks (core)	Computer	240. 4	241. -	242. 3	243. 4
244. BCA502	245. Systems (core)	Operating	246. 4	247. -	248. 3	249. 4
250. BCA503	251. Programming (core)	Java	252. 3	253. -	254. 3	255. 3
256. BCA504	257. Course (core)	Open	258. 3	259. -	260. 3	261. 4
262. BCA505	263. Lab ♦ V (core)	Software	264. -	265. 7	266. 3	267. 2
268. BCA506	269. Development Lab ♦ I (Mini Project) (core)	Software	270. -	271. 4	272. -	273. 2
274.	275. Total	♦♦♦♦♦♦♦♦♦♦	276. 14	277. 11	278.	279. 19

280.

281. **VI Semester**
282.

283. Course No.	286. 287. 288.	289. Course 292. Lect	290. o. of hours per week		291. Durn. of Exam in hours	Credits
			293. Lab.	294.		
294. BCA601	295. Technology(core)	Web	296. 4	297. 4	298. 3	299. 4
300. BCA602	301. Engineering (core)	Software	302. 4	303. -	304. 3	305. 4
306. BCA603	307. (core)	Elective	308. 4	309. -	310. 3	311. 4
312. BCA604	313.	Seminar	314. -	315. 2	316. -	317. 2
318. BCA605	319. Development 320. Main Project)	Software ♦ Lab II (321. -	322. 7	323. -	324. 4
325.	326. Total	♦♦♦♦♦♦♦♦♦♦	327. 12	328. 13	329.	330. 18

331.

332.

- Elective:**
- 333. BCA603(A): Client Server Computing
 - 334. BCA603(B): ♦ Linux Operating System
 - 335. BCA603(C) : Data Mining
 - BCA603(D) ♦♦♦♦ : System Software

Open Course for students of other Departments

Course Title : Internet, Web Designing & Cyber Laws

SEMESTER 1

BCA 101 ENGLISH (Common Course)

(Syllabus as approved by Board of Studies of English (UG)

BCA102 MATHEMATICS (Complementary)

(Syllabus as approved by Board of Studies of Mathematics (UG)

BCA 103 : BASIC STATISTICS (Complementary)

(Syllabus as approved by Board of Studies of Statistics (UG)

BCA104 : Introduction to Computers (Core)

Unit-1:

Introduction: Parts of Computer System- Hardware, Software, Data, Users, Different types of computers, Characteristics of computers, Computer Languages - Machine , Assembly Language and Higher Level languages - 3GL, 4GL, 5GL

Unit-2:

Interacting with Computers:-Input Devices - Key Board, Mouse, Variants of Mouse, Hand held devices, Optical Input devices. **Output Devices:** Monitors, Sound Systems, and Printers.

Unit-3:

Data Processing: Representation of data, processing of data - The CPU, Memory-different types of RAM and ROM, Factors affecting speed

Unit-4:

Storing Information in a Computer: Types of Storage Devices - Magnetic Storage Devices Data storage and organization on a Magnetic Disk, Finding data on a disk - Diskettes - Hard Disks- Tape drives- Optical Storage devices ,Solid state storage devices

Unit-5:

Operating Systems and Networking: Definition of an Operating System - Different types of PC Operating Systems. Computer Networks uses - categories of networks - LAN, WAN, The Internet - Working of Internet - Major Features of Internet. Brief idea of multimedia.

Book of study :

Peter Norton's Introduction to Computers, Sixth Edition,
Published by Tata McGraw Hill

Arrays and subscripting- one, two dimensional tables, PERFORM statement - five different formats, GO TO with DEPENDING ON option. Programs based on above verbs.

Unit 5: SEQUENTIAL FILES AND FILE PROGRAMS : Various types of files, File program entries in various divisions- ENVIRONMENT DIVISION, INPUT-OUTPUT SECTION- DATA DIVISION- FILE SECTION entries- Level numbers, Level indicators- FD - SD, FILLER clause, PROCEDURE DIVISION for sequential files- OPEN, READ, WRITE, REWRITE, CLOSE verbs, various File opening modes- INPUT, OUTPUT, EXTEND and I-O modes, Simple SORT verb, Simple MERGE verb, Detailed structure of COBOL programs, SEQUENTIAL FILE program including sorting and merging. Concept of Indexed sequential file and Random access files.

Book of study:

1. Financial Accounting: Balakrishnan Nair.
2. COBOL Programming: M.K Roy, D.G Dastidar, - Tata McGraw Hill Second Edition.

References:

1. Accountancy : S P Jain , K L Narang
2. Advanced Accountancy (Vol.1) : S N Maheshwari, S K Maheshwari

BCA204 : Data Structures (Core)

Unit 1:

Concept of Structured data: Data structure definition, Different types and classification of data structures, Arrays representation of array in the memory, linear array operations, Bubble sort, Selection sort, linear search, binary search, sparse matrix.

Unit 2: Stacks and Queues: organization and operation on stacks Conversion between infix to postfix & prefix representations- Expression Evaluation - Organization and operations on queues-circular queue-multiple stacks and queue - Applications of stacks and queues.

Unit 3:

Linked list: Concept of dynamic data structures, linked list, types of linked list, linked list using pointers, insertion and deletion examples, circular list doubly linked lists, garbage collection.

Unit 4:

Trees: Concept of recursion, definition of - trees, binary trees, strictly binary trees, complete binary tree and Binary search tree, Creation of binary search tree, traversing methods - examples.

Unit 5:

File organization: File organizations- sequential, random files, linked organization, inverted files, cellular partitioning, hashing function

Book of study :

Data Structures Through C (A Practical Approach), G.S Baluja

2. Floyd- Digital Electronics
3. Malvino & Leach- Digital Principles and Applications

BCA206 : Software Lab II (Core)

(There will be two questions; the first from COBOL and second from Data structures.)

Business Data Processing Using COBOL (only business problems)
 (2 hours per week)

1. Programs using ADD, SUBTRACT, MULTIPLY, DIVIDE, COMPUTE VERBS
2. Programs using IF, IF.. ELSE, GO TO statements
3. Programs using PERFORM statements.
4. Programs using sequential file processing only Accounting problems are to be given as listed below.
 - i) To create a sequential file to store journal entries. The structure of the file may be Date, Account Name to be debited, Account Name to be credited, Amount.
 - ii) Using the journal file created above, display total debit amount, total credit amount, Debit balance or credit balance for a particular account name entered through the keyboard. (Balance is the Difference of debit total and credit total Debit balance when debit total exceeds credit total, Credit balance otherwise)
 - iii) Preparing a sequential file containing Salary statement using an input file containing employee pay details.
 - iv) To Display the summary of total deposits and total withdrawals in a day using a bank transaction file containing date, Account no, Type of transaction (D-deposit, W-withdrawal) and Amount.
 - v) Preparing Electricity Bill using a sequential file containing Consumer No, Name, Previous Reading and Current Reading. An appropriate tariff structure may be assumed.

II. Data Structures using C. (3 hours per week)

1. Array search and sort Bubble sort, Selection sort, linear search, binary search, sparse matrix, polynomial addition.
2. Stack implementation, Application of stacks Conversion of infix expression to postfix, expression evaluation.
3. Queue implementation, Implementation of circular queue.
4. Linked list- implementation, concatenation etc., circular list and doubly linked list implementation, implementation of stacks and queue using linked lists.
5. Creation and traversal of binary search trees.

SEMESTER 3

BCA301 : Advanced Statistical Methods (Complementary)
(Syllabus as approved by Board of Studies of Statistics (UG)

BCA302 : Design and Analysis of Algorithms (Core)

Unit I:

Introduction Definition of Algorithm, Areas of algorithm study, performance analysis space complexity, time complexity, asymptotic notations (O , Ω , θ).

Unit II:

Divide and Conquer General method, Binary search, finding the maximum and minimum, merge sort, quick sort, performance measurement of quick sort, Selection, Saracens matrix multiplication.

Unit III:

Greedy method General method, Knapsack problem, Job sequencing with dead lines, Minimum cost spanning trees Prim's algorithm, Kruskal's algorithm, Optimal merge patterns, Single source shortest path, Optimal binary search trees.

Unit IV:

Dynamic programming The general method, multistage graphs, all-pairs shortest path, Single source shortest path, 0/1 Knapsack problem, Traveling Sales person problem.

Unit V:

Basic traversal and search techniques - BFS and traversal, DFS and traversal, Bi-connected components and DFS, Backtracking General method, 8-queens problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.

Book of study:

Ellis Horowitz, Sartaj Sahni, Sanguthevan Rajasekharan
Computer algorithms/C++ (Second Edition)
Universities Press.

Reference:

1. Anany Levitin
Introduction to design and analysis of algorithms
Addison Wesley
Low price edition.
2. Richard Neapolitan, Kumarss Naimipour
Foundation of Algorithms using C++

BCA303: Computer Organization and Architecture (Core)

Unit 1:

Functional units of a computer, Basic operational concepts, Bus structure, Addressing methods, Memory locations and addresses, Instructions and instruction sequencing, Instruction execution.

Unit 2:

Central Processing Unit, General Register Organization, Stack Organization, Instruction Formats, Instruction Classification, Addressing modes.

Unit 3:

Main Memory, Organization of RAM, SRAM, DRAM,, Read Only Memory- ROM,PROM,EROM,EEPROM, Auxiliary memory, Cache memory, Virtual Memory, Memory mapping Techniques.

Unit 4:

Parallel Computer Structures: Introduction to parallel processing, Pipeline computers, Multi processing systems, Architectural classification scheme-SISD, SIMD, MISD, MIMD.

Unit 5:

Pipelining and Vector processing, Introduction to pipelining, Instruction and Arithmetic pipelines(design) Vector processing, Array Processors.

Book of study :

M.M Mano-Computer Systems Architecture

Kai Hwang and F A Briggs-Computer Architecture and parallel processing

Reference


Hamachar-Computer Organization

BCA304: Computer Graphics (Core)



Unit 1:

Practical applications of Computer Graphics: Display devices, Raster Scan Display, DVST, Flat panel, LCD, Raster Scan systems, Random Scan systems. Input devices, Hard copy devices, Graphics software.

Unit 2:

Points and lines: Line drawing algorithms, Simple DDA. Circle generation, Mid point circle algorithm, Character generation.

Unit 3:

2D Transformations: Translation, Rotation, Scaling **** Matrix representation and homogenous coordinates, composite transformation, raster methods for transformations. **Two-dimensional viewing:** viewing pipeline, concept of window and view port, window to viewport transformation. Clipping operations **** point clipping, line clipping, Cohen Sutherland line clipping, polygon clipping, Sutherland-Hodgeman polygon clipping.

Unit 4:

Structure Concepts: Basic structure functions, setting structure attributes, Editing structures. **Graphical User interface and interactive input methods:** Input of graphical data, interactive picture construction techniques.

Unit 5:

Three-dimensional concepts: Three dimensional display methods, three dimensional graphics packages. **Three dimensional object representations:** Polygon surfaces, sweep representations, constructive solid geometry methods, octrees and quad trees.

Book of study :

Hearn D & Baker MP, Computer Graphics, PHI pvt Ltd

References



1. Newman W M & R F Sproul, Principles of Interactive Computer Graphics, McGraw Hill Book Company.
2. Plastock R & Xiang Z, Theory and problems of computer Graphics, Schaum Series, McGraw Hill bok Company.

BCA305 :Object Oriented Programming and C++ (Core)

Unit 1:

Introduction- Object Orientation- object oriented development-Object oriented Methodology-Object oriented Models-Object oriented themes-Modeling-Objects and classes concepts-Links and association concepts-Generalization and Inheritance-state modeling- interaction modeling

Unit 2:

Object Oriented language C++: Basic concept of object oriented programming -benefits of oops-Structure of C++ Program-Basic, derived and user defined data types-Symbolic constants-operators in C++ - Control Structures -Functions in C++-The main function, function prototyping-call by reference-return by reference- inline function-function overloading- friend and virtual functions,

Unit 3:

classes and objects-specifying a class - Defining member functions - Nesting of member functions - Private member functions - arrays within a class - static data members - static member functions - Arrays of objects-objects as function arguments

Unit 4: Constructors and Destructors- Constructors- Parameterized Constructors-Multiple constructors - Copy constructor - Dynamic constructor-Destructors - Operator overloading & Type conversions.

Inheritance-Defining derived classes-Single, Multiple, Multilevel, Hierarchical and hybrid inheritance- private, public, protected inheritance-virtual base classes-Abstract classes- Constructors in derived classes- nesting of classes.

Unit 5: Pointers-Virtual functions and polymorphism-Pointers-Pointers to objects-this pointer-pointer to derived classes-virtual functions-Pure virtual functions-C++ streams-

Stream classes-Unformatted and Formatted console I/O operations- Managing output with manipulators. Manipulating strings.

Book of study :

◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆ Object Oriented Modeling and Design with UML, Second Edition

◆◆◆◆◆◆◆◆◆◆ By James Rumbaugh, Michael Blaha

◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆ Object oriented Programming with C++, Fourth edition By E. Balaguruswamy

References:

◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆ Let Us C++ ,Yashwant Kanetkar, Bpb Publications

◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆ John R Hubbard, Programming with C++, Shaum◆s Outline series.

◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆ Objected-Oriented Programming in C++ , Rajesh K Shukla, Wiley India.2008 Edition

◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆ Venugopal, Rajkumar, Ravishankar, *Mastering C++*, Mc Graw Hill

BCA306 :◆ Software Lab III (Core)

[There will be two questions one◆ from 1 to 4 and second◆ from 5 to 8]

1. Programs based on class, objects and manipulation of objects using member functions
2. Programs based on friend functions, passing objects as arguments to function.
3. Programs based on array of objects.
4. Programs based on function overloading, Default arguments.
5. Programs based on operator overloading (binary, unary) using member functions and friend functions.
6. Programs based on constructors, different types of constructors- copy constructor, default constructor.
7. Programs based on Inheritance, different types of inheritance.
8. Programs using virtual functions and polymorphism, this pointer

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SEMESTER 4

BCA401: Operational Research

Unit I

Information systems concepts, Business information systems; Describing the business organization ♦ organization chart , organization function list ; information system levels ♦ - operational, lower, middle, top management; the system development life cycle concepts; hardware and software end products.

Life cycle activities- life cycle flow chart, task, management review, baseline specifications, role of system analyst.

Unit II

Basic tool of system analysis: ♦ identification codes ♦ definition, need for codes, code plan, code dictionary, common type of codes, forms design ♦ basic parts of form, style and types of form, principles of form design

Tools for structure analysis and design: Types of basic charts, decision tables, decision trees, structured English, data flow diagram, data dictionary, system flow charts, flow charting symbols, information oriented flow charts, process oriented flow charts, HIPO charts.



Unit III

Study phase: Study phase activities, information service request, initial investigation, fact finding techniques, fact analysis techniques, steps in feasibility analysis, study phase report.

Unit IV

Design phase: Design phase activities, structure design, input design- input data, input media and devices, output design, design phase report.

Unit V

Development phase: Development phase activities, bottom up and top down computer program development, training- programmer, operator, user trainings ; conversion; change over plan; PERT; steps in computer program development; structured programming; development phase report.

Book of study :

Elements Of ♦ System Analysis ♦ Marvin Gore & John Stubbe, Galgotia Book Source.

References

System Analysis And Design ♦ Elias M Awad , Galgotia Book Source.

Software Engineering Concepts ♦ Richard Fairley , Tata Mc Graw Publication.

BCA404 : ♦ ♦ Data Base Management System (Core)



Unit ♦ I: ♦ Introduction: Characteristics ♦ of database approach, Data base users-DBA, Data base designers and end users, Advantages of using DBMS, Data Modes- Schemas and instances, DBMS architecture and data independence. DBMS language-DDL, DML,DCL Data Base system environment, DBMS Component and modules.

ER Modeling- Introduction- Entity types, Entity sets, Attributes and Keys, Relationship Types, Relationship Sets relationship instances, Constraints on relationship types, Weak entity types, sample ER diagrams.

Unit-II: Relational Data Model: Relational model concepts domains, attributes, tuples and relations, characteristics of relations. Relational Model constraints Relational Databases and relational data base schemas, entity integrity, referential integrity and foreign keys with examples.

Relational algebra and Relational calculus:

Relations Operations- SELECT, PROJECT, UNION, INTERSECTION, The CARTESIAN PRODUCT, JOIN, EQUIJOIN, Aggregate functions. Examples of queries in Relations Algebra Tuple relations calculus, Domain relational calculus.

Relational Data base design using ER-to-Relational mapping.

Unit-III : SQL: Data definition commands- CREATE, ALTER,DROP, Adding constraints, Basic SQL queries-INSERT, SELECT,DELETE,UPDATE Ordering of rows UNION,EXCEPT,INTERSET Substring comparisons using LIKE operator, BETWEEN operator, Complex Queries-Nested queries, EXISTS and UNIQUE functions, NULL values, Renaming of attributes and joining of tables, Aggregate functions and grouping, Managing views

Unit IV: Data Normalization:- Informal Design Guide lines for relation schemas, functional dependencies, Normal forms- first, second and third normal form, Boyce- Codd normal form.

Indexing structures for files- types of single level ordered indexes.

Unit V: Transaction processing:- Introduction to transaction processing, Transaction and system concepts, Desirable properties of transactions. Concurrency Control:- Locking techniques for concurrency control.

Database Security and Authorization:- Types of security , control measures, database security and the DBA, Access protection, User accounts and database audits, Access Control based on granting and Revoking privileges.

Book of study :

Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems Pearson Education, 5th edition

References:

1. C.J Date, An Introduction to Database systems
2. Reghu Ramakrishnan, Data base Management Systems, Mc Graw Hill international Edition.
3. Bipin Desai, An Intriduction to Database Systems Galgoria Publications, 1991

BCA405 : Visual Programming Techniques (Core)

Unit 1

Visual Basic Basic Concepts: Getting Started with Visual Basic 6, Understanding Visual Basic Projects, Designing the user interface, Putting your Forms to Work with controls, Mastering Menus and Toolbars.

Unit 2

Programming in Visual Basic : Visual Basic Code Basics, Using Visual Basic Variables, Using the Visual Basic Debugging Tools, Handling Runtime Errors.

Unit 3

Objects and Classes : Creating Objects and Classes, Advanced Class Concepts, Working with objects and collections.

Unit 4

Working with other Applications & Database Access: Mastering the Visual Basic Data Control, Creating Queries in Visual Basic, Mastering Jet DAO.

Unit 5

Advanced Data Access Methods & Report generation : Using Advanced Data Access Methods ADO, OLEDB; Using Crystal Reports, Using the Package and Deployment Wizard.

Book of study :

Peter Norton's Guide to Visual Basic 6 by Peter Norton and Michael Groh, Techmedia Publications -Chapters:

References:

1. Visual Basic 6 from the Ground Up by Gary Cornell, Tata McGraw-Hill
2. Using Visual Basic 6 by Bob Roselman, Richard Peasley and Wayne Prunchiah, PHI

BCA406: Software Lab IV (Core)

[There will be two questions, the first one from Group I and second from Group II]

SQL Commands (2 hours)

1. **Data definition commands** - CREATE, ALTER, DROP, Adding Constraints Primary key, foreign key, unique key, check, not null.
2. **Basic SQL queries** INSERT, SELECT, DELETE, UPDATE, Using multiple tables, ordering of rows using ORDER BY option, Set operations using UNION, EXCEPT, INTERSECT, Substring Comparison using LIKE operator, BETWEEN operator.
3. **Complex Queries** Nested Queries, EXISTS and UNIQUE/DISTINCT functions, NULL values, Renaming of attributes and Joining of tables, Aggregate functions and grouping.

Hop to Hop Delivery. Error Detection and Correction ♦ Type of Errors, Redundancy, Detection, Correction, Forward Error and Retransmission. Coding -Block Coding(Parity Chek Code and Hamming Code) and Cyclic Codes. ♦ Framing, flow and error control, Protocols - Noiseless channels (Simplest, Stop and Wait) and Noisy channels(Stop and Wait and Piggy Backing) .

UNIT-4

♦ Multiple Access Protocols . ♦ Random Access-ALOHA, CSMA. Wired ♦ LANs-IEEE standards, standard Ethernet, wireless LANs-Bluetooth, Wireless Lan- Cellular Telephony-Frequency Reuse Principle, Transmitting, Receiving, Handoff, Hard Hand off, Soft Hand off, Roaming . ♦ Cellular Telephony Generations ♦ First, Second and Third generations. Satellite Networks ♦ Geo, Meo, ♦ Leo.

UNIT-5

Host- To-Host ♦ Communication . Network Level Logical addressing-IPv4 addresses, IPv6 addresses, Internet protocol-IPv4 and IPv6, ♦ Process to Process ♦ Delivery
♦ Connectionless and Connection Oriented Service : UDP, TCP. Congestion control, quality of service. Client Server Programs. ♦ Name space, domain name space, Remote logging, Electronic mail, file transfer.

Book of study : Data communication and Networking (fourth edition)-B. A. Forouzan

BCA 502 : Operating Systems

Unit 1:

Introduction: OS Definition, Functions, OS as a resource manager, types of OS Evolution of OS, Operating System Operations, Operating System Services, User Operating System Interface, System Calls, Types of System Calls.

Unit 2:

Process: Basic Concepts, Process Scheduling, Operations on ♦ Processes, Inter process communication, Process Scheduling - Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling.

Unit 3:

Process Coordination : Synchronization - The Critical Section problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors. Dead Locks : System Model, Dead Lock Characterization, Methods of Handling Dead Locks, Dead Lock Prevention, Dead Lock Avoidance, Dead ♦ Lock Detection, Recovery from Dead Lock.

Unit 4:

Memory Management: Memory Management Strategies -Swapping, Contiguous memory allocation, Paging, Segmentation. Virtual Memory Management- Demand paging, Page Replacement

Unit 5:

Storage Management :-File System :- File Concept, Access Methods, Directory Structure, protection , Implementing File Systems :-File System Structure, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery.

Book of study :

Operating System Principles, Seventh Edition, Abraham Silberschatz, Peter Galvin and Greg Gagne, John Wiley
Operating Systems- By William Stallings

Reference:

Operating Systems- By Milan Kovic (TMH)

336.

BCA 503:◆ Java Programming

Unit 1:

Object oriented programming-Encapsulation-Inheritance-Polymorphism-Genesis of Java-characteristics of java- program structure-identifiers-operators-variables-literals-data types-Arrays. Control Statements-selection statements-iterative statements-jump statements - Loops- while loop-do while loop- for loop



Unit 2:

Classes-declaration ◆object references-instantiation- method declaration-method calling
◆ this operator- constructor- method overloading-constructor overloading-method overriding-inheritance-super class-dynamic method dispatch-final-static-abstract classes
◆ String Handling.

Unit 3:

Packages - creating packages-using packages-Interfaces-Exception Handling Techniques-try-catch-throw-throws-finally -Multithreading- creation of multithreaded program-Thread class-Runnable interface- thread priorities.

Unit 4:◆

Event Handling-Delegation Event Model-Event Classes-Sources of Events-Event Listeners- AWT: Frame Class-AWT Controls: Label-Button-Checkbox-List-Choice control-Text Field-Text Area- Lay out Managers.

Unit 5

Applet Fundamentals -applet tag-applet life cycle-passing parameters to applets-working with graphics ◆Line-Rectangle-Oval ◆ Arc- color setting-I/O Streams: DataInputStream-DataOutputStream-BufferedReader-BufferedWriter classes

Book of study :

Java2 The Complete Reference ♦ Seventh Edition: Patrick Naughton

Reference:

1. Programming with java ♦ .E. Balagurusamy
2. Core Java Volume 1- Fundamentals eighth edition ♦ Cay S Horstmann ♦ & Gary Cornell
3. Java ♦ 6 Programming Black Book 2007 Edition ♦ Dreamtech press-

BCA504: OPEN COURSE

BCA505: Software Lab ♦ V

Part I

Applet Programs ♦ : ♦ Graphics- AWT controls- Event Handling ♦ ♦ ♦

Part II ♦ (using class and read inputs from keyboard)

Java Programs: ♦ ♦ ♦ ♦ ♦ MethodOverloading- MethodOverriding-inheritance-abstract class ♦ interfaces- packages-Exception Handling-Multithreading.

BCA506: ♦ SOFTWARE DEVELOPMENT LAB I ♦ (Mini Project)

♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦

♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ Mini project shall be a small complete project, to make the student confident in designing a system based on ♦ *System Analysis & Design* course, using VB and SQL Server/ ORACLE..

SEMESTER 6

BCA601: WEB TECHNOLOGY

UNIT I: INTERNET- Basics of internet- Addresses & names for the internet, Web objects & site , E-mail, WWW, File transfer, The TELNET , The USENET , Gopher, Wais, Archie, Veronica, Internet chat, Web server, Proxy server, Fast ready connections to the Web, Web Browser.

UNIT II : HTML, Basic HTML, Document Body Text, Hyperlink, Adding more formatting, LISTS- Using Colour & images- Tables, Multimedia objects, Frames, forms- MARQUEE.

UNIT III: DHTML, Cascading ,style sheets, Introduction using styles, Working simple examples, Defining your own styles, Properties & values in styles , Style sheets A worked example , Formatting blocks of information

UNIT IV: Java script Introduction to Java script Basics Variables String manipulation Mathematical Functions Operations Arrays Functions Objects in Java script- regular expressions Built- in objects Data validation Messages & Confirmation Status bar- Writing to a different frame.

UNIT V: PHP Introduction to PHP , Including PHP in a page , Datatypes , Program Control, Arrays , User defined functions, Built-in Functions , Regular expressions Using files

Book of study :

1. Internet & Web Technologies, Raj Kamal, Tata Mc Graw Hill
2. Web Programming, Chris Bates, 3rd Edition; Pub: John Wiley & Sons

Reference 1.HTML Black Book, Steven Holzner, Dreamtech Publishers

BCA602: Software Engineering

Unit I: Introduction to Software Engineering Definition, Program Vs Software, and Software process, Software Characteristics, Brief introduction about product and process, Software process and product matrices.

Software life cycle models Definition, Waterfall model, Increment process models, Evolutionary process models, Selection of a life cycle model.



Unit II: Software Requirement Analysis and Specification ♦ Requirements Engineering ♦ type of requirements, Feasibility Studies, Requirement Elicitation, Various steps for requirement analysis, Requirement documentation, Requirement validation, an example to illustrate the various stages in Requirement analysis. Project planning-Size estimation, cost estimation, the constructive cost model (COCOMO)



Unit III: Software Design - Definition, Various types, Objectives and importance of Design phase, Modularity, Strategy of design, Function oriented design, IEEE recommended practice for software design descriptions. Steps to Analyze and Design Objected Oriented System. Software Reliability ♦ Definition, McCall software quality model, Capability Maturity Model

(Chapter 5 and 7)

Unit IV: Software Testing ♦ What is testing?, Test, Test case and Test Suit, Verification and Validation, Alpha, beta and acceptance testing, functional testing, techniques to design test cases, boundary value analysis, Equivalence class testing, decision table based testing, cause effect graphing technique, Structural testing ♦ path testing, Graph matrices, Data flow testing; Levels of testing ♦ Unit testing, integration testing, system testing, validation testing, a brief introduction about debugging and various testing tools.

(Chapter 8)

Book of Study:

K K Aggarwal, Yogesh Singh
Software Engineering (Third Edition)
New Age International Publications

Reference:

- ♦♦♦♦♦♦♦♦ 1. Ian Sommerville
Software Engineering VII th Edition Pearson Education
- 2♦♦♦♦♦ Pankaj Jalote
An Integrated approach to Software Engineering
Narosa Publishing Company, Second Edition.
Pearson Education

BCA603(A): Client Server Computing

Unit 1

Overview of C/S Computing: Definition, Benefits & Evolution, Hardware & Software, Trends, Evolution of operating systems, networking trends.
Overview of C/S applications: components, classes, categories.
Overview of C/S computing: Dispelling the Myths, Obstacles- Upfront and hidden, open systems and standards, Standards setting organizations, factors of success.

Unit 2

Client hardware and software: Client components and operating systems. What is GUI?, Xwindow vs. windowing, database access.

Application logic client software products: GUI environments, converting 3270/5250 screens, database access tools.

Client requirements: GUI design standards, Open GUI standards, Interface dependents, testing interfaces, development aides.

Unit 3

Server hardware: Benchmarks, categories of servers, features and classes of server machines.

Server Environment: eight layers of software's, network management and computing environments, extensions, network operating systems, loadable modules.

Server operating systems: OS/2, Windows new technology, UNIX based operating systems.

Unit 4

Server Requirements : Platform independence, transaction processing, connectivity, intelligent database, stored procedures, Triggers, Load Leveling, Optimizer, testing and diagnostics tools, real ability backup and recovery mechanisms.

Server data management and access tools: Data manager features, data management software, database gateways. LAN hardware and software, Network Operating Systems.

Text

1. Dawna Travis Dewire , Client Server Computing, McGraw Hill International

References

1. Tanenbaum and Van Steen, Distributed Systems Principles and Paradigams, Pearson Education, 2005
2. Orfali, Harkey and Edwards, The Essential Client server Survival guide, 2nd edition, Galgotia, 2003
3. Jeffrey.D.Schan, C/S Application and Architecture, Novell Press, BPB
4. Joe Salami, Guide to C/S Databases, Bpb Publ., 1994
5. David Vaskevitch , Client Server Strategies, Galgotia, 1994.

BCA603(B): Linux Operating System

Unit 1:

Linux introduction and file system - Basic Features, Advantages, Installing requirement, Basic Architecture of Unix/Linux system, Kernel, Shell - Linux File system - Boot block, Super block, Inode table, Data blocks, Linux standard directories. Commands for files and directories cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less, Creating and viewing files using cat, file comparisons, View files, disk related commands, checking disk free spaces.

Unit 2:

Essential Linux commands, Understanding shells, Processes in Linux, process fundamentals, connecting processes with pipes, redirecting input/output, Background processing, managing multiple processes, scheduling of processes. Batch commands, kill, ps, who, Printing commands, find, sort, touch, file, file processing commands - wc, cut, paste etc - mathematical commands - expr, factor etc. Creating and editing files with vi editor

Unit 3:

System administration - Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disabling of user's accounts, creating and mounting file system, checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command



Unit 4:

Shell programming - Basics of shell programming, various types of shell available in Linux, comparisons between various shells, shell programming in bash
Conditional and looping statements, case statement, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automating system tasks

Unit 5:

Simple filter commands pr, head, tail, cut, sort, uniq, tr - Filter using regular expression
grep, egrep, sed **Understanding various Servers** DHCP, DNS, Squid, Apache, Telnet, FTP, Samba.

Book of study :

- Red Hat Linux Bible by Cristopher Negus, Wiley Dreamtech India
- UNIX Shell Programming by Yeswant Kanethkar, BPB

References :

- Official Red Hat Linux User's guide by Redhat, Wiley Dreamtech India
- UNIX for programmers and users by Graham Glass & King Ables, Pearson Education
- Beginning Linux Programming by Neil Mathew & Richard Stones, Wiley Dreamtech India

BCA603(C) : DATA MINING

Unit I: Introduction Data Mining, Data Ware House, Transactional Databases, Data Mining Functionalities Characterization and Discrimination, Mining frequent patterns, Association and correlation, Classification and Prediction, Cluster Analysis, Classification of Data Mining Systems, Data Mining Task Primitive, Integration of Data Mining systems, Major issues in Data Mining, Data integration and transformation, Data reduction, Data discretization.

Unit 1:

System software and application software-general concepts. Language processing concepts: Introduction, Language Processing activities, Fundamentals of Language Processing, Fundamentals of Language specification. Phases of language processor.

Unit II

Assembly Language statements- imperative, declarative, assembler directive, Elements of assembly language programming- forward reference problem, design of two pass assemblers and single pass. Marcos: ♦ Macro Definition, macro call, macro features, ♦

Unit III

Compilers: ♦ Aspects of compilation, Phases of compiler, syntactic structure of language, Grammars-classification, Scanning, Parsing techniques- representation of parse tree- intermediate code generation-loop optimization.

♦Unit IV

Linkers and Loaders :Various types of loaders ♦ linking and relocation concepts.

Book of study :

- ♦1. Principles of Compiler Design by Aho and Ullman
- ♦2. Systems programming and Operating Systems by D.M. Dhamdhare, Second Revised Edition, published by Tata McGraw ♦ Hill

Reference:

1. Introduction to System Programming , Leland L. Beck -3rd Edition-Pearson Education

BCA 604 Seminar

♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦ The student shall choose a modern topic of current day interest in the areas of Computer Science / Information Technology and present a seminar using appropriate presentation media such as LCD projector, OHP etc. A seminar report in bound form in the pattern of a complete technical report (with contents page, well structured presentation, references etc.) shall be submitted.

BCA 605: SOFTWARE DEVELOPMENT LAB II (Main Project)

The project topic shall be chosen from areas of current day interest using latest packages/ languages running on appropriate platforms, so that the student can be trained to meet the requirements of the Industry. A project report shall be submitted in hard bound complete in all aspects. For internal evaluation, the progress of the student shall be systematically assessed through various stages of evaluation at periodic intervals

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