

UNIVERSITY OF CALICUT



IT MISSION PROGRAMME

Regulations, Scheme of Evaluation, Course Structure Syllabus for **POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS** (with effect from 2012 Admission)

REGULATIONS

- 1. Duration** of the course shall be one year, divided into 2 semesters.
- 2. Selection and Eligibility for Admission:** The candidates seeking admission in PGDCA shall have to be graduated from any University recognized by University of Calicut.
- 3. Evaluation** of all semester theory papers and conduct of practical examination will be on the basis of existing University rules..
- 4. Project Work & Viva-voce:** The Project work should be carried out during the period of the course in the Institution. Every student should do the Project individually and no grouping is allowed. All the candidates are required to get the approval of their synopsis and the guide before commencement of the project from the Institution and the matter may be intimated to the University at the beginning of the second semester by the Institution. The project will be reviewed periodically every month by the Institution. At the end of the semester the candidate shall submit the Project report (one bound copy and one soft copy) duly approved by the guide. Evaluation of the project should be conducted by a board of examiners appointed by the University. (Mark Distribution: Content 30% + Methodology 30 % + Presentation 20 %, and Via- voce 20 %). If project work and the report are found to be not up to the expected standard, the examiners can ask the candidate to modify and resubmit the project report after incorporating the suggestions of the examiners. Such reports shall be resubmitted within the stipulated period suggested by the examiner(s)

COURSE STRUCTURE AND SCHEME OF EVALUATION

Semester 1

Sl. No	Course Code	Course	Duration of examination (Hrs)		Marks
			Theory	Practical	External
1	PGD1C01	Digital Fundamentals and Operating System	3		100
2	PGD1C02	Fundamentals of Programming and Problem solving using C	3		100
3	PGD1C03	Data structures	3		100
4	PGD1C04	Introduction to Scripting Languages and Web Designing	3		100
5	PGD1C05	Practical - 1	-	3	100
	Total				500

Semester 2

Sl. No	Course Code	Course	Duration of examination (Hrs)		Marks
			Theory	Practical	External
1	PGD2C06	Object Oriented Programming using JAVA	3		100
2	PGD2C07	Database Fundamentals and Visual Programming	3		100
3	PGD2C08	Data Communication and Computer Networks	3		100
4	PGD2C09	Software Engineering	3		100
5	PGD2C10	Practical - 2	-	3	100
6	PGD2C11	Project Work & Viva-voce	Dissertation (150 marks)	Viva-voce (50 Marks)	200
		Total			700

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POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS

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SYLLABUS

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PGD1C01 Digital Fundamentals and Operating System

Unit - 1

Introduction, History and Generation, Types of computers, Characteristics of computers, Concept of hardware and software, Types of software, Programming Languages, Machine languages, Assembly languages and high level languages, Overview of a computer system, Input / Output units, CPU, ALU, Control unit, Memory unit, Storage devices: Primary & Auxiliary memory.

Unit – II

Number systems, Introduction to binary, octal, decimal and hexadecimal number systems, Introduction to ASCII and Unicode standards, another-Boolean postulates and laws De-Morgans Theorem- Principle of Duality- Boolean expression Boolean function- Minimization of Boolean expressions Sum of Products (SOP) Product of Sums (POS)- Minterm- Maxterm- Canonical forms Conversion between canonical forms Karnaugh map Minimization Dont care conditions.

Unit – III

Operating System Objectives and functions: Evolution, Serial Processing, Batch Systems, Multi Programmed batch Systems, Time Sharing Systems, Parallel Systems, Distributed Systems, Real time systems. Definition of Process, States, Process Control Block, Process Communication, Communication in Client server System, Basic concepts of threads, Concurrency, Principles of Concurrency, Mutual exclusion, Semaphores, Messages, Dead lock, Dead lock Prevention and detection.

Unit – IV

CPU Scheduling: Scheduling Criteria, Scheduling algorithms - FCFS, SJF, Priority, RR, Memory Management: Address binding, Logical Vs Physical address space, Dynamic Loading, Dynamic Linking and Shared Libraries, Overlays, Swapping, Contiguous Memory allocation, Paging, Segmentation.

Unit – V

Introduction of free and open source software, Introduction to GNU/Linux and basics, Linux distribution, File System Introduction, File System Hierarchies, User interfaces, Running an Application, File and Directory Management in Linux, Mobile OS: Concepts, history, features, architecture, future scope, Case study : Windows NT (concept), Android.

REFECENCES:

1. Computer Fundamentals, PK Sinha, BPB Publications, 2004
2. Thomas L. Floyd, Digital Fundamentals, Pearson Education, Inc, New Delhi, 2003
3. Operating System Concepts, Silberschatz, Galvin, Gagne, John Willey & Sons INC.
4. Operating Systems A Modern Perspective, Nutt G.J, Addison Wesley.
5. Introduction to Linux Installation and Programming, N. B. Venkateshwarlu (Ed); B S Publis hers Hyderabad, 2005
6. Microsoft Windows 2000, Diana Rain, Karl Schwartz, DDC Publications, 2000

PGD1C02 Fundamentals of Programming and Problem solving using C

Unit - 1

Problem analysis and logic development, Concept of a well posed problem, Concept of Algorithm, Objectives, Recursive and iterative algorithms, Flow chart development, Symbol used to draw flow chart, Typical examples of flow chart and algorithms, Quality of an algorithm, Space complexity and Time complexity of algorithm.

Unit – II

Overview of C, Constants, Variables, and Data type, Operators and Expression, Arithmetic, relational operators and logical operators, assignment operators, increment / decrement operators, conditional operators, arithmetic expressions, precedence of arithmetic operators, Type conversion Managing Input and Output, Library functions.

Unit – III

Decision making, Branching and Looping. Decision making with IF statement, if-else statement, Nesting of if-else, and else-if ladder, Switch statement, Conditional operator, go-to statement. Looping: while loop, do-while, and for Loops, Nesting of loops, jumps in loop, skipping of loops, break and continue statements.

Unit – IV

Arrays, processing array, passing arrays to functions, Introduction to multidimensional arrays, arrays and strings, Handling of Character Strings, string manipulation functions, User defined Functions, Function prototypes, passing arguments to a function, Nesting of functions and recursion, functions and arrays, scope and life-time of variables in functions.

Unit – V

Definition of Structures and Unions, giving values to members, structure initialization, comparison of structure variables, arrays of structures, Introduction to pointers, Understanding pointers, accessing the address of a variable, declaring and initializing pointers, accessing a variable through its pointer, pointer expressions, pointer and arrays, pointer and character string, pointers and functions, Concepts of file management, Opening and closing files, i/o operations on files , error handling on files.

REFECENCES:

1. How to solve it by Computer, Dromey, PHI
2. Programming in ANSI C, E. Balaguruswami.
3. Mastering C, Venugopal, Prasad, TMH
4. Complete reference with C, Tata McGraw Hill.

PGD1C03 Data structures

Unit - 1

Definition of Data Structure, precondition, Examples of data structures. Kinds of data structures, logical Implementation and Application levels of data structures. Node and Representative node of data structure, Empty data structure. Mathematical Structure, hardware Structure and Storage structure. Abstract Data Type (ADT)

Unit – II

Linear data structures, Characteristics of an array. Definition of an Array, Positional value of a member, Base address of array, Indexing of an array, Index variable, Index type. Implementation of 1-D arrays, Row and Column Major implementations of 2-D, 3-D and n-D arrays. Simple examples illustrating address computations.

Unit – III

Stack as a data structure, Relationship component (LIFO) in stacks. Representative node for stack, uses of stack. Static and Dynamic stack. PUSH and POP operations for stack. Polish and reverse Polish notations, Polish and Reverse Polish Notations.

Simulation of recursion using stacks. Queue as data structure, Relationship component (FIFO) Queue. Representative nodes (Front and Rear) for queue. Classification of queue as Linear Queue, (b) Circular Queue (c) Priority Queue.

Unit – IV

Concept of a Linked List as a run time equivalent of array. List versus array. Classification of a node as Atomic and List node. Internal pointer and External Pointer. Head and Tail of a list. NULL list, Length of a list. Classification of lists based on the number of internal pointers in a list node - Single and Double lists. Classification of lists based on the kind of collection - Linear list and Circular list. Linear Single List (LSL), Circular Single List (CSL), Linear Double List (LDL) and Circular Double List (CDL)

Unit – V

Non Linear Data Structure: Trees, Basic terminology, Binary Trees, Inorder, Postorder, preorder traversals, Binary Search Trees (BST), Operations on a BST – Insertion, Deletion, Search for a key in BST, Sorting and Searching.

REFECENCES:

1. Fundamentals of Data Structures, Horowitz and Sahani
2. Data Structures and Program Design in "C" , Robert L. Kruse
3. Introduction of data structures with application, P.G. Sorenson

PGD1C04 - Introduction to Scripting Languages and Web Designing

Unit I:

Introduction to Internet: What is Internet –Services provided by internet, What is WWW, Web servers and web browsers, IP address and Domain Name System (DNS), URI and URL, Client-server model, HTTP, FTP, Email(POP,IMAP,SMTP), Search Engine, Introduction to Front Page & Dreamweaver.

Unit II:

HTML: Introduction to HTML, Basic formatting tags: heading, paragraph, underline break, bold, italic, underline, superscript, 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, text area, button, checkbox, radio button, select box, hidden controls, frameset and frames.

Unit III:

Defining styles using CSS: styles and HTML, selectors, structure and cascade, values and units, text properties, fonts, colors and backgrounds, visual formatting, boxes and borders, positioning, table layout, user interface styles.

Unit IV:

Client-side programming languages, Uses of JavaScript, Incorporating JavaScript in a HTML document, Basic JavaScript syntax, Data types and variables, Expressions and operators, Control structures, Functions and procedures, Arrays and objects, Document object model (DOM), Event handling, Using JavaScript for form validation.

Unit V:

Server side programming languages, PHP fundamentals, Data types and variables, Expressions and operators, Control structures, Functions and procedures, Arrays and objects, Form data handling, Handling sessions, Accessing a MySQL database, Errors and troubleshooting.

REFECENCES:

1. HTML, CSS, JavaScript® , Perl, Python®, and PHP Web Standards Programmer's Reference, Steven M. Schafer, Wiley Publishing Inc., USA (Indian Edition), 2005
2. Head Frist PHP & MySQL, Beighley, L., Morrison, M., O'Reilley, 2009
3. PHP and MYSQL Web Development, Welling, L., 4th Ed. New Jersey: Addison-Wesley
4. HTML 4.0 No experience required, E Stephen Mack & Janan Platt
5. Tech yourself web publishing with HTML 4 in 14 days, Laura Lemay,
6. Javascript the definitive guide, David Flanagan, O Reilly & Associates inc.

PGD1C05 - Practical – 1

C Programming and Data structures

Experiments should include but not limited to:

1. Write C program and implement to solve the following problems
 - a. Compute area of a circle, rectangle
 - b. Check whether a given number is prime or not
 - c. Reverse a number, string, string manipulations
 - d. Write a program to sort the list of N numbers in ascending /descending order.
 - e. Searching and sorting, Matrix addition and multiplication
 - f. Compute GRADE of N students in a class based on their %Marks obtained.
 - g. Compute Factorial of a given number using C function.
 - h. Programs involving Structures and union (like addition of two complex numbers, student record creation and manipulation etc.)
 - i. Create file for storing students records and generate the rank list based on the total marks obtained.
 - j. Pointers - simple programs to learn concept of pointers

2. Web designing
 - a. Creation of a simple HTML web page
 - b. Create a web page to show different attributes: italics, bold, underline.
 - c. Design a page having background colour, giving text colour, display links in another colour and using all the attributes of font tab.
 - d. Write an HTML code to create a Web page that contains appropriate content and an image at its center. When user clicks on the image, it should open another page.
 - e. Develop web page with Javascript
 - f. Develop web page with CSS
 - g. Table creation
 - h. List creation

PGD2C06 - Object Oriented Programming using JAVA

Unit I:

Fundamentals of Object Oriented programming: Object Oriented paradigm – Basic concepts of Object Oriented Programming – Benefits of OOP – Applications of OOP. Java Evolution, Overview of Java Language: Simple Java Program – Java Program Structure – Java Tokens- Java Statements – Implementing a Java Program – Java Virtual Machine – Command Line Arguments. Constants, Variables and Data types: Constants – Variables – Data types – Declaration of Variables-Giving Values to variables- Scope of Variables-Symbolic Constants-Type Casting.

Unit II:

Operators and Expressions, Decision Making and Branching, Decision Making and Looping: , Class , Objects and Methods: Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing class members – Constructors – Methods Overloading – Static Members – Nesting of Methods – Inheritance – Overriding Methods – Final Variables and Methods – Final Classes – Abstract Methods and Classes – Visibility Control.

Unit III:

Arrays, Strings and Vectors: One-dimensional Arrays-creating an Array – Two dimensional Arrays – Strings – Vectors – Wrapper Classes – Enumerated Types. Interfaces: Multiple Inheritance : Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables. Packages: Java API Packages – Using system Packages – Naming Conventions – Creating Packages – Accessing a Package – Using a Package – Adding a Class to a Package – Hiding Classes – Static Import.

UNIT IV:

Multithreaded Programming, Managing Errors and Exceptions, Applet Programming: How Applets differ from Applications – Preparing to write Applets – Building Applet Code – Applet Life Cycle – Creating an executable Applet – Designing a WebPage – Applet Tag – Adding Applet to HTML file – Running the Applet – More about Applet Tag – Passing parameters to Applets – Aligning the display – More about HTML tags – Displaying Numerical Values – Getting Input from the user.

Unit V:

Graphics Programming: The Graphics class – Lines and Rectangles – Circle and Ellipses – Drawing Arcs – Drawing polygons – Line Graphs – Using control loops in Applets – Drawing bar charts , Managing input/output files.

REFECENCES:

1. Programming with Java, A primer, 3e, E.Balaguruswamy, TATA McGraw-Hill Company (2008).
2. Programming with Java, Second Edition, John R. Hubbard, Schaum's outline Series, Tata McGrawhill (2007).
3. Understanding Object Oriented Programming with Java, Timothy Budd, Pearson Education (2007).
4. Java and Object Oriented Programming Paradigm, Jana, PHI (2007).
5. Java TM: How to Program, Deitel & Deitel, 7th Edition, PHI (2008).

PGD2C07 – Database Fundamentals and Visual Programming

Unit - 1

Introduction, Database Models — Relational — Network — Hierarchical models. Relational database design, entity relationship model, ER diagram, The relational Model, Relational database Structure, Tables, Relations, Domains, Attributes, Tuples, Primary key, Foreign key, Normalization, Functional Dependencies. First, Second and Third Normal Forms, Relations with more than one Candidate Key, Good and Bad Decompositions, Boyce Codd Normal Form, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

Unit – II

.Introduction to SQL, Data Definition Language (DDL), data types, creation, insertion, viewing, updation and deletion of tables, modifying the structure of the tables, renaming, dropping of tables, Data Manipulation Language (DML), Select commands, Logical operators, SQL Operator, BETWEEN, AND IN, LIKE, IS NULL

Unit – III

SQL Functions, Number, Character, Date, Conversion, Group Functions, Group by & Having Clause, Views— Defining a View — Granting view access to others — Querying views, Joins – joining multiple tables and joining a table to itself, SQL Queries, Reports

Unit – IV

Introduction to visual programming - event driven programming - Introduction to VB.Net environment,.NET Framework and the Common Language Runtime. Building VB.NET Applications, Visual Basic Integrated Development - Basic Language - Console application and windows application, Data types, Declaring Variables, scope of variables, operators and statements, Making Decisions with if-else Statements, Using Select Case, Switch and Choose, Loop statements - Do Loop, for, while - The With Statement - Handling Dates and Times – Converting between Data Types - Arrays - declaration and manipulation, Strings, string functions - Sub Procedures and Functions.

Unit – V

Windows Applications - Forms - Adding Controls to Forms, Handling Events, MsgBox , InputBox , Working with Multiple Forms, Setting the Startup Form, SDI & MDI Forms, Handling Mouse & Keyboard Events, Common controls,Text Boxes, Rich Text Boxes, Labels, Buttons, Checkboxes, Radio Buttons, Group Boxes, List Boxes, Checked List Boxes, Combo Boxes, Picture Boxes, Scroll Bars, Tool Tips, Timers - properties - methods

REFECENCES:

1. Database Management System - Date ,C.J., Galgotia Publications
2. Fundamentals of Database System, Elmasri, R.A.,Navathe, Shyam B. Narosa Publishing House
3. Learning SQL (2nd ed.), Alan Beaulieu, Mary E. Treseler. ed., O'Reilly, 2009.
4. Visual Basic .NET Black Book, Steven Holzner
5. VB.NET for developers, Keith Franklin, Rebecca Riordan, SAMS.

PGD2C08 - Data Communication and Computer Networks

Unit - 1

Transmission media, Wired and unwired media, Mode of transmission: Serial, Parallel, Synchronous, Asynchronous, Analog, Digital, Type of Communication: Simplex, Half Duplex, Full Duplex, Encoding & Decoding, Error Detection & Recovery, Flow Control, Multiplexing, Frequency division multiplexing, Time Division Multiplexing and Wave Division Multiplexing, Switching - Circuit switching, Packet Switching and Message Switching.

Unit – II

Introduction to networking, Advantages of Networking, Network Components: Cables, Hubs, Bridges, Switches, Routers, Network Topologies :Bus, Star, Ring, Star Bus, Star Ring, Mesh, Shared Medium, Peer to Peer, Hybrid Technology, LAN, WAN, MAN, Ethernet Technologies, Ethernet Versions, Token Ring Technologies, Wide Area Network Technologies , Frame Relay, ISDN, PPP, Wireless Networks , Radio Frequencies, Microwave Frequencies, Infrared Waves, Internet, ATM.

Unit – III

Network Models, Layered Architectures, TCP/IP model, OSI model, Overview of Physical layer, Data Link Layer, Error detection and correction, Types of errors, Single bit error and Burst error, Vertical redundancy check(VRC), longitudinal redundancy Check(LRC), Cyclic Redundancy Check(CRC), Error correction - Single bit error correction.

Unit – IV

Network layer, Networking and Internetworking devices - Repeaters, Bridges, Routers, Gateways, Logical addressing - IPv4 & IPv6 addresses, Network Address Translation(NAT), Internet protocols, internetworking, Datagram.

Unit – V

Transport layer, Process-to-process Delivery:UDP, TCP and SCTP, Congestion control and Quality of Service,Application Layer, Domain Name Systems-Remote Login-Email-FTP,WWW,HTTP; Network management :SNMP, Network security, Cryptography.

REFECENCES:

1. Data Communications and Networking, Fourth Edition, Behrou A Forouzan, McGraw-Hill reprint, 2011.
2. Computer Networks, Tanenbaum, PHI.

PGD2C09 - Software Engineering

Unit - 1

Introduction to Software Engineering, Introduction —Software Engineering—Life Cycle Models (Waterfall, Incremental, Spiral, WINWIN Spiral, Evolutionary, Prototyping ,Object Oriented), Software Development Team Structure, Chief Programmer Team Structure, Hierarchical Team Structure, Types of Software Projects. Software Project Management, Project Definition, Contract Management, Activities Covered by Software Project Management, Overview of Project Planning, Project Scheduling.

Unit – II

Software Requirement Specification, Introduction to SRS, system Models, System Evolution, Functional Requirement, Non Functional Requirement, Glossary of Documentation, Software Requirement Metrics.

Unit – III

Software Design, Design Concepts, Modularity, Coupling and Cohesion, Data Dictionary, Input, Output Design, Data Flow Diagram, Object Orientation Models, Object Oriented Analysis , Principles , UML diagrams, Use Case Models, Use Case Diagrams, Developing Use Case Diagrams for Typical Applications.

Unit – IV

Computer aided software engineering tools, Case study in Software Engineering Software Testing, Taxonomy of Software Testing, Levels, Test activities, Kinds of software Testing Concepts from White-Box and Black-Box Testing.

Unit – V

Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

REFECENCES:

1. An Integrated Approach to Software Engineering, Pankaj Jalote, 2nd Edition, Narosa
2. Software Engineering - A Practical Approach, Roger S. Pressman, McGraw Hill - International Ed.
3. Software Engineering - Ivan Somervelli.

PGD2C10 – Practical 2

List of Experiments

Experiments should include but not limited to:

Java:

1. Freehand Drawing
2. Illustrate Mouse Events
3. Creating Menu Bar
4. Package example
5. Exception handling example

DBMS:

1. Implementation of Data definition and Data manipulation statements
2. SELECT statement with different clauses
3. Use of single row and group functions
4. Usage of various SET operators
5. Implementation of various types of JOINS

General Pattern of Question Paper

POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS

(with effect from 2012 Admission)

Code:

Reg. No:

Name :

First Semester PGDCA Examination – 2012

Course Code:

Course :

Time: 3 Hours

Total Marks: 100

Answer five full questions; Each Question carries 20 marks.

Question Numbers 1 to 8

Total Marks = 20 x 5 Marks = 100 Marks

NOTE: Minimum one question from each of the five modules. Remaining three questions can be from any module. There should not be more than two questions from the same module.