

UNIVERSITY OF CALICUT

(Abstract)

BCA programme under Choice based Credit Semester System - Scheme and Syllabus – implemented with effect from 2009 admission onwards – approved – Orders issued.

GENERAL AND ACADEMIC BRANCH – I ‘J’ SECTION

No. GA I/J1/2471/06

Dated, Calicut University. P.O., 29.06.2009.

Read: 1. U.O.No.GAI/J2/3601/08 Vol.II dated 19.06.2009.

2. Minutes of the meeting of the Board of Studies in Computer Science and Applications held on 02.05.2009.
3. Item No.2 (xxii) of the minutes of Faculty of Science held on 05.05.2009.
4. Item No.II-A-23 of the minutes of meeting of the Academic Council of 14.05.2009.

ORDER

Choice based Credit Semester System and Grading has been introduced for UG curriculum in all affiliated colleges under this University with effect from 2009 admission onwards and the Regulations for the same implemented vide paper cited 1st above.

As per paper read as (2) above, the Board of Studies has resolved to approve the scheme and Syllabus of BCA Programme under Choice based Credit Semester System.

As per paper read as (3) & (4) above, the Faculty of Science at its meeting held on 05.05.2009 endorsed the minutes of Board of Studies and the Academic Council held on 14.05.2009 approved the same.

Sanction has therefore been accorded to implement the Scheme and Syllabus of BCA Programme under Choice based Credit Semester System in this University with effect from 2009 admission onwards.

Orders are issued accordingly. Scheme and Syllabus appended.

Sd/-

DEPUTY REGISTRAR (G&A I)
For REGISTRAR.

To

The Principals of all affiliated Colleges
offering BCA Programme.

Copy to: C.E, EX Sn, EGI, DR, B.Sc
System Administrator (with a request to
upload in University website), Tabulation Sn.,
Enquiry/G&A-I F.Sn./SF/DF/FC.

Forwarded/By Order

SECTION OFFICER

UNIVERSITY OF CALICUT

B.C.A Programme

Syllabi for Core/Open Courses

Programme Structure

Total Courses: 39

Total Credits: 120

Semester	Course No	Course Code	Course Title	Contact Hours			Credits
				Theory	Lab	Total	
I Semester	1	CA1A01	Communication Skills in English	4	0	4	4
	2	CA1A02	Critical Reasoning, Writing And Presentation	4	0	4	4
	3	CA1A03	Literature in Malayalam /Hindi/Other Indian/World Languages other than English	4	0	4	4
	4	CA1B01	Computer Fundamentals & Programming in C	3	0	3	2
	5	CA1B02	Programming Language in C LAB I	0	2	2	-
	6	CA1C01	Mathematics - I	4	0	4	3
	7	CA1C02	Optional Complimentary I or Optional Complimentary with Lab	4 2	0 2	4 4	3 3

			Total (7 Courses)			25	20
II Se m e s t e r	8	CA2A04	Reading Literature In English	4	0	4	4
	9	CA2A05	Literature and Contemporary issues	4	0	4	4
	10	CA2A06	Communication Skills in Languages other than English	4	0	4	4
	11	CA2B03	Programming in C++ and Datastructure	3	2	5	2
	12	CA2C03	Mathematics II	4	0	4	3
	13	CA2C04	Optional Complimentary I or	4	0	4	3
			Optional Complimentary with Lab	2	2	4	3
			Total (6 Courses)			25	20
III Se m e s t e r	14	CA3A07	History And Philosophy of science	4	0	4	4
	15	CA3A08	Basics of Business Management	5	0	5	4
	16	CA3B04	Database Design and RDBMS	4	0	4	3
	17	CA3B05	Operating Systems	4	0	4	3
	18	CA3C05	Financial management and Accounting	4	0	4	3

	19	CA3C06	Optional Complimentary II or Optional Complimentary with Lab	4 2	0 2	4 4	3 3
	Total (6 Courses)					25	20
IV Se m e s t e r	20	CA4A09	Basic Numerical Skills	4	0	4	4
	21	CA4A10	Entrepreneurship Development	4	0	4	4
	22	CA4B06	Programming in Java	3	2	5	3
	23	CA4B07	Programming Laboratory – Data structures using C++	0	4	4	3
	24	CA4C07	E-Commerce	4	0	4	3
	25	CA4C08	Management Information Systems	4	0	4	3
	Total (6 Courses)					25	20
V Se m e s t e r	26	CA5B08	Data Communication & Mobile Computing	5	0	5	4
	27	CA5B09	Computer Networks	4	0	4	3
	28	CA5B10	Software Engineering	4	0	4	4

	29	CA5B11	Visual Programming using VB .NET	3	2	5	3
	30	CA5D01	Choose one course from Open Course I	3	2	5	3
	31	CA5B12	Mini Project Work	0	2	2	—
	Total (7 Courses)					25	17
VI Se m es te r	32	CA6B13	WEB Programming using PHP	3	2	5	3
	33	CA6B14	Graphics and Multimedia Computer	3	1	4	3
	34	CA6B15	Programming Laboratory II	0	4	4	3
	35	CA6B16	Programming Laboratory III	0	4	4	3
	36	CA6D02	Choose one course from Open Course II	2	1	3	3
	37	CA6B17	Project Work	0	5	5	8
	Total (7 Courses)					25	23
Total 39Courses and 120 Credits							
Open Course - I							
CA5D01A – Stimulation in Modeling CA5D01B– Computer Animation							
Open Course - II							
CA6D02A – Software Testing CA6D02B– Linux Administration							

Question Paper Scheme

Type of Questions	Question Numbers	Weightage
Twenty multiple choice objective questions (4 choices for each question)	1 - 4	1
	5 - 8	1
	9 - 12	1
	13 - 16	1
	17 - 20	1
Six Short Answer Questions to be answered in one or two sentences	21	1
	22	1
	23	1
	24	1
	25	1
	26	1
Six Short Essays to be answered in 50 words each. Only four questions (best four) will be considered for weightage.	27	4×2 = 8
	28	
	29	
	30	
	31	
	32	
Three Long Essays to be answered in 100 words each. Only two questions (best two) will be considered for weightage.	33	2×4 = 8
	34	
	35	
Total Weightage		27

CA1B01 - Computer Fundamentals & Programming in C

Course Number: 4

Contact Hours: 3 T

Number of Credits: 2

Number of Contact Hours: 60 Hrs

Aim of the Course

To equip the students with fundamental principles of operations of various units of computer and to impart them with basic principles and concepts of computer programming

Objectives of the Course

- To learn the basics of computer hardware components
- To learn the basics of computer hardware units and how they work together
- To learn the concept of programming
- To study C language

Prerequisites

Background of the basic science at +2 level

Course Outline

Module I – 12 Hrs (Chapter 1, 2 of Text 1)

Digital Logic Circuits:- Digital computer, Logic gates, Boolean algebra, Map simplification – POS simplification, Don't care condition, Combinational circuits – Half-Adder, Full-Adder, Flip-Flops – SR, D, JK, T, and Edge-Triggered Flip-Flop, Excitation Tables, Sequential circuits. Digital Components:- Integrated circuits, Decoders, Multiplexers, Shift registers, Binary counters, Memory unit – RAM, ROM, ROM types.

Module II – 12 Hrs (Chapter 3, 8, 12 of Text1)

Data Representation:- Number systems, Decimal representation, Alphanumeric representation, Complements, Subtraction of unsigned numbers, Fixed-Point representation, Floating-Point representation, Other Binary codes, Error-Detection codes. Central Processing Unit:- General Register Organization, Stack Organization, Instruction formats, Addressing modes, CISC and RISC architecture (basic idea and characteristics only), Memory Organization:- Memory Hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, Virtual memory.

Module III – 12 Hrs (Chapter 2, 3, 4, 5 of Text2)

Algorithms and Flowcharting concepts, Constants, Variables and Data Types:- Character set, C tokens, Keywords and identifiers, Constants, Variables, Data types, Declaration of variables, Declaration of storage class, Assigning values to variables, Defining symbolic constants. Operators and Expressions:- Arithmetic, Relational, Logical, Assignment, Increment, Decrement, Conditional, Bitwise, Comma and sizeof operators, Arithmetic expressions, Type conversions in expressions, Operator precedence and associativity. Managing Input and Output Operations:- Reading and Writing a character, Formatted input and output. Decision making And Branching:- Decision making with if statement,

Simple if statement, The if...else statement, Nesting of if...else statements, The elseif ladder, The switch statement, The ?: operator, The goto statement.

Module IV – 12 Hrs (Chapters 6, 7, 8, 9 of Text2)

Decision making and Looping:- while, do and for statements, break, continue. Arrays:- One-dimensional arrays declaration, initialisation, Two-dimensional arrays, Initialization, Multidimensional arrays. Character arrays and strings:- Declaring and initialising string variables, Reading and Writing strings, Arithmetic operations on characters, String handling functions. User-defined functions:- it's Need, Elements of user-defined functions, Definition of functions, Return values and their types, Function calls, Function declaration, Category of functions, Nesting of functions, Recursion, Passing arrays to functions.

Module V – 12 Hrs (Chapter 10, 11, 12 of Text2)

Structures and Unions:- Defining a structure, Declaring structure variables, Accessing structure members, Structure initialization, Operations on individual members, Arrays of structures, Structures within structures, Unions, Pointers:- Accessing the address of a variable, Declaring pointer variables, Accessing a variable through its pointer, Pointer expressions, Pointer increments and scale factor, Pointers and Arrays, Arrays of pointers, Pointers as function arguments

Core Reference:

1. M. Morris Mano, "Computer System Architecture", Pearson Education Third edition.
2. E. Balagurusamy, "Programming in ANSI C", Tata Mc Graw Hill, 4th Edition

Reference Books:

1. P.V.S Rao, Computer Sytem Architecture, PHI, 2009
2. Byran Gotfried, Schaums Outline series- "*Programming with C*"

CA2B03- Programming in C++ and Data Structures

Course Number: 11

Contact Hours: 3T + 2 L

Number of Credits: 2

Number of Contact Hours: 60 Hrs

Aim of the Course

To equip the students with principles and concepts of object oriented design

Objectives of the Course

- To learn the basic concepts and principles of object oriented design
- To study C++ language

Prerequisites

Basic programming knowledge

Course Outline

Module I – 12 Hrs

OOP Concepts: Introduction: Characteristics of OOP **C++ Fundamentals:** C++ data types, Operators, Expressions, Type conversion, iostream library, Control statements, Functions: Prototype, Arguments passing, Return type, Default arguments, Inline functions, Function overloading **Classes:** Classes and Objects, Defining classes, Creating objects, Defining member function, Static class members, Friend functions, Passing and returning objects to and from functions, Nesting of classes Constructors: Default constructors, Parameterized constructors, Constructor overloading, Constructors with default arguments, Copy constructors - Destructors,

Module II– 12 Hrs

Pointers: Dynamic memory management, new and delete operators, Pointers to objects, Pointers to object members, Accessing members, this pointer, Operator overloading: Overloading unary and binary operators, Type conversion: Between objects and basic types and between objects of different classes, **Inheritance:** Single Inheritance, Overriding base class members, Abstract classes, Constructors and destructors in derived classes, Multilevel inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual functions, Virtual base class, File processing: Opening and closing files, File pointers, Filestream functions, Creating and processing text and binary files

Module III– 12 Hrs

Program Performance: Space complexity, Time complexity, Asymptotic notations, Contiguous data structures - Arrays: Structure of arrays, Representation of arrays, Operations on one dimensional arrays, Overloading operators for one-dimensional arrays, Polynomials using one-dimensional arrays, Multidimensional arrays, String representation and manipulation **Non Contiguous Data Structures:** Lists: Representation and Traversing of linked list, Operations with linked list, Doubly linked list, Circular list, Header linked list, Sparse matrices: Array representation and Linked representation of Sparse matrices

Module IV – 12 Hrs

Contiguous Data Structures: Stacks: Definition, Operation on stack, Implementation using arrays and linked lists, Evaluation of arithmetic expressions, Queues: Definition, Implementations using arrays and linked lists, Circular queue, Dequeues, Priority queues, Applications of queues **Trees and Graphs:** Basic terminology, Binary trees, Properties of binary tree, Traversal application, Representation of binary trees, Sequential representation of binary trees, Linked representation of binary trees, BST: Definition, Insertion, Deletion, Traversal and Searching BST, Threaded binary tree, Heap tree: Insertion and deletion,

Module V– 12 Hrs

Graphs: Representation of graphs, Graph search methods (BFS and DFS), Shortest path problems **Searching and Sorting:** Searching: Linear search, Binary search, Comparison of different methods, Sorting: Insertion, Bubble, Selection, Quick, Heap, Merge sort methods, Comparisons, Hashing: Different hashing functions, Methods for collision handling

Core Reference :

- 1 Balagurusamy, Object Oriented Programming in C++, TMH
2. raj Shani, *"Data Structures, Algorithms and Applications in C++"*

References:

1. Bjarne Stroustrup, *"The C++ Programming Language"*, Addison Wesley, 1999.
- Aron M Tenenbaum, *"Data Structure Using C and C++"*

CA3B04- Database System Design and RDBMS

Course Number: 16

Contact Hours: 4 T

Number of Credits: 3

Number of Contact Hours: 60 Hrs

Aim of the Course

To equip the students with principles and concepts of database design

Objectives of the Course

- To learn the basic principles of database and database design
- To learn the basics of RDBMS
- To learn the concepts of database manipulation SQL
- To study PL/SQL language

Prerequisites

Basic knowledge of the computer functional units and their functioning and basic programming knowledge

Course Outline

Module I – 12 Hrs

Introduction: Purpose of database systems, View of data- Data abstraction, Instances and Schemas, data models. Database languages, Database administrator, database users, database architecture. The entity-relationship model- Entity sets, Relationship sets, Attributes. Constraints- Mapping cardinalities, Keys, ER diagrams, Weak entity sets, Strong entity sets.

Module II – 12 Hrs

Relational Database Design: 1st, 2nd, 3rd, BCNF, 4th, 5th Normal forms. Transactions - Properties (ACID), States, Concurrent executions. Concurrency control-lock-based protocols - Locks.

Module III – 12 Hrs

Data Definition in SQL: Data types, creation, Insertion, viewing, updation, deletion of tables, modifying the structure of tables, renaming, dropping of tables. Data constraints- I/O constraints- Primary key, foreign key, Unique key constraints. Business rule constraints- Null, not null, check integrity constraints, Defining different constraints on table, ALTER TABLE Command.

Module IV – 12 Hrs

Database Manipulation in SQL: Computations done on table data - Select command, Logical operators, Range searching, Pattern matching, Grouping data from tables in SQL, GROUP BY, HAVING clauses, Joins - Joining Multiple Tables, Joining a Table to itself. Views - Creation, Renaming the column of a view, destroys view. Granting and revoking permissions - Granting privileges, Object privileges, Revoking privileges.

Module V – 12 Hrs

Program with SQL – data types – Using set and select commands-procedural flow-if-if/else-while-goto-global variables - Security- Locks, types of locks, levels of locks. Cursors- working with cursors- Error handling-developing stored procedures- create, alter and drop- passing and returning data to stored procedures-using stored procedures within queries- building user defined functions—creating and calling a scalar function- implementing triggers-creating triggers - multiple trigger interaction.

Core Reference:

1. Database System Concepts Abraham Silberschatz, Henry F Korth, S. Sudarshan, 5th Ed.
2. Ivan Bayross, SQL, PL/SQL The programming Language of Oracle.
3. Alex Kriegel and Boris M. Trukhnov, SQL Bible, Wiley pubs.
4. Paul Nielsen, Microsoft SQL Server 2000 Bible, Wiley dreamtech India pubs.

CA3B05: OPERATING SYSTEM

Course Number: 17

Contact Hours: 4T

Number of Credits: 3

NUMBER OF CONTACT HOURS:60 HRS

Unit – 1: (12 Hours)

Basic features of OS, I/O devices, Single user and multi-user OS, I/O utilities, Multitasking OS, Various parts of OS, Loading of OS, Boot strapping, Different types of OS, Shell, File system, Software tools, Program translation sequence, Compilers & interpreters, Linkers, Loaders, Assemblers, Fundamentals of DOS and Windows.

Unit – II: (12 Hours)

Process concept, Process scheduling, Types of schedulers, Scheduling and performance criteria, Scheduling algorithms, Inter process communication and synchronization basic concepts, Mutual exclusion, Semaphores, Critical section, Dead locks

Unit –III: (12 Hours)

Single process monitor, Multi-programming with fixed partitions and dynamic partitions, Paging, Hardware support for paging, Address translation by associative memory sharing system, Segmentation, Virtual memory, Demand paging with virtual memory management.

Unit – IV: (12 Hours)

File concept, Directories, Disk organization, Disk space management methods, Linked list, Bit map, Disk allocation methods, Contiguous allocation, Non-contiguous allocation, Disk scheduling, Different scheduling algorithms, File protection, Passwords access groups.

Unit – V: (12 Hours)

Case Study (Unix) : Basic commands, Permissions, Piping, Directory management, The shell, Background process, File system, Terminals, Devises, Shell history, Vi editor, Basic operations., Mail, Shell programming, Simple Network Management Protocols, System calls, Sockets and IPC, System administration.

REFERENCES

1. Deitel, *"Operating systems"* , Addison Wesley
2. Andrew S Tanenbaum, *"Operating Systems"*, Prentice Hall
3. Vickery, *"Unix Shell Programming"*, Addison Wesley

CA4B06: PROGRAMMING IN JAVA

Course Number: 22

Contact Hours: 3T + 2L

Number of Credits: 3

Number of Contact Hours: 55 Hrs

Unit – 1: (11 Hours)

Fundamentals of Object Oriented Programming. Evolution : Features, Environment, JFC. Constants, Variables & Data Types.

Unit – II: (12 Hours)

Operators and Expressions. Decision Making : Branching, Looping

Unit –III: (12 Hours)

Classes, Objects and Methods. Arrays, Strings and Vectors. Interfaces. Packages. Multi threaded Programming. Exceptions.

Unit – 1V:(10 Hours)

Applet Programming. Graphic Programming.

Unit – V: (10 Hours)

Managing Input/Output files. Java Collection. JDBC. Concepts of J2EE

REFERENCES

- E. Balaguruswami, “ *Programming with Java a Primer*”, 3rd Edition, Tata McGraw-Hill, 2008
- Andy Harris, “ *Java 2-Fast and Easy Web development*”, Prentice-Hall
- Peter Rossbach & Hendrisk Schreiber, “*Java – Server And Servlets*”, Person Education
- Vivek Sharma & Rajiv Sharma, “*Developing E-commerce Sites*” Person Education
- Matt J Crouch , “*Web Programming Wwith ASP*”, Person Education

CA4B07: PROGRAMMING LABORATORY

DATA STRUCTURES USING C++

Course Number: 23

Contact Hours: 4L

Number of Credits: 3

MENU DRIVEN C++ PROGRAMS USING CLASS

1. Data structure operation using Array and Linked list
2. Stack and Queue using Array and Linked list.
3. Dequeue using Array and Linked list.
4. Polynomial Operations on Two Polynomials: Addition, Subtraction, Multiplication using Arrays and Linked lists.
5. String operations
6. Stack Application: Expression evaluation.
7. Sorted linked list
8. Doubly linked list.
9. Circular linked list and Circular Doubly linked list.
10. Operator Overloading: +,-,+=,-=,>><<.
11. Sorting: Bubble, Insertion, Selection, Quick, Merge, Heap
12. Searching : Linear, Binary
13. Binary Search Tree
14. Prepare list of students details using linked list data structure

REFERENCES

1. Seymour Lipschutz, *"Theory and Problems of Data Structures"*, International Edition, 1986
2. E. Horowitz, S. Sahni & D. Mehta, *"Fundamentals of Data Structures in C++"*, 1st Edition, Galgotia, 2005.
3. Yashavant P. Kanetkar, *"Data Structures Through C++"*, 1st Edition, BPB Publications, 2007
4. K R Venugopa, Ravikumar, T. Ravisankar, *"Mastering C++"*, 19th Reprint, Tata McGraw-Hill, 2005.

5. E Balaguruswami, *"Object Oriented Programming with C++"*, 2nd Edition, TataMcGraw-Hill, 2002