Gujarat University

Course Name: Fundamentals of Programming

Course Code: PGDCSA111

Objectives: The aim of this course is to introduce the rudiments of programming to the students. Students will become familiar with problem solving techniques and algorithm development using computers. This will include structured programming using C, a high-level programming language.

Prerequisites: None

Contents:

1.Introduction to programming& Basics of C: Concepts of Algorithm and Flowcharts, Process of compilation, Generation of languages, Basic features of C Language like Identifier, Keywords, Variable, data types, Operators and Expression. Basic screen and keyboard I/O   **[10%]**

2.Control Statements: Test Conditions, Conditional execution and selection, Iteration and Repetitive Executions, Nested loops.   **[10%]**

3.Arrays: Introduction to contiguous data types. One dimensional arrays, multidimensional arrays, Array as strings, multidimensional character arrays. Operations on strings.   **[15%]**

4.Functions: Concept of modular programming, Using functions, Scope of data, Recursive functions. Command line arguments.   **[15%]**

5.Pointers: Need of pointer, Types and uses of pointer, Array and Pointers, Pointers and strings, Pointer to Pointer, Pointers and functions, other aspect of pointers.   **[15%]**

6.User Defined Data Types: Introduction to structures, usage of structure, nested structures, Union and its usage, Enumeration types, bit fields.   **[10%]**

7.Files: Types of files, working with files, usage of file management functions.   **[15%]**

8.Linked List: Introduction to dynamic memory allocation, singly link list, operations on singly link list.   **[5%]**

9.Other features of C: Bitwise operators and its usage, C Preprocessor statements.   **[5%]**

Main Reference Book(s):
1. **Programming in C**, by Pradip Dey & Manas Ghosh, Publisher – Oxford

Suggested Additional Reading :

1. **Computer Science: A Structured Programming Approach Using C,** by Behrouz A. Forouzan & Richard F. Gilberg, Publisher – Thomson Education.
2. **Programming in ANSI C, by Balagurusamy**, Publisher - Tata McGraw Hill.
3. **Programming with ANSI and Turbo C**, by Ashok N Kamthane, Publisher – Pearson Education.
4. **Mastering C**, by Venugopal & Prasad, Publisher – Tata McGraw Hill.
5. **C: The Complete Reference,** by Herbert Schildt, Publisher – Tata McGraw Hill.
6. **Let us C,** by Yashwant Kanitkar, Publisher – BPB Publication
7. **Schaum's Outline of Programming with C**, By**:** Byron Gottfried, Publisher Shaum Series.

Chapter wise coverage from main reference Book(s) :

Chapter 1 to 11 except 10.4-10.6, 11.5-11.7

Accomplishments of the student after completing the course :

After completion of the course students should become reasonably good at problem solving and algorithm development. They would become capable of solving problems using computers through C programming language.

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Gujarat University

Course Name: **Fundamentals of Computer Organization**

Course Code: PGDCSA112

Objectives: Students will learn
- The elements of Computer Organization and Architecture.
- The basic knowledge necessary to understand the hardware operations of digital computers.

Contents:

1. **Basic Components of a digital computer [4%]**

2. **Number Systems[10%]**
   - Decimal System
   - Bistable Devices
   - Binary, Octal and Hexadecimal numbers.
   - Number Base conversions
   - Binary Addition, Subtraction, Multiplication, Division
   - Complements
     - Use of complements to represent Negative Numbers
     - Binary Number Complements
     - Complements in other Number Systems.
   - Binary codes
     - Weighted and Non-weighted codes
       - BCD Code
       - Excess Three (XS-3) Code
       - Gray Code
         - Binary to Gray & Gray to Binary
     - Error detecting and correcting codes
       - Parity and Hamming code

3. **Boolean Algebra and Logic Gates [16%]**
   - Fundamental Concepts of Boolean Algebra
   - Logical Multiplication
   - AND & OR gates
   - Complementation & Inverters
   - Evaluation of Logical Expressions
   - Basic Laws of Boolean Algebra
   - Proof by Perfect induction
   - Simplification of Expressions
   - De Morgan's Theorems
   - Basic duality of Boolean Algebra
   - Derivation of a Boolean Expression
   - Interconnecting gates
   - Sum of Products and Product of Sums
   - Derivation of Product-of-Sums expressions

- Derivation of Three input variable expressions
- NAND & NOR gates
- Map Method for Simplifying Expressions
    - K-map (Four Variables)
    - Cubes & covering
    - Don't Cares
- Design Using NAND Gates
- Design Using NOR Gates
- NAND to AND & NOR to OR gate Networks

4. Logic Design [16%]

- Flip-Flops
- Transfer Circuit
- Clocks
- Flip-Flop Designs
- Gated Flip-Flop
- Master Slave Flip-Flop
- Shift Register
- Binary Counter
- BCD Counter
- Counter Design

5. The Arithmetic-Logic Unit [10%]

- Construction of the ALU
- Integer Representation
- Binary Half-Adder
- Full-Adder
- Parallel Binary Adder
- Positive & Negative Numbers
- Addition in the 1'S Complement System
- Addition in the 2'S Complement System
- Addition and subtraction in a parallel Arithmetic Element
- Binary Coded Decimal Adder
- Sift Operations
- Binary Multiplication
- Binary Division

6. Digital Components [10%]

- Integrated Circuits
- Decoders
    - NAND gate Decoder
    - Decoder Expansion
- Encoders
- Multiplexers
- Memory Units
    - Random-Access Memory
    - Read-Only Memory

o Types of ROMs

7. Central Processing Units [6%]
- Stack Organization (Intro.)
- Instruction Formats
- Addressing modes

8. Input-Output Organization [8%]
- Peripheral Devices
- Asynchronous Data Transfer
  - o Handshaking
- Modes of Transfer
  - o Programmed I/O
  - o Interrupt-initiated I/O
  - o Direct Memory Access (DMA)
- Direct Memory Access (DMA)

9. Memory Organization [6%]
- Memory Hierarchy
- Main Memory
  - o RAM, ROM, Bootstrap Loader
- Auxiliary Memory
  - o Magnetic Disk
  - o Magnetic Tape
- Cache Memory (Intro)
- Virtual Memory (Intro)

10. Peripheral Devices * (Intro) [14%]
- Key Board
- Mouse
- Display Unit
- Printer (Types)
- Scanner
- OCR-OMR-MICR
- Multimedia Projector

Main Reference Book(s):
1. Digital Computer Fundamentals , Tata McGraw Hill, 6th Edition, Thomas C. Bartee
2. Computer System Architecture, PHI/Pearson Education, 3rd Edition, M. Morris Mano

Suggested Additional Reading:
1. Fundamentals of Digital circuits,PHI/Pearson education, A. Anand Kumar

Chapter wise Coverage from the main reference book(s):

1. Digital Computer Fundamentals – Thomas C. Bartee

   Chapter – 1:   1.7
   Chapter – 2:   Whole
   Chapter – 3:   3.1 to 3.23
   Chapter – 4:   4.1 to 4.9, 4.12
   Chapter – 5:   5.1 to 5.9, 5.11, 5.14, 5.16 to 5.18

2. Computer System Architecture – M. Morris Mano

   Chapter – 2:   2.1 to 2.3, 2.7
   Chapter – 8:   8.3 to 8.5
   Chapter – 11:   11.1, 11.3, 11.4, 11.6
   Chapter – 1:   12.1 to 12.3, 12.5, 12.6

   * Peripheral Devices may be covered from Internet or any latest books.

Accomplishments of the student after completing the course:

Students will get the knowledge of computer organization and architecture. They will know the actual working and organization of digital computer system.

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Gujarat University

Course Name: Database Management Systems

Course Code: PGDCSA113

Objectives: This course is intended to give students a solid background in relational database management systems (RDBMS).

Contents:

1. Introduction : [10%]

Basic Concepts: data, database, database systems, database management system, Purpose and advantages of Database management system (over file systems) , data models: Introduction, Three level architecture, Overall architecture of DBMS, Various components of a DBMS

2. Data Modeling/Conceptual Design   [15%]

Entity sets, attributes and keys, Types of entities, Relationships (ER) and Types of relationships, Database modeling using entity and relationships, Enhanced entity-relationship diagrams

3. Relational Data Model   [10%]

Relational structure - tables (relations), rows (tuples), domains, columns (attributes), keys: super key, candidate keys, primary key, entity integrity constraints, referential integrity constraints

4. Database Design   [20%]

Relational structure - tables (relations), rows (tuples), domains, columns (attributes), keys: super key, candidate keys, primary key, entity integrity constraints, referential integrity constraints, Database design process, Anomalies in a database, Functional Dependencies(Lossless decomposition, Dependency preservance, Closure set of FD, Canonical cover, Lossless Joins), Finding Candidate keys using Armstrong rules, Stages of Normalisation: 1NF ,2NF ,3NF, BCNF (with general definition also) and Multi-valued Dependency : 4NF & 5NF(Project Join NF)
Translation of E-R schemes (logical design) to relational schemes (physical design): A case study.

5. Relational Algebra   [15%]

Basic operators (Select, project, union, set, difference, cartesian product and rename)
Additional operators (Set interaction, Natural Join, Division and Assignment operator), Insert, Update, Delete operators

6. Query languages [25%]

Introduction to SQL, Advantages of using SQL, Data definition language and Data manipulation language commands using SQL, Basic and Advanced queries in SQL, Views.

7. Data Dictionary   [5%]

 Introduction to data dictionary, Usage of data dictionary

Main Reference Book(s):
1.Database Design, Application Development and Administration (Micahel V. Mannino)- Second/Third edition, Mc-Graw Hill.
2.SQL, PL/SQL – The programming Language of Oracle, BPB Publications, Ivan Bayross

Suggested Additional Reading:

1.Database Management Systems, Ramakrishnan, Gehrke, Third edition, McGraw Hill.

2.Database Systems: Design, Implementation and Management, seventh edition, Peter Rob, Carlos Coronel, Thomson Course technology.

3.Database Systems: Concepts, Design and Applications, Pearson Education, S.K.Singh.

Chapter wise Coverage from the main reference book(s):

Book No. 1 : Chapter 1,2,5,6,7,14.2.4
Book No. 2 : Complete

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Course Name: Internet Technology And Web Design

Course Code: PGDCSA114

Objective:
The goal of this course is to present overview of the Internet as a global resource for the people. The course has been designed to provide knowledge on series of Internet related activities. Students will understand the basic activities related to Internet and the basic knowledge for design of the web page / site.

Contents:

1. Internet and the World Wide Web [20%]
   Introduction to Internet and WWW, elements of www, browsers, Internet services, Intranet – its advantages and disadvantages, difference between Internet and Intranet, difference between Intranet and LAN, email concepts, sending and receiving email messages, email netiquette, using smileys, abbreviations and emoticons, signatures and attachments to emails, filtering emails, securing emails by using digital certificates, forms of chats and conferencing, chat netiquette, ways to use chat effectively, usenet newsgroups concepts, web-site development through MS-FrontPage

2. TCP/IP – Internet Technology and Protocol. [10%]
   Packet switching technology, Internet Protocols: TCP/IP, Router, Internet Addressing Scheme: MachineAddressing(IPaddress),E-mailAddresses,ResourcesAddresses, Internet Devices

3. Internet Connectivity [10%]
Connectivity types: level one, level two and level three connectivity, Setting up a connection: hardware requirement, selection of a modem, software requirement, modem configuration, Internet accounts by ISP: Telephone line options, Protocol options, Service options, Telephone line options – Dialup connections through the telephone system, dedicated connections through the telephone system, ISDN, Protocol options – Shell, SLIP, PPP, Service options – E-mail, WWW, News Firewall etc.

4. Internet Network [10%]
Network definition, Common terminologies: LAN, WAN, Node, Host, Workstation, bandwidth, Interoperability, Network administrator, network security, Network Components: Severs, Clients, Communication Media, Types of network: Peer to Peer, Clients Server, Addressing in Internet: DNS, Domain Name and their organization, understanding the Internet Protocol Address. Network topologies: Bust, star and ring,

8. Web Publishing and Browsing [20%]
Overview, SGML, Web hosting, HTML. CGL, Documents Interchange Standards, Components of Web Publishing, Document management, Web Page Design Consideration and Principles, Search and Meta Search Engines, WWW, Browser, HTTP, Publishing Tools

9. HTML Programming Basics [30%]
HTML page structure, HTML Text, HTML links, HTML document tables, HTML Frames, HTML Images, HTML forms, multimedia, introduction to CSS, introduction to XML & XHTML, introduction to DHTML

RECOMMENDE

D BOOKS MAIN

READING

1   Greenlaw R and Hepp E "Fundamentals of Internet and www" 2nd EL, TMH (2007)
2   Doeacc "O" Level, "Internet and Web Design", Firewall Media.
3   D. Comer, "The Internet Book", Prentice Hall of India.
4   NIIT Press, "HTML & XML", Prentice Hall of India
5   Internet : The Complete Reference, Millenium Edition by Margaret Levine Young, Doug Muder, Dave Kay, Kathy Warfel & Alison Barrows, Tata-McGraw Hill Publishing Company, New Delhi
6   Mastering Microsoft Frontpage-2000, Daniel A. Tauber, Brenda Kienal & Molly E. Holzschlag, BPB Publications

SUPPLEMENTARY READING

1   M. L. Young,"The Complete reference to Internet", , Tata McGraw Hill.
2   "HTML Complete Reference", TMH
3   J. Sklar, "Principles of Web Design", Second Edition, 2001, Vikas Publishing House Pvt.Ltd
4   W. G. Lehnert, "Internet 101, First Edition, 2001, Pearson Education.
5   Net surfing, browsing Internet contents using any browser, Creation of email account using any provider to be exercised, Designing a website

At the end of the course the students will be able to:

Effectively use the Internet for both information retrieval and data transfer.
Understand the client server relationships between Web servers and Web browsers.
Understand the domain name concept and services, Internet addressing and URL's.
Setup Internet network platforms.
Plan and manage the back-end infrastructure of a small-to medium-size Web site.
Design a simple web page using Hypertext Markup Language (HTML).
Be in a position to search for information on the Internet, read and send emails and communicate effectively over the Web
Be able to design simple websites

Course Name: Software Lab

Course Code: **PGDCSA115**

Objectives:
Since the advent of computers, technology has come a long way. Before plunging into high end computing, it is necessary for any computer user to understand the fundamentals of the functioning of a computer. Hence it is inevitable that the user gets acquainted with the two basic operating systems: DOS and Windows XP. Computers are widely and popularly used for the storage, representation, analysis and reproduction of data and thus it is important to have a thorough understanding of the various software packages available for use. The objective of this course is thus to acquaint the students with computers, its basic operating systems and Office suite of programs for effective representation and analysis of data.

Prerequisites: None

Contents:
1 : Disk Operating System (DOS) [10%]
   What is DOS ?, configuring DOS, working at command prompt, commands and programming, data organization in DOS, managing directories, DOSKEY, copying and moving files, file management, formatting and unformatting disks, disk management, DOS Editor, batch programs and macros

2 : Windows XP [10%]
   Introduction to Windows basic, using the Windows XP interface effectively, working with files and folders, viewing and managing files and folders, configuring, customizing and optimizing Windows, using Control Panel, customizing the taskbar, start menu, desktop, keyboard settings and mouse settings, creating and customizing shortcuts, configuring the Recycle Bin, file and data management, using and customizing Windows Explorer, using Windows interface to create, installing and uninstalling applications and devices, print and store a file, managing system resources, disk defragmenter, understanding and using digital certificates, benefits of Windows XP Professional,

3 : Microsoft Office [80%]
   Introduction to MS-Office suite of programs, file management, using common office tools

   I.   MS-Word : Laying out text, laying out the page, speeding text entry, quick text changes, using scroll bar, using Go To command, viewing files, techniques for entering text and graphics, finding and replacing text and other things, using textboxes, border, shading and color, creating numbered and bulleted lists, adding "text effects", creating and removing columns, working with tables, macros, using mail merge, managing

footnotes and endnotes, using headers and footers, page numbering, inserting captions, forging cross-references, paragraph and character styles, creating and applying styles, constructing Word templates, using hyperlinks, table of contents and indexes, using spell check, grammar and thesaurus, object linking and embedding

II. MS-Excel : Types of data, entering, editing and erasing data, resizing rows and columns, hiding and unhiding rows and columns, formatting, auto formatting, conditional formatting, adding comments, working with ranges, working with formulas and functions, fixing formulas, evaluating formulas, entering functions, nesting functions, recording, storing and using macros, understanding data series and categories, using the chart wizard, adjusting data on charts, formatting charts, mixing different types of charts in the same chart, filtering data with auto filter and advanced filter, sorting data, working with lists, Pivot Tables and Pivot Charts, using PivotTable wizard, creating one-variable and two-variable data tables, what-if analysis using Goal Seek and Scenario, working with Add-ins, protecting and unprotecting a worksheet and a workbook

III. MS-Powerpoint : Creating a presentation with AutoContent wizard, with a template and from scratch, inserting, deleting, rearranging and copying slides, using numbers and bullets, customizing and sprucing up presentations by adding images, slide transitions, animation schemes, including graphs, charts, tables, columns, sound and video, creating and modifying WordArt objects, managing headers and footers, using Action buttons, using Masters like the Slide Master, Handout Master and Notes Master, creating slide shows, rearranging and hiding slides, adding comments, moving between slides, setting up the slide show, custom slide show, using recording narration, creating self-running presentations, using Pack and Go wizard, printing slides, speaker notes, handouts, an outline

IV. MS-Access : Introduction to database, tables, records, fields, forms, queries macros, modules and reports, creating a database with the Database wizard and from scratch, creating tables, defining data types and its properties, refining and customizing a table, understanding and creating relationships and indexes, entering data in datasheet view or through form, using form views, controlling form appearance using Auto Format, binding a form to data, working with controls, exporting of data to other programs and databases, sorting, filtering and querying data, using select queries, action queries, customizing queries, creating forms and its layouts, creating, editing and executing macros, creating and printing reports and creating mailing labels

Reference Books : (all these books to be purchased by the Institute Library)

1. Peter Norton's Complete Guide to DOS 6.22, Sixth Edition, Techmedia
2. Windows XP Bible Desktop Edition by Alan Simpson, Wiley-Dreamtech India Pvt. Ltd., Wiley Publishing Inc.
3. Windows XP Computer Basics All in One by Greg Perry, Jill T. Freeeze, Galen A. Grimes, Matt Hayden & Ned Snell, Sams Teach Yourself, Pearson Education
4. Windows XP Professional : The Complete Reference by Guy Hart-Davis, Tata-McGraw Hill Publishing Company, New Delhi
5. Windows XP Simplified, Maran Graphics & Wiley Publishing, Inc.
6. Office XP : The Complete Reference by Stephen L. Nelson & Julia Kelly, Osborne / McGraw Hill
7. Microsoft Office 2003 Bible by Edward C. Willett, Wiley-Dreamtech India Pvt. Ltd.,Wiley-India Publication

Assignments to be given to students for Lab sessions :

1 : Execution of DOS commands at command prompt, execution of macros at command prompt and batch programs
2 : Customizing of various Windows XP components to be explored by the students
3 : Exercises encompassing the features explored in each of the three components of this Unit to be given

Accomplishments of the student after completing the course:

- ✓ Be able to work in both DOS (non GUI) and Windows (GUI) operating environment with ease
- ✓ Be in a position to create one's own document, perform analysis using a spreadsheet, prepare exotic presentations, and also be able to work with databases.

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