

Purbanchal University

Post Graduate Diploma in Computer Application (PGDCA)

(Jestha, 2069)

PGDCA 1st Semester

Subject Code	Subject Name	Credit	Lecture	Tutorial	Lab	Total
PCA111	Introduction to Information Technology	2	2	1	2	5
PCA112	Data Communication & Networks	3	3	1	2/2	5
PCA113	Web Technology	2	2	1	2	5
PCA114	Mathematics	3	3	1	-	4
PCA115	Digital Computer Design	3	3	1	2/2	5
PCA116	Problem Solving & Programming in C	3	3	1	2	6
Total Credits		16	16	6	8	30

PGDCA 2nd Semester

Subject Code	Subject Name	Credit	Lecture	Tutorial	Lab	Total
PCA121	Statistics & Numerical Methods	4	4	1	2/2	6
PCA122	Object Oriented Programming in C++	3	3	1	2	6
PCA123	System Analysis & Design	3	3	1	-	4
PCA124	Data Structure & Algorithm	3	3	1	2/2	5
PCA125	Database System	3	3	1	2/2	5
PCA126	Project	2	-	-	3	3
Total Credits		18	16	5	8	29

Introduction to Information Technology



Semester: I
Credit Hr: 2

Full Marks: 100
Internal: 20+20
Final Exam: 60

Course Objective: This course aims to give the fundamental idea about information technology to the graduates from difference discipline. It provides the interface for non-IT students to pursue higher studies in IT.

Course Contents:

1. Information Concepts

4 hrs

Introduction, History and Evolution of Computers, Types of Computer (Supercomputers, Mainframes, Minicomputers, Workstations, Microcomputers), Definition of Information Technology, Evolution of Information Processing, Scopes of Information Technology

2. Elements of Computer Processing System

9 hrs

Definition of Hardware, I/O Devices, Types of Input Devices (Keyboard, Mouse and brief overview of other input devices), Types of Output Devices (Monitors, printers and brief overview of other input devices), Microprocessors (Intel Processors, RISC Processors, Concepts of Parallel Processing), Storage Devices (Magnetic Storage Devices, Optical Storage Devices) Definition and Types of Software, System Software (Operating systems, Compilers and Interpreters, Device Drivers), Application Software (Word Processors, Spreadsheets, Multimedia applications and brief overview of other application software), Utility software

3. Operating Systems

2 hrs

Introduction, Functions of an Operating System, Classification of Operating Systems

4. Programming Languages

2 hrs

Introduction, Types of Programming Languages, Machine Language, Assembly Language, High Level Language (Procedure Oriented, Problem Oriented), Natural Languages

5. Database Management Systems

3 hrs

Introduction (Data, Database, DBMS, RDBMS), Significance, Characteristics, Types of Database Management System (Hierarchical Model, Network Model, Relational Model, Object Oriented Model)

6. Computer Networks and Communications

4 hrs

Introduction, Uses, Types (LAN, MAN, WAN, Client-Server, Peer-to-Peer), Topologies (Bus, Star, Ring, Mesh, Tree), Network Media (Twisted-Pair, Coaxial Cable, Fiber-Optic Cable, Wireless Media), Network Software

7. Internet Technology

3 hrs

Definition (Internet, Intranet, Extranet), Uses of Internet, World Wide Web, Electronic Mail, URL, Web Browsers, Web Servers, HTML

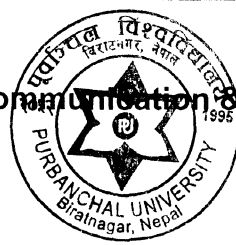
8. Information Security

3 hrs

Concepts of Security, Privacy Issues (Junk Mails and Faxes, Spam blocking, Privacy in corporate computers), Computer Crime (Software Piracy, Antipiracy), Computer Viruses (Categories and Prevention), Theft, Ethical Issues in Computing

Reference Books:

1. Peter Nortons, Introduction to Computer, 4th Edition, Tata McGraw Hill
2. Alexis Leon & Mathews Leon, Fundamentals of Information Technology, 1st Edition, Leon TechWorld
3. P. K. Sinha, Computer Fundamentals, 1st Edition, BPB Publication
4. V. Rajaraman, Fundamentals of Computer, 3rd Edition, Asoke K
5. Ram B., Computer Fundamentals, 2nd Edition, New Age International



Semester: I
Credit Hr: 3

Full Marks: 100
Internal: 20+20
Final Exam: 60

Course Objective: This course must provide students with the fundamental concepts of data communications and networking and their practical applications. This course should also impart managerial aspects along with technical aspects of communications.

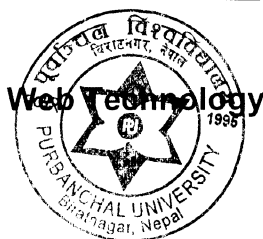
Course Contents:

1. Introduction	3 Hrs
Introduction, Information and communications, The nature of business information Requirements, Transmission of Information, Communications Software, Management Issues, Standards, Regulations	
2. Data Transmission	3 Hrs
Signals for conveying information, Transmission Impairments and Channel capacity	
3. Data Communications Fundamentals	4 Hrs
Analog and Digital data communications, Data Encoding Techniques, Asynchronous and Synchronous Transmission, Interfacing	
4. Transmission Media	3 Hrs
Guided Transmission Media, Wireless Transmission	
5. Reference Models	3 Hrs
The OSI Reference Model, The TCP/IP Reference Model, Comparison, TCP and IP details, Internet Addressing	
6. Data Link Control	2 Hrs
Flow control, Error Detection and Correction, Data Link Control Protocol-HDLC	
7. Transmission Efficiency	2 Hrs
Multiplexing and Data Compression	
8. Approaches to computer networking	3 Hrs
LANs, MANs and WANs, Circuit-Switching, Packet Switching, X.25, ISDN	
9. Wide Area Networks	3 Hrs
Wide Area Networking Alternatives, Frame Relay and ATM	
10. Wireless Networks	3 Hrs
Wireless Networks	
11. Local Area Network Technology	8 Hrs
Background, LAN Configurations, Topologies and Transmission Media, LAN Standards, Bridges, Layer 2 and 3 Switches, The IEEE Standards for LAN: IEEE 802.X	
12. Distributed Applications	2 Hrs
Electronic-Mail, Electronic Data Interchange	
13. Network Management	2 Hrs
Network Management Requirements	
14. Network Security	4 Hrs
Security Threats, Encryption Methods, Encryption Management, Digital Signatures, Web Security, VPN	



Reference Books:

1. Business Data Communications, 4/e, William Stallings, Pearson Education
2. Business Data Communications & Networking, 6/e, Fitzgerald & Dennis, John Wiley & Sons Inc.
3. Data & Computer Communications, 7/e, William Stallings, Pearson Education
4. Data Communications, Computer Networks & Open Systems, 4/e, Fred Halsall, Pearson Education
5. An Introduction to Computer Networking, Kenneth C. Mansfield, Jr. & James L. Antonakos, PHI
6. Understanding Data Communications & Networks, 2/e, William A. Shay, Thomson Learning
7. Computer Networks, 4/e, A. S. Tanenbaum, Pearson Education / PHI
8. The Essential Guide to Telecommunications, 3/e, Annabel Z. Dodd, Pearson Education
9. Computer Networks & Internet, 2/e, D. E. Comer, Pearson Education
10. Data & Network Communications, Miller, Thomson Learning



Semester: I
Credit Hr: 2

Full Marks: 100
Internal: 20+20
Final Exam: 60

Course Objective: This course must enable student to choose best technologies for solving web client/server problems and create conforming and adaptive web pages using HTML, JavaScript and dynamic HTML.

Course Contents:

1. Introduction

[2 Hrs]

Basics of Internet: Concepts of Client and Server, Web Browser and Web server

Overview of how communication happens on the Internet: Basic Introduction on what is Domain name, TCP/IP Protocol and IP Addresses.

Practicals: Internet Explorer, Telnet, FTP client and Email Client.

2. Client side technologies

[8 Hrs]

HTML: Structure of HTML Document - Meta tags, Basic Tags, Links, Text, Lists, Tables, Inclusions (Graphics). [2 Hrs]

Presentation of HTML Document – Alignment, Fonts, Frames. [1 Hr]

Interactive HTML Document: Forms. [2 Hrs]

Practicals: Creating Simple and conforming web pages using HTML

Introduction to HTML5, some of the popular html5 tags: <header>, <footer>, <nav>, <section>, <article>, <canvas>, <audio>, <video> [3 Hrs]

3. JAVASCRIPT

[13 Hrs]

Introduction to Scripting: Overview of Java Scripts, General Syntactic Structures (Data Types and Literals, Operators and Expressions, Control Structures) [3 Hrs]

Java Script Functions: Built-in Functions, User-defined functions, Basic scoping rules [2 Hrs]

Advanced Structures in Java Script: Arrays (Declaring and Allocating Arrays), Java Script Objects (Math, String, Date and Number) [3 Hrs]

Java Script Document Object Model: Hierarchy of objects and their methods, Event Handling. [4 Hrs]

Cookies: Creating and using cookies [1 Hr]

Practicals: Creating web pages using HTML and Java Script and cookies

4. Dynamic HTML

[3 Hrs]

Cascading Style sheets: Class, Using , External Style Sheets

Practicals: Creating web pages using external CSS

5. JQUERY Integration

[2 Hrs]

JQuery Sliders, auto complete list, date picker, accordion menu etc.

Practicals: Integrating JQuery slidre, accordion menu etc in web pages

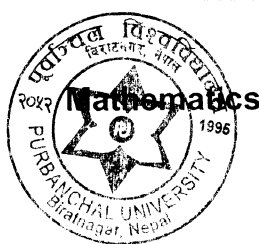
6. Server-side technologies

[2 Hrs]

Basic concepts in Web Server: Introduction to Server side scripting, Difference between client side and server side scripting, Introduction to different types of server side scripting technologies (Active Server Pages, CGI, Servlets, PHP)

Reference Books:

1. Internet & World Wide Web, How to Program, Deitel, Deitel & Nieto, AWL, 2nd Edition
2. Internet & World Wide Web, How to Program, Deitel, Deitel & Goldberg, AWL, 3rd Edition
3. Web Enabled Commercial Application Development Using HTML, DHTML, Java Script, Perl CGI, Ivan Bayross, BPB Publications, 2nd Edition
4. HTML: The Definitive Guide, Chuck Musciano & Bill Kennedy, O'Reilly & Associates
5. JavaScript: The Definitive Guide By David Flanagan, O'Reilly & Associates
6. Webmaster in a Nutshell, Stephen Spainhour, O'Reilly & Associates



Semester: I
Credit Hr: 3

Full Marks: 100
Internal: 20
Final Exam: 80

Course Objective: The purpose of this course is to round out the student's preparation more sophisticated applications with an introduction of linear algebra, a continuous of the study of ordinary differential equations and an introduction to vector algebra and Fourier series.

Course Contents:

1. Matrices and Determinant. 14 Hrs

- 1.1 Matrix and Determinant
- 1.2 Vector Space (Introduction), Dependent and Independent vectors
- 1.3 Linear Transformation
- 1.4 System of Linear Equations, Gauss elimination method only
- 1.5 Inverse of Matrix (Gauss Jordan Method)
- 1.6 Rank of the Matrix,
- 1.7 Eigen Values of Matrix, Eigen Vectors and Its applications.

2. Laplace Transformation 10 Hrs

- 2.1 Introduction
- 2.2 Laplace Transform of Some Elementary Functions
- 2.3 Properties of Laplace Transform
- 2.4 Inverse Laplace transforms
- 2.5 Application to differential equations

3. Line, Surface and Volume Integrals 9 Hrs

- 3.1 Definition of Line Integral
- 3.2 Evaluation of Line Integral
- 3.3 Evaluation of Surface and Volume Integrals
- 3.4 Dirichlet Integrals.

4. Integral Theorems 6 Hrs

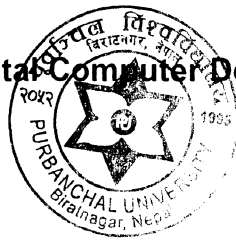
- 4.1 Greens Theorem in the plane
- 4.2 Stoke's Theorem (Without Proof)
- 4.3 Gauss Divergence Theorem (Without Proof)
- 4.4 Consequences and Applications of Integral Theorems

5. Fourier Series 6 Hrs

- 5.1 Periodic Function
- 5.2 Trigonometric Series
- 5.3 Fourier Series
- 5.4 Determination of Fourier Coefficients: Euler Formulae $(-\pi, \pi)$
- 5.5 Fourier Series in the Intervals $(0, 2\pi)$ and $(-l, l)$
- 5.6 Even and Odd Functions and Their Fourier series: Fourier Cosine & Sine Series
- 5.7 Half Range Function
- 5.8 Parsevals Formula
- 5.9 Fourier Series in Complex Form (Introduction)

Reference Books:

- 1. E. Kreyszig, Advanced Engineering Mathematics, 5th Edition, Wiley, New York
- 2. A Text Book of Engineering Mathematics - Vol. II – P. R. Pokharel
- 3. A Text Book of Engineering Mathematics - Vol. III – N. B. Khatakho & S. P. Pradhanang



Semester: I
Credit Hr: 3

Full Marks: 100
Internal: 20+20
Final Exam: 60

Course Objective: This course provides students with the basic concepts of digital logic, organization and architecture of digital computers as foundation for more advanced computer related studies.

Course Contents:

1. Introduction

5 Hrs

Introduction to Analog and Digital Systems, Number Systems (Binary, Octal, Decimal and Hexadecimal Numbers), Number Base conversion, 1's and 2's Complements, Subtraction using 1's and 2's Complements, Binary Codes (BCD, Excess-3, Parity and ASCII codes).

2. Boolean Algebra

5 Hrs

Basic Definitions, Basic theorems and properties, Boolean Functions, Digital Logic Gates (Name, Graphic symbol, Algebraic function, truth table), Simplification of Boolean functions, K-Map Method (two and three variable maps), Don't care conditions.

3. Combinational Logic

5 Hrs

Introduction, Design Procedure, Adders, Binary Parallel Adder, Decoders, Multiplexers.

4. Sequential Logic

7 Hrs

Introduction, Flip-Flops (Basic, RS, D, JK, T,), Triggering of Flip-flops, Timing Diagram, Flip-Flop Excitation Tables, Analysis of Sequential Circuits (State Table, State Diagram, State Equations, Flip-Flop Input Functions), Design Procedure, Registers (4-bit register), Shift Registers, Ripple Counters, Synchronous counters (Binary and BCD counter).

5. Register Transfer Logic

4 Hrs

Introduction, Interregister Transfer, Arithmetic, Logic and Shift Micro-operations, Conditional Control Statements, Fixed-point binary data (Signed Binary Numbers, Arithmetic Addition & Subtraction), Overflow, Instruction Codes, Macrooperations, Design of a simple computer.

6. Processor and Control Logic Design

4 Hrs

Introduction to Processor Logic Design, Processor Organization (Bus Organization only), Introduction to Control Logic Design, Microprogram Control and Hard-Wired Control (Definitions, Block Diagram, Comparison and Differences).

7. Computer Design

5 Hrs

Introduction, System Configuration, Computer Instructions, Timing and Control, Execution of Instructions.

8. Microcomputer System Design

10 Hrs

Introduction, Microcomputer Organization, Microprocessor Organization (Typical Set of Control Signals and CPU), Instructions (Basic Sets of Microprocessor Instructions) and Addressing Modes, Stack, Subroutines and Interrupt, Input-Output Interface, Direct Memory Access.

Reference Books:

1. Digital Logic & Computer Design, M. Morris Mano, Prentice Hall, 1st Edition
2. Computer System Organization & Architecture, John D. Carpinelli, Pearson Education
3. Digital Design, M. Morris Mano, Prentice Hall, 2nd Edition
4. An Engineering Approach to Digital Design, William I. Fletcher, Prentice Hall, 1st Edition
5. Computer System Architecture, M. Morris Mano, Prentice Hall/Pearson Education, 3rd Edition