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 1/J1/2471/06 Dated, Calicut University, P.O., 27.06.2009.

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 Nu.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/PC.

Forwarded/By Order

SECTION OFFICER
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Total Courses: 37
Total Credit: 120
Course Number: 4  
Contact Hours: 3 T  
Number of Credits: 2  
Number of Contact Hours: 50 Hrs

**Aim of the Course**  
To equip the students with fundamental principles of operations of various units of computer and to impart them with the 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 concepts of programming.
- To study C language

**Prerequisites**

Background of the basic science at +2 level

**Course Outline**

**UNIT I : Introduction (10 Hrs)**


**UNIT II : Memory, Peripheral Devices and CPU (10 Hrs)**


CPU: Functions, Components, Organization, System Buses, Common Registers, Instruction Codes, Instruction formats, addressing modes.

**UNIT III : C Fundamentals (10 Hrs)**

Introduction to tools for Program Design: Algorithm, Flowchart. Introduction to C, Structure of C Programs, C Tokens, Keywords, Identifiers, Operators, Strings, Constants, Specified symbols, Data types: Primary, User-defined, Derived, Empty. Data type Qualifiers, Data Input functions: getchar(), scanf(), gets(). Data Output functions: putchar(), printf(), puts(). Formatted scanf() and printf(). Precedence and Associativity. Control Statements: Branching: if, switch, Looping: Entry controlled
– while, for ; Exit controlled – do while, Jumping:- goto label. Forward jump & Backward jump, break and continue.

UNIT IV : Structured Data Types and Functions (10 Hrs)

Arrays:- One dimensional , Two dimensional and Multidimensional. Character arrays. Structure and Union. Functions:- System defined or Library functions, User defined functions, Prototype declaration, Definition, Calling by value, Calling by Reference, Arguments- formal & actual, return statement, recursion function, scope of variables, Local & Global variables, Storage class. Automatic, external, Static & Register variables. Passing arrays (1 dimensional, 2 dimensional & character arrays) to functions, Passing structures to functions, Pointers:- declaration, initialization, operations, Dynamic memory allocation.

UNIT V : Data Files (10 Hrs)

Introduction to data files, opening & closing a file, file types, fopen, fgets, fputs, fscanf, fprintf, fclose functions, C pre-processor & other features, Macro expansion, file inclusion, conditional compilation, Miscellaneous directives, Command line arguments.

Main References :-

4. “Programming with C”, Byran Gottfried
5. “Fundamentals of Computer”, V. Rajaraman
6. “Programming in C”, Kezningham & Ritchie

Additional References :-

2. “Let us C”, Yashvant Kanetkar, BPB publications
3. “The spirit of C”, Mullish Cooper, Jasco books

Course Number: 4
Contact Hours: 2L  
Number of Credits: 2  
Number of Contact Hours: 30 Hrs

**Aim of the Course**  
To equip the students with fundamental programming principles

**Objectives of the Course**  
- To learn the concept of programming  
- To study C language

**Prerequisites**  
Basic programming concepts

**Course Outline**

**Module I – 30 Hrs**

**Programming in C**

1. Programs involving no transfer of control  
2. Programs involving if, if…else, else if ladder, switch, ?: and goto statement  
3. Programs involving while, do…while, for, break and continue statements  
4. Programs involving one and two dimensional arrays  
5. Programs involving functions, recursions, arguments as arrays, strings  
6. Programs involving structures, arrays of structures, structure within structure  
7. Programs involving pointers, pointers and arrays, pointers and strings, pointer arguments to functions, return value as pointer, pointers and structures  
8. Programs involving files, command line arguments
CA1C01 - Mathematical Foundation for Computer Applications

Course Number: 5  
Contact Hours: 4 T  
Number of Credits: 3  
Number of Contact Hours: 60 Hrs

Aim of the Course
To equip the students with basic principles of integration and differentiation and matrix operations.

Objectives of the Course
- To learn the set operations.
- To learn the basics of limits
- To learn the basics of Differentiation & Integration
- To study the matrix operations.

Course Outline

Unit I (12 Hrs)
Sets & Binary Operations: Definition of set, finite set, infinite set, null set, singleton set, equal sets, equivalent sets, Universal set
Operations on a set: Union, Intersection, difference, disjoint sets
Relations: Inverse, Reflexive, Symmetric, Transitive, Equivalence (No Proof Required)

Unit II (12 Hrs)
Functions, Limits & Continuity: Function: Definition, Value of a function, domain, range, Real functions: Types, Even & Odd functions, one-one and onto functions.
Operations: Sum, Difference, Product, Quotient, Scalar multiple, Composition, Inverse.
Limits: Definition (basic properties only).

Unit III (12 Hrs)
Differentiation: Derivative at a point Derivative of a Function, Differentiation from first principle, Differentiation of important functions, Product rule, Quotient rule, Differentiation of a function of a function (problem based), Higher order derivatives (Definition only)

Unit IV (12 Hrs)
Integration: Integral as Anti derivative, Indefinite integral & constant of integration, Fundamental theorems, Elementary Standard results, Methods of Integration, Integration through Partial Functions, Integration by parts.
Definite Integral: Evaluation by Substitution, Properties of definite integrals (Problem Based)

**Unit V (12 Hrs)**
Matrices: Matrix Definition, Order of a Matrix, Types of Matrices, Addition of Matrices, Multiplication of Matrices, Various Kinds of Matrices, Transpose of a Matrix, Inverse of a Matrix.

Reference:
“Skills in Mathematics : Algebra”, S.K. Goyal
CA1C02 – Discrete Mathematics

Course Number: 6
Contact Hours: 4 T
Number of Credits: 3
Number of Contact Hours: 60 Hrs

Aim of the Course
To equip the students with basic principles of Discrete Mathematics

Objectives of the Course

- To learn the mathematical logic & Boolean Algebra
- To learn the basics of Groups & Rings

Course Outline

Unit 1: (12 Hrs)
Mathematical Logic – Proportions-Predicates and quantifiers, Logical operators- Logical inference- Methods of proof.

Unit II: (12 Hrs)
Counting Techniques:
Basic counting techniques-permutations and combinations, asymptotic behaviour of functions.

Unit III: (12 Hrs)

Unit IV: (12 Hrs)
Recurrence relations: Linear recurrence relations with constants coefficients – solution by the method of generating functions.

Unit V: (12 Hrs)
Groups and Rings – Groups- Subgroups – Generation and evaluation of process- Rings, Integral domains and fields (definitions and simple properties only)

Main References

1. Elements of Discrete Mathematics
   TATA MCGRAW – HILL Edition
3. Discrete mathematical Structures – Kolman, Busby, Ross – Pearson Education
CA2B02 – Programming in C++ & Data Structures

Course Number: 10
Contact Hours: 3 T
Number of Credits: 2
Number of Contact Hours: 50 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 background skills

Course Outline

Unit I: (10 Hrs)
Oop concepts: Introduction-Difference between procedure oriented and object oriented programming-Characteristics of Oop - abstraction, inheritance, polymorphism, and encapsulation
Class and Object .C++ data types, operators-insertion, extraction operators-pointers-references-enumeration-functions in c++, prototype, argument passing, return type, default argument

Unit II: (10 Hrs)
Classes: Member and member function- inline function-constructor and destructor-new and delete operators-friend function –function overloading with example-operator overloading

Unit III: (10 Hrs)
Inheritance: derived classes-single inheritance, multiple inheritance, multilevel inheritance, hierarchical inheritance, hybrid inheritance-virtual functions, virtual base classes-Nesting of classes and containership-Exception handling-Templates and template functions

Unit IV: (10 Hrs)
Arrays; representation of arrays, insertion and deletion operation, multidimensional arrays-Search -Linear and binary search methods- Sorting-insertion, bubble and quick sort methods and comparisons.

Unit V: (10 Hrs)
Linked list- Representation, insertions, deletion-stack using linked list-queue using linked list, and doubly linked list with header nodes.

Main References
1. Sartaj Shani “Data structures, Algorithms and applications in C++
2. Bjarne Stroustrup “the C++ programming language” Addison Wesley.1999
3. Robert Lafore “Object oriented programming in c++” Galgotia
5. Dinesh Mehta “Fundamentals of Data Structures in C++”

Course Number:10
Contact Hours: 3 L
Number of Credits: 2
Number of Contact Hours: 30 Hrs

Aim of the Course
To develop the basic programming skills

Objectives of the Course
- To learn the basic programming skill in OOPS
- To learn the implementation of various data structures

Prerequisites
Basic programming skills in C & knowledge in OOPS

Course Outline
Programs involving OOP features
Programs involving data structures using c++

CA2C03 – Computer Oriented Statistical Methods

Course Number: 11
Contact Hours: 2 4
Number of Credits: 2
Number of Contact Hours: 60 Hrs

Aim of the Course
To train the students with basic statistical methods.

Objectives of the Course
- To learn the basics of statistics
- To learn probability theory
- To learn the sampling distributions

Course Outline

Unit I

Unit II
Probability theory :Random experiment . Sample point, sample space, events, union, intersection and compliment of events. Different approaches of probability, frequency approach to probability, statistical regularity. Classical definition, numerical examples
Unit III
Random variables and probability distribution, Discrete and continuous random variables- density function- distribution- density function- change of variable in univariate case. Bivariate distributions-definition of bivariate distribution, marginal and conditional distributions, independence of two variables. Mathematical expectation- elementary properties, raw and central moments, moment generating functions, standard distributions- Binomial, Poisson, Normal

Unit IV
Sampling distributions, the distribution of mean samples from a Normal population, Definition and statement of the form of the distributions- Chisquare and F and use of their tables

Unit V
Estimation of parameters, Desirable properties of point estimates, Maximum likelihood estimator, Interval estimation, Interval estimates of mean and variance of Normal population and proportion of Binomial population, Testing of hypothesis, General principles of testing, Two types of errors, Neyman- Pearson approach

Main References
CA2C04 – Numerical Methods in C

Course Number: 12
Contact Hours: 2 T
Number of Credits: 2
Number of Contact Hours: 50 Hrs

Aim of the Course
To train the students with basic Numerical Methods

Objectives of the Course
- To learn the floating point arithmetic
- To learn how to solve linear equations
- To learn the numerical differentiation and integration

Prerequisites
Background of the basic Mathematics at +2 level

Course Outline

Unit 1 (10 hrs)
Floating Point Arithmetic- Errors, Significant digits and Numerical Instability

Unit 2 (10 hrs)
**Unit 3 ((10 hrs))**

**Unit 4 ((10 hrs))**

**Unit 5 ((10 hrs))**

**Main References**


Course Number: 12  
Contact Hours: 2 P  
Number of Credits: 1  
Number of Contact Hours: 30 Hrs

**Aim of the Course**
To train the students in programming Numerical Methods

**Objectives of the Course**
- To learn the floating point arithmetic
- To learn how to solve linear equations
- To learn the numerical differentiation and integration

**Prerequisites**
Background of the basic Mathematics at +2 level & knowledge in C programming
Course Outline

C Programs to solve numerical method problems

CA3B03 – Database Design & RDBMS

Course Number: 15
Contact Hours: 3 T
Number of Credits: 2
Number of Contact Hours: 50 Hrs

Aim of the Course:
To equip the students with principles and concepts of relational 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 Hours)
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 Hours)
Relational Database Design: First, Second, Third, BCNF, Fourth and Fifth Normal forms. Transactions: ACID properties, States, Concurrent executions.

Module III (12 Hours)
Data Definition in SQL: Data types, Creation, Insertion, Viewing, Updation, Deletion of tables, Modifying the structure of the tables, Renaming, Dropping of tables. Data Constraints – I/O constraints, Primary key, Foreign key, Unique key constraints, ALTER TABLE command.

Module IV (12 Hours)
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 Hours)
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.

Main References:
2. Ivan Bayross, “SQL,PL/SQL: The Programming Language of Oracle”
3. Alex Krigel and Boris M.Trukhnov, “SQL Bible”, Wiley pubs

Course Number: 15
Contact Hours: 2L
Number of Credits: 1
Number of Contact Hours: 30 Hrs

Aim of the Course:
To equip the students with fundamental programming principles

Objectives of the Course
- To study PL/SQL language
- To study SQL commands and procedures

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

Course Outline
CA3B04 – Operating Systems

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 basic concepts of Operating Systems

Objectives of the Course
- To learn the basic concepts and functions of operating system

Prerequisites
Basic knowledge of computer functional units

Course Outline

Unit I (12 hrs)
What is an OS, Functions, Structure, Types: Batch, Multiprogramming, Timesharing, Real time, Multiprocessor system, Distributed system, OS as Resource manager, Booting process, POST.

Unit II (12 hrs)

Unit III (12 hrs)

Unit IV (12 hrs)

Unit V (12 hrs)
Device Management: Disk scheduling, Disk scheduling policies, Device management: Functions, Techniques for device management: Dedicated, Shared, Virtual, Spooling, Channels and Control unit.

Main References:
1. Dietel, “An Introduction to Operating System”, Addison Wesly

Additional References:
CA3C05- Financial & Management Accounting

Course Number: 17
Contact Hours: 4 T
Number of Credits: 3
Number of Contact Hours: 60 Hrs

Aim of the Course
To equip the students with fundamental principles of financial & management accounting

Objectives of the Course
- To get a general introduction on accounting and its general application.
- To get a general understanding on various tools for financial statement analysis.
- To get a general understanding on accounting procedures up to the preparation of various financial statements.
- To get a general understanding and important tools for managerial decision making.

Prerequisites
Basic Accounting knowledge

Course Outline

UNIT-I (12 hrs)

UNIT-II (12 hrs)

UNIT-III (12 hrs)
Ratio analysis: uses of ratios in interpreting trading accounts and financial statements –different types of ratios – Liquidity ratios –turnover ratios-activity ratios –solvency ratios

UNIT-IV (12 hrs)
Fund flow statement – schedule of changes in working capital – fund from operation– cash flow statement– cash from operating activities – cash from financing activities – cash from investing activities

UNIT-V (12 hrs)

Main References
1. Pandey I.M “Financial Management” Vikas publishing house
2. Kellock.J “elements of Accounting” Heinmann
3. S.N Maheshwari “advanced Accountancy” Vikas publishing house
4. A.Vinod “cost and Management accounting”- Calicut University central co-operative stores

CA3C06 – Operations Research

Course Number: 18
Contact Hours: 4 T
Number of Credits: 3
Number of Contact Hours: 60 Hrs

Aim of the Course
To impart an interdisciplinary approach in mathematical formulation of different models.

Objectives of the Course
- To get a general introduction in solving linear programming problems.
- To get a general understanding of network analysis technique.
- To get a general understanding of different mathematical models.

Prerequisites
Basic Mathematical knowledge.

Course Outline

Unit 1: (12 hrs)

Unit II: (12 hrs)

Unit III: (12 hrs)
Network scheduling: concept of network, basic components, PERT and CPM, Rules of network construction, maximal flow problem, project scheduling critical path calculations, advantages
of network (PERT/CPM). Sequencing models: processing n jobs through two machines, n jobs through three machines, two jobs through m machines

Unit IV: (12 hrs)
   Replacement model: Replacement of items with gradual deteriorates-items deteriorates with value of money, items that fail completely and suddenly, staff replacement problem.

Unit V: (12 hrs)
   Inventory model: Deterministic inventory problem- EOQ problem with no shortages, EOQ problem with no shortage and several production runs of unequal length, EOQ production problem with no shortages, EOQ problem with shortages, E)Q problem with one and two price break- ABC analysis.

Main References


Additional References

CA4B05 – Programming in Java

Course Number: 21
Contact Hours: 3 T
Number of Credits: 2
Number of Contact Hours: 55 Hrs

Aim of the Course
To equip the students with basic programming skill in Java

Objectives of the Course
To learn the core Java language

Prerequisites
Basic Knowledge of OOPS concepts

Course Outline

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 and Looping

Unit III: (12 Hours)
Classes, Objects and Methods, Arrays, Strings and Vectors, Interfaces, Packages, Multithreaded programming, Exceptions.

Unit IV: (10 Hours)
Applet Programming, Graphic Programming

Unit V: (10 Hours)
Managing Input/Output files, Java Collection, JDBC, Concepts of J2EE

References

- Andy Harris, “Java 2- Fast and easy Web development”, Prentice Hall;
- Peter Rossbach & Hendrisk Schereliber, “Java – Server and Servlets”, Person Education
- Vivek Sharma & Rajiv Sharma, “Developing E Commerce Sites”, Person Education

Course Number: 21
Contact Hours: 2L
Number of Credits: 1
Number of Contact Hours: 30 Hrs

Aim of the Course:
To equip the students with programming principles of core Java

Objectives of the Course

- To study the features of Java
- To study two tier architecture
- To study the event driven programming

Prerequisites
Basic knowledge of Object Oriented Concepts

Course Outline
Programs involving arrays, strings, packages, interfaces, exception handling, frames, applets.
CA4B06 – Programming Laboratory I (C++ & Data Structures)

Course Number: 22
Contact Hours: 4 L
Number of Credits: 3
Number of Contact Hours: 50 Hrs

Aim of the Course
   To develop the programming skills in C++

Objectives of the Course
   ▪ To learn the basic programming in OOPS
   ▪ To learn the implementation of various data structures

Prerequisites
   Basic programming skills in C & knowledge in OOPS

Course Outline

Programs involving OOPS features
Programs involving Data Structures
CA4C07 – E - Commerce

Course Number: 23
Contact Hours: 4 T
Number of Credits: 3
Number of Contact Hours: 60 Hrs

Aim of the Course
To provide the students with the basic knowledge in E-Commerce

Objectives of the Course
- To get a general introduction Electronic Commerce framework
- To get a general understanding on various electronic payment system
- To get a general understanding on Internal information systems
- To get a general understanding on the new age of Information.

Prerequisites
Basic knowledge in Commerce

Course Outline

UNIT I: (12 hrs)

UNIT II: (12 hrs)

UNIT III: (12 hrs)

UNIT IV: (12 hrs)


UNIT V: (12 hrs)

The New Age of Information-Based Marketing – Advertising on the Internet- charting the Online Marketing process –Information search and Retrieval – Electronic commerce Catalogs or Directories – Information Filtering

Main References
CA4C08 – Management Information Systems

Course Number: 24
Contact Hours: 4 T
Number of Credits: 3
Number of Contact Hours: 60 Hrs

Aim of the Course
To provide the students with the basic knowledge in Management Information Systems

Objectives of the Course
- To get a general introduction to Information Systems
- To get a general understanding on the conceptual foundations
- To get a general understanding on organizational & management concepts
- To get a general understanding on developing & implementing application systems.

Prerequisites
Basic knowledge in Information Systems

Course Outline

Unit I (12 hrs) Introduction to information Systems: Definition of a management information system, MIS as an evolving concept, MIS & other academic disciplines, Subsystems of an MIS, Operating elements of an information system, Management information system support for decision making, MIS structure based on management activity, MIS structure based on organizational function, synthesis of MIS system structure, some issues of MIS.

Unit II (12 hrs) Conceptual Foundations: Phases in decision Making Process, Concepts of decision Making, Behavioral models of the decision Maker, Behavioral Model of organizational decision making, decision making under psychological stress, Methods for decision among alternatives, relevance of decision making concepts for information system design, Definition of information,


**Unit IV (12 hrs)** Organizational structure & management concepts: The basic model of Organizational Structure, Modifications of basic organizational structure, Information processing model of organization structure, Organizational culture & Power, Organizational change, Management theories, organizations as sociotechnical systems, implications of organizational structure & management theory of MIS.

**Unit V (12 hrs)** Developing & implementing application systems: A Contingency approach to choosing an application development strategy, Prototyping approach to application system development, Life cycle approach to application system development, Life cycle definition stage, Life cycle installation & operation stage, Implementation of IS as an organizational change process, Quality in IS, Organizational functions for control & quality assurance, Quality assurance for applications, Quality assurance with user developed systems, Post audit evaluation of Is Applications, Evaluation of existing Hardware & Software, Evaluation of Proposed Hardware & Software, Auditing of IS.

**Main Reference:**
Gordon B Davis, Margrethe H Olson, Management information systems conceptual foundations, Structure and development, TATA McGraw Hill
CA5B07 – Data Communication & Mobile Computing

Course Number: 25
Contact Hours: 4 T
Number of Credits: 3
Number of Contact Hours: 60 Hrs

Aim of the Course
To provide the students with the basic knowledge in Data Communication & Mobile Computing

Objectives of the Course
- To get a general introduction to data & mobile communication concepts
- To get a general understanding on wireless networking

Prerequisites
Basic knowledge in Communication Systems

Course Outline

UNIT I (12 hrs)

UNIT II (12 hrs)
Key Techniques - ASK, FSK, PSK, QPSK

UNIT III (12 hrs)
Transmission Media: Guided Media: Twisted Pair Cable, Coaxial Cable, optical fiber Cable
Unguided (wireless): Terrestrial microwave – satellite microwave – wireless propagation,
Multiplexing - Frequency Division Multiplexing (FDM) – Time Division Multiplexing (TDM),
Synchronous Time Division Multiplexing – Statistical time Division multiplexing –

UNIT IV (12 hrs)

Introduction to wireless networking-Mobile and Wireless Devices – Need for Mobile Computing –
3-tier Architecture- Mobile computing through internet- Mobile computing through telephone: IVR-
Voice XML-TAPI. GSM: GSM history-GSM architecture-GSM Entities- GSM Channel types-
GSM addresses and identifiers- Network aspects in GSM- Authentication and security in GSM.

UNIT V (12 hrs)

GPRS: Introduction-GPRS and Packet data Network-GPRS Network architecture-GPRS Network
operation- Data service in GPRS- Application for GPRS-limitation of GPRS, WAP: The Mobile
Internet Standard: Overview of WAP

Text Books:

2. Electronic communication system - Kennedy, Mc Graw Hill.

Reference Books:

1. Introduction to Data Communications & Networking - Behrouz & Forozan Mc Graw Hill.
CA5B08 – Microprocessor

Course Number: 26
Contact Hours: 3 T
Number of Credits: 3
Number of Contact Hours: 50 Hrs

Aim of the Course
To equip the students with the architecture and instruction sets of different microprocessors and to design systems using microprocessors

Objectives of the Course
- To study the architecture of microprocessors like 8085, 8086 and higher versions
- To understand the instruction set of the above.
- To know the methods of connecting them to the peripheral devices. To learn the basic concepts and functions of operating system

Prerequisites
Basic knowledge in computer hardware

Course Outline

Unit I (10 hrs)
Introduction to the microprocessor and computer: Internal processor architecture, Functional block diagram, Bus, Clock signals, addressing modes

Unit II (10 hrs)
Programming 8086: Data movement instructions, Arithmetic and logic instructions, program control instructions, string instructions, programming techniques, examples, Modular programming: stacks, subroutines, Macros.

Unit III (10 hrs)
Assembler Directives: Data Definition and Storage Allocation, Program Organization, Alignment, Program End, Value Returning Attribute, Procedure Definition, Macro Definition, Data Control, Branch Displacement, Header File, Inclusion, Target Machine Code Generation Control Directives
Unit IV (10 hrs)
Interrupts and interrupt routines, I/O interface and programming: Fundamental I/O considerations, Data transfer schemes-Programmed I/O, Interrupt I/O, DMA, System bus structure, Min.Max Modes, Application of 8259, 8255, 8251, 8257, 8253

Unit V (10 hrs)
Introduction to other 16 bit 32 bit processors: 80286, 386, 486, Pentium and Pentium ProProcessor

References:
1. K.R Venugopal, Microprocessor X6 Programming, BPB
2. Peter Abel, IBM PC Assembly Language and programming, Prentice Hall
3. Interfacing, S\W application, Prentice Hall
4. Mohammed Rafiqussaman, Microprocessor and microcomputer based system design
5. Yu-Chang Liu & Glenn A Gibson, "Microcomputer systems: the 8086\8088 Family: Architecture, Programming and design", PHI
CA5B09 – Computer Networks

Course Number: 27
Contact Hours: 4 T
Number of Credits: 3
Number of Contact Hours: 60 Hrs

Aim of the Course
To provide the students with the basic knowledge in Networking

Objectives of the Course
- To get a general introduction to Computer Networks
- To get a general understanding on different OSI layers

Prerequisites
Basic knowledge in Communication Systems

Course Outline

UNIT I (12 Hrs)
Introduction to Computer Networks: Network Topologies-Types of Network-OSI Model, Switching-The Physical Layer: Modem-RS232 Interface

UNIT II (12 Hrs)
Data Link Layer: LAN - Ethernet IEEE 802.3 - IEEE 802.4 - IEEE 802.5 - IEEE 802.11 – FDDI - SONET – Bridges-Sliding window protocol-ALOHA-CSMA/CD

UNIT III (12 Hrs)

UNIT IV (12 Hrs)
Session layer: Synchronization – Presentation layer: Encryption-Decryption-Application layer : HTTP-FTP-SMTP-DNS

UNIT V (12 Hrs)
References:

1. Introduction to Data Communications & Networking - Behrouz & Forozan, TMH
CA5B10 – Software Engineering

Course Number: 28
Contact Hours: 3 T
Number of Credits: 3
Number of Contact Hours: 60 Hrs

Aim of the Course
To provide the students with the basic knowledge in Software Engineering

Objectives of the Course
- To equip the students with basic system development skills
- To get a general understanding on Software Life Cycles

Prerequisites
Basic knowledge in Programming

Course Outline

Unit I: Introduction (12 hrs)
Introduction to software Engineering, Software Components, Software Characteristics, Software Applications, Software engineering processes, Similarity and differences from conventional engineering processes

Unit II: Software Requirement Specification (SRS) (12 hrs)
Software Quality Assurance (SQA): Verification and Validation, SQA Plans, software quality frameworks, ISO 9000 models

UNIT III: Software Design (12 hrs)
Low Level Design: Modularization, Design Structure, Charts, Pseudo Codes, flow Charts, Coupling and Cohesion Measures
Design strategies: Function Oriented Design, Object oriented Design, Top –Down and Bottom-UP design

UNIT IV: Software Testing and Maintenance (12 hrs)
Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, White Box Testing, Black Box Testing, Test Data Preparation
Software as an entity, Need for Maintenance, Categories of maintenance: Preventive, Corrective and perfective maintenance, cost of maintenance, Software Re-Engineering, Reverse Engineering.
UNIT V: Software Project Management (12 hrs)
Software configuration management Activities: Change control Process, Software Version Control, An Overview of CASE Tools
Estimation: Cost, Efforts, Schedule/Duration, Constructive cost Models, Resource Allocation Models, Software Risk Analysis and Management

Reference Books:
CA5B11 – Visual programming Using C#.Net

Course Number: 29
Contact Hours: 3 T
Number of Credits: 2
Number of Contact Hours: 60 Hrs

Aim of the Course
To provide the students with the basic knowledge in Visual programming

Objectives of the Course
- To get a general understanding on .Net Frame Work
- To get a general understanding on .ADO .Net

Prerequisites
Basic knowledge in OOPS

Course Outline

UNIT – I (10 hrs)
the origins of the .NET technology .net framework, features of .net, architectures of C#.net.
Introduction to visual studio,.net IDE interface and event driven programming, the common
language runtime, The Just-In-Time Compiler visual studio, .NET Framework class library
introduction.NET languages, benefits of the .NET approach, C# and .NET.

UNIT – II (12 hrs)
Basic classes, declarations, conditionals, loops, arrays, strings, enumerations,
Windows Forms, Text Boxes, Buttons, Labels, Check Boxes, and Radio Buttons.
List Boxes, Combo Boxes , Menus ,Image List, Tree Views, List Views, Toolbars, Status Bar
and Progress bars.

UNIT –III (14 hrs)
Object Oriented Programming in c#.NET , Class and Object, Properties, methods and events.
Constructors and Destructors
Method overloading
Inheritance

UNIT IV (14 hrs)
Database :Connected and disconnected mechanism, Connection Objects, Command Objects,
Data Adapters, Dataset Class, Data binding with controls like Text Boxes, List Boxes, Data
grid

UNIT –V (10 hrs)
Exception, structured exception handling using try, catch and final statements, and user
defined exception.
References

1. Net Framework Essentials 3rd Edition (O’Reilly)
2. Beginning with C#.Net, Wrox publications

Course Number: 29
Contact Hours: 2 L
Number of Credits: 1
Number of Contact Hours: 30 Hrs

Aim of the Course
To develop the programming skills in C#.Net

Objectives of the Course
- To learn the basic programming skills in .Net

Prerequisites
Basic programming skills in C++ & knowledge in OOPS

Course Outline
1. Create and populate Windows Forms.
2. Create and use user controls in a Windows Forms application
3. Create menus in a Windows Forms application
4. Add code to form and control event procedures in a Windows Forms application
5. Validate user input in a Windows Forms application
6. Bind Windows Forms applications to various data sources by using Microsoft ADO.NET
7. Debug a Windows Form Application (try/catch)
Open course Offered to other Programmes

CA5D01 – Internet Programming

Course Number: 30
Contact Hours: 2 T + 2 P
Number of Credits: 2
Number of Contact Hours: 50 Hrs (T) +30 Hrs (P)

Aim of the Course
To provide the students with the basic knowledge in Internet Programming

Objectives of the Course
- To get a general understanding on HTML
- To get a general understanding on ASP

Prerequisites
Basic knowledge of Internet

Course Outline

UNIT I (10 hrs)
Introduction to Internet: What is Internet –Services provided by internet, HTTP-FTP-Email(P POP,IMAP,SMTP)-TELNET-USENET-GOPHER-Search Engine- HTML - URL-Domain Names- Browsers- WWW.

UNIT II (10 hrs)
HTML: Introduction to HTML-Essential Tags-Adding Images-Color and Background of Web Pages-Lists and their Types- Linking to External Documents- Creating Table-Frames-Forms-Introduction to DHTML: CSS

UNIT III (10 hrs)

UNIT IV (10 hrs)
UNIT V (10 hrs)

Front Page: Front Page Basics - Phases of Planning and Building Web Sites- Front Page Views-Adding Pictures-Backgrounds-Links

References

1. HTML Black Book – Steven Holzner – Dreamtech Press
2. HTML, Java Script, DHTML, PERL, CGI – Evan Bayross – BPB
3. Internet and Word wide Web How to Program- Deitel &Nieto,Pearson Education
   Asia , 2003
CA5B12 – Mini Project

Course Number: 31
Contact Hours: 2 P
Number of Credits: 1
Number of Contact Hours: 30 Hrs

**Aim of the Course**
To equip the students with Computer Application

**Objectives of the Course**
To develop the software development skill

**Prerequisites**
Basic programming knowledge

**Course Outline**
Mini Project in any platform using any language of student’s choice
CA6B13 – Web Programming Using PHP

Course Number: 32
Contact Hours: 4 T
Number of Credits: 3
Number of Contact Hours: 60 Hrs

Aim of the Course
To equip the students with basic programming skill in Web Designing

Objectives of the Course
To learn the Web Designing

Prerequisites
Basic knowledge in HTML

Course Outline

Unit I (10 Hrs)
HTML: Introduction to HTML, Basic formatting tags: heading, paragraph, underline break, bold, italic, underline, superecript, subscript, font and image. Different attributes like align, color, bgcolor, font face, border, size. Navigation Links using anchor tag: internal, external, mail and image links. Lists: ordered, unordered and definition. Table tag, HTML Form controls: form, text, password, textarea, button, checkbox, radio button, select box, hidden controls, Frameset and frames

Unit II (10 Hrs)
Javascript: Introduction, Client side programming, script tag, comments, variables, Document Methods: write and writeln methods, alert, Operators: Arithmetic, Assignment, Relational, Logical, Javascript Functions, Conditional Statements, Loops, break and continue. Events Familiarization: onLoad, onClick, onBlur, onSubmit, onChange

Unit III (10 Hrs)
PHP: Introduction to PHP, Server side scripting, Role of Web Server software, including files, comments, variables and scope, echo and print, Operators: Logical, Comparison and Conditional operators, Branching statements, Loops, break and continue, PHP functions,

Unit IV (10 Hrs)
Working with PHP: Passing information between pages, HTTP GET and POST method, String functions: strlen, strrev, strstr, strcmp, substr, str_replace, string case, Array constructs: array(), list() and foreach(), PHP advanced functions: Header, Session, Cookie Object Oriented Programming using PHP: class, object, constructor, destructor and inheritance

Unit V (10 Hrs)
PHP & MySQL: Features of MySQL, data types, Introduction to SQL commands-SQL, SELECT, DELETE, UPDATE, INSERT, PHP functions for MySQL operations: mysql_connect, mysql_select_db, mysql_query, mysql_fetch_row, mysql_fetch_array, mysql_fetch_object, mysql_result, Insertion and Deletion of data using PHP, Displaying data from MYSQL in webpage
Reference:

Reference Books
1. HTML 4.0 IN SIMPLE STEPS Author: Kogent Solutions Publishers: Wiley
2. HTML 4 FOR DUMMIES Author: ED TITTEL & MARY BURMEISTER Publishers: Wiley
3. Beginning PHP D W Mercer, A Kent, S D Nowicki Publisher: Wrox
4. PHP & MYSQL FOR DUMMIES, 3RD ED Author: JANET VALADE Publishers: Wiley
CA6B14 – Computer Graphics & Multimedia

Course Number: 33
Contact Hours: 4 T
Number of Credits: 3
Number of Contact Hours: 60 Hrs

Aim of the Course
To impart knowledge in computer graphics and multimedia

Objectives of the Course
- To Learn the basics & applications of computer graphics
- To learn multimedia applications

Prerequisites
Basic knowledge in graphics and multimedia

Course Outline

UNIT I (12 Hrs)
Origin of computer graphics - Application of computer graphics – Random scan & Raster scan systems - Display devices - CRT, LCD, plasma panel. LED devices - input & output devices. Raster scan algorithms – DDA - Bresenham’s line & circle drawing algorithms

UNIT II (12 Hrs)
Geometrical transformations - Basic 2D transformations - 2D composite transformations Homogeneous coordinate systems and matrix representation of transformations - window to viewport transformation - clipping-line & polygon clipping - Basic interaction tasks & interaction hardware-user interaction software

UNIT III (12 Hrs)
Multimedia applications - Media and Data streams - Properties of multimedia systems - Data stream characteristics - Audio: Music – MIDI - audio file formats - Speech

UNIT IV (12 Hrs)
Images - computer image processing - Video – video file formats - video and animation – animation techniques - multimedia software tools - multimedia authoring tools

UNIT V (12 Hrs)
Data Compression: Storage Space – Coding Requirements – source, entropy and hybrid compressing techniques JPEG – MPEG – DVI, Optical Storage Media
Main References

2. Judith Jeffcoate “Multimedia in Practice” Prntice Hall India
CA6B15 – Programming Laboratory II
(Programming in Java, PHP)

Course Number: 34
Contact Hours: 5 L
Number of Credits: 3
Number of Contact Hours: 80 Hrs

Aim of the Course
To equip the students with basic programming skill in Web Designing

Objectives of the Course
To learn the Web Designing

Prerequisites
Basic knowledge in HTML

Course Outline

Programs implementing features of java
Programs implementing features of PHP
CA6B16 – Programming Laboratory III
(Programming in RDBMS, VB.Net)

Course Number: 35
Contact Hours: 5 L
Number of Credits: 3
Number of Contact Hours: 80 Hrs

Aim of the Course
To equip the students with basic programming skill in Database designing and manipulations

Objectives of the Course
To learn the database manipulations and .Net applications

Prerequisites
Knowledge in SQL and VB.Net

Course Outline

Programs involving SQL manipulations
Programs involving VB.Net applications
Open course 2

CA6D02 – Software Testing

Course Number: 36
Contact Hours: 4 T
Number of Credits: 3
Number of Contact Hours: 60 Hrs

UNIT I


UNIT II


UNIT III


UNIT-IV


UNIT-V


Main References

Additional References
1. William E.Perry, “Effective methods of software testing” Wiley India.
2 Renu Rajani, Pradeep Oak,”SoftwareTesting” 2007, TMH
CA6D02 – Introduction to System Administration

Unit I: Introduction to NOS and Administration
Overview of Network Operating System: What they are, how they differ from other operating systems, How they work, Network Components, Protocols & Topologies, File Systems & Disk Storage, Server Hardware, Admin Roles & Responsibilities
DNS Operation, Multi Level DNS, DHCP Operation

Unit II: Managing Windows 2000 or Windows 2003 Part I

Unit III: Managing Windows 2000 or Windows 2003 Part II
Managing Printing Services: Adding A Printer, Connecting to Shared Printer, Controlling and monitoring access to the printer
Manage resources and security by using windows Explorer, Group Policy Management tools and the security configuration and analysis tool
Managing DNS, Managing Servers, Managing Terminal Services
Managing IIS: Install IIS, Configure authentication, Implement Web Applications, Manage the IIS metabase, Manage an IIS server in a Remote Location, Monitor and Optimize IIS.
Managing Disaster Recovery: use Automatic System Recovery (ASR) to back up and restore server.

Unit IV: Managing Linux Part I
Overview, Installing and configuring Linux NFS, Responsibilities, The Super user account, System Administration tools, System Logs
Managing Users: The Password and group Files, The Passed Command
Processes: Overview, Listing with ps, killing with kill, System Start-up, Run Levels, The inittab and rc files, checking tools, System Shut down

Unit V: Managing Linux Part II
Managing Printing Services: Overview, Adding and Managing Printers, Local and Remote Printers
Disks and File Systems: Partitioning, mounting, Linux file systems, structure, Checking with fsck, df, quot, backing up, Package movement
Network Services, Samba: ftp, sftp, DHCP, DNS, Apache, Security
CA6B17 – Project

Course Number: 37
Contact Hours: 3 P
Number of Credits: 2
Number of Contact Hours: 50 Hrs

Aim of the Course
To equip the students with Computer Applications

Objectives of the Course
To develop the software development skill

Prerequisites
Advanced programming knowledge

Course Outline
Software Projects in any platform using any language of student’s choice