Computer Centre
Assam University: Silchar

Syllabus of Post Graduate Diploma in Computer Application (PGDCA)

First Semester Course Structure

Paper Code	Name of the Paper	Credit Assigned	Evaluation Scheme*		Full Marks
			Sessional	End Semester Examination	
PGDCA 101	Programming and Problem Solving using C	4	MM: 25 QM: 10	MM: 75 PM: 30	100
PGDCA 102	Data Structure using C	4	MM: 25 QM: 10	MM: 75 PM: 30	100
PGDCA 103	Computer Organization & Networking Concepts	4	MM: 25 QM: 10	MM: 75 PM: 30	100
PGDCA 104	Foundation of Computer Application	4	MM: 25 QM: 10	MM: 75 PM: 30	100
PGDCA 105	CA Lab - I Programming and Problem Solving	2	MM: 25 QM: 10	MM: 25 PM: 10	50
PGDCA 106	Data Structure Lab	2	MM: 25 QM: 10	MM: 25 PM: 10	50

Second Semester Course Structure

Paper Code	Name of the Paper	Credit Assigned	Evaluation Scheme*		Full Marks
			Sessional	End Semester Examination	
PGDCA 201	System Analysis & Design	4	MM: 25 QM: 10	MM: 75 PM: 30	100
PGDCA 202	Web Technology	4	MM: 25 QM: 10	MM: 75 PM: 30	100
PGDCA 203	Programming and Problem Solving using PYTHON	4	MM: 25 QM: 10	MM: 75 PM: 30	100
PGDCA 204	Object Oriented Programming in C++	4	MM: 25 QM: 10	MM: 75 PM: 30	100
PGDCA 205	CA Lab - II Object Oriented Programming	2	MM: 25 QM: 10	MM: 25 PM: 10	50
PGDCA 206	Project	2	MM: 25 QM: 10	MM: 25 PM: 10	50

*MM: Maximum Marks, PM: Pass Marks, QM: Qualifying Marks, CA: Computer Application

PGDCA 101: Programming and Problem Solving using C

Full marks: 100
Pass Marks: 40

Unit 1:-

Notion of an algorithm, tools for design and analysis of algorithms-Flow chart decision table, Pseudo code, concept of machine language and high level Language

Unit 2:-

Writing a Program, Input statement, Output Statement, data type: Constants, Variables; Integers, Arithmetic & Logical Expressions, Integer & Floating point Expressions,

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Unit3:-

Expressions; conditional statement, Iterative Statements; Array data type and use of arrays; character data type and text processing; functional and procedural abstraction.

Unit 4:-

Pointer Data type and simple applications of pointers. Example algorithms: string processing, root finding, Matrix operations, record processing, searching & sorting.

Unit 5:-

File Handling & Debugging.

Text Books:

1. Programming in C – E. Balaguruswamy, TMH Publication
2. Programming with C- Gottfried B, TMH Publication.
3. Let us C- Y Kanitkar, BPH Publication

Reference Book:

1. How to solve it by Computer- Drommy G, PHI (EEE), 1985
2. Karnigham and Ritchie: The programming Languages.

PGDCA 102: Data Structure using C

Full marks: 100
Pass Marks: 40

Unit 1:-
Basic concepts: Data Structures, Algorithms, Complexity of algorithm.

Unit 2:-
Basic data types, List, Stack, Queues. Trees: Definition & implementation; Binary trees, Tree traversal, Postfix, Prefix notations.

Unit 3-
Sets: Implementation; Dictionary, hash table, Priority queues; Advanced set representation method- Binary search tree, AVL Tree, Balanced Tree.

Unit 4:-
Directed graph: Representation; Single source shortest path problem, all pair shortest path problem, Transitive Closure, Undirected Graph, Minimum Spanning tree.

Unit 5:-
Sorting Algorithm: Quick Sort, Heap sort, selection Sort, Binary Sort. Memory Management, Garbage Collection.

Text Books:

1. Data Structures & algorithm- Addison & Wesley.
2. Fundamentals of Algorithm-Horowitz & Sahni, Narosa Publishing House.
3. The Art of Computer programming-Knuth. D.Vol I & Vol II, Addison Wesley.

Reference Books:

1. Data structure through C- Y. Kanitkar, BPH Publication

PGDCA 103: Computer Organization & Networking Concepts

Full marks: 100
Pass Marks: 40

Unit1:-

Representation of information: Number System: Binary, Octal, Hexadecimal; Positive & negative numbers; Arithmetic operations: Addition, Subtraction.

Unit2:-

Character Codes: ASCII and EBCDIC, Redundant coding for error detection and correction: Concept of hamming distance, Parity codes, Hamming Codes. Combinational Logic circuits: - AND, OR, NAND, NOR & NOT, EXOR, EXNOR gates; Implementation of Boolean functions using logic gates.

Unit3-

Logic Design: Boolean Algebra, Boolean Variables and functions- Canonical & standard forms, Truth table & minimization of Boolean functions-Karnaugh map. Combinational circuits: Multiplexer, Demutiplexer, Decoder; encoder.

Unit4:-

An Introduction to Networking, Networking Standards and the OSI Model, Transmission Basics and Networking Media, Introduction to TCP/IP Protocols. Topologies and Ethernet Standards. Network hardware

Unit5:-

WANs and Remote Connectivity, Fundamentals of Wireless Networking.

Textbook:

1. Digital Logic and Computer design-Mano M.M,PHI(EEE)Publication
2. An introduction to Digital Computer and design-Rajaraman, V Radhakrishnan
3. Computer Network- Andrew S Tanenbaum, Pearson Publication.

Reference Books:

1. Computer organization-Hamacher, Vranesic, Zaky-McGrawHill.

Networking for Beginners – Kevin Kali

PGDCA 104: Foundation of Computer Application.

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Full marks: 100
Pass Marks: 40

Unit 1:-
　　　Information: Concept of information and information processing; Information gathering, storage, processing, retrieval, and dissemination; Evaluation of information processing. Elements of modern information processing system.

Unit 2:-
　　　Hardware: Processor, input/ output devices, storage devices & media. Data communication equipment. Software: System & Application.
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Unit 3:-
Machine Language, Assembly Language, High level language, Low level language, Generation of Computer language, Operating System, Major function, Task function.

Unit 4:-
Data communication networks, Computer network LAN, MAN, WAN, Client Server Architecture, Network Structure, Communication service across network, Network Protocol(Telnet, HTTP,SOAP,POP), e-mail, internet, Communication device.

Unit 5:-
Integrity definition, Enduring integrity, Computer and communication security, Concept of security, Preventive measures and treatment

Text and Reference Books:

1. Rajaraman V, "Introduction to Computer"
2. Morris, "Computer organisation"
3. Kanter, " Managing Information System"
4. Hamacher, "Computer organisation"

PGDCA 105:   CA Lab-I

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Programming and Problem Solving (in C)

Writing an algorithm and drawing Flow chart of at least three programs;
Writing programs for:
   computing Expressions; declaration of data type;
Writing programs using:
   Conditional statement; Iterative Statements;
Writing programs for:
   Declaration of Arrays and use of arrays: one and two dimensions; character
   data type and text processing;
Writing programs:
   Declaration and use of functions
Writing programs:
   Declaration and use of pointers
Writing programs for:
   File Handling

PGDCA 106:   Data Structure Lab (in C)

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Write programs for declaration of data types and use of input-output statement:
Write programs for :
   List: Sequential; Linked
   Stack and Queues: Implementation, application
   Tree -   Binary, AVL, Balanced .
   Search –   Sequential, Binary, Hashing
   Sort -   Quick Sort, Heap sort, selection Sort, Binary Sort
   Graph: Breadth First Search, Depth First Search;
                              Implementation of Minimum Spanning tree.
                              Shortest path problem: Single source, all pair
                              Transitive Closure,

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PGDCA 201- System Analysis and Design

Full marks: 100
Pass Marks: 40

Unit-1
Overview of systems analysis and design; Information systems concepts; Systems development life-cycle; Project selection, feasibility analysis, design, implementation, testing and evaluation.

Unit-2

Project selection: Sources of project requests, managing project - review and selection; preliminary investigation.
Feasibility Study: Technical and economical feasibility; cost and benefit analysis.

Unit-3
System requirement specification and analysis: Fact finding techniques; data flow diagrams; data dictionaries; process organization and interactions; Decision analysis-decision trees and tables.
Detailed design: Modularization, module specification; file design; systems development involving databases.

Unit-4
System control and quality assurance: Design objectives; Reliability and maintenance; Software design and documentation tools; Top-down and bottom-up and variants; Units and integration testing; Testing practices and plans; System controls; Audit trails.

Unit-5
System administration and training, conversion, and operation plans.
Hardware and software selection: Hardware acquisition - memory, processors, peripherals, benchmarking, vendor selection; Software selection- Operating system, languages; Performance and acceptance criteria.

Books/References:

1. Senn J.A., Analysis and Design of Information Systems, McGraw Hill.
2. Awad, E.M, Systems Analysis and Design, Irwin series.
3. Lucas, H.C, The Analysis, Design and Implementation of Information Systems, McGGraw Hill.

PGDCA 202: - Web Technology

Unit-1

Basics Of Internet, Client/Server Computing: What is C/S Computing, Middleware, Fat client VS Fat Servers, N-tiered Software Architecture.

Unit-2

Markup Languages And Their Grammers: SGML, DTD Resouce ; HTML, CSS; XML, XSL, Query Languages for XMLW3schools xml validator script
Web Browser: Browser Architecture, Configuration of Netscape and IE

Unit-3

Web Server Apache Architecture : Web Server Architecture, Server Features, Configuration of Apache and IIS.

Unit-4

Protocols: TCP, UDP, POP, HTTP, FTP, SMTP, SNMP
Web Database Connectivity; CGI interface to Datatabase,
JDBC interface to Database.

Unit-5

Web Security: S-HTTP, Fire Walls, Proxy Servers. Distributed
Object Models: CORBA, DCOM , EJB.

Books/References:

1. Shelly Powerset al., Dynamic Web Publishing, Techmedia, 1998.
2. Jamie Jaworski, Java1.2 Unleashed, Techmedia, 1998.
3. Robert Niles et.al., CGIby Examples, Que,1996.
4. Scot Johnson et. al., Using Active Server Pages, Que,, Information Technology.

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PGDCA 203: Programming and Problem Solving using PYTHON

Full Marks: 100
Pass Marks: 40

Unit-1

Introduction: Relationship between computers and programs, Basic principles of computers, File systems, Using the Python interpreter, Introduction to binary computation, Input / Output

Unit-2

Data types and control structures: Operators (unary, arithmetic, etc.), Data types, variables, expressions, and statements, Assignment statements, Strings and string operations, Control Structures: loops and decision

Unit-3

Modularization and Classes: Standard modules, Packages, Defining Classes, Defining functions, Functions and arguments (signature), Data Structures (array, List, Dictionary), Programming types, Object Oriented Programming

Unit-4

Exceptions & Data Structures: Data Structure – Array, List, Dictionary; Error Processing; Exception raising & Handling.

Unit-5

Object Oriented Design: Programming Types; Object Oriented Programming, Object Oriented Design; Inheritance & Polymorphism.

Text Books:

1. "Starting Out with Python plus My Programming Lab with Pearson e-Text --Access Card Package (3rd Edition) Tony Gaddis, ISBN-13: 978-0133862256"

Reference Books:

1. PYTHON Programming (for beginners) – By Adam Stewart

PGDCA 204: Object Oriented Programming in C++

Unit-1
Part I : Object Oriented Programming
Structured Programming and Object Oriented Programming paradigms.

Unit-2
Key Concepts :
Data Abstraction : Class, object, constructors, destructors, memory allocations for objects, member functions, friend functions, templates.

Unit-3
Inheritance : Single & multiple inheritance, virtual base class.
Polymorphism : Compile time polymorphism : operator overloading, function overloading, static binding.
Run-time polymorphism : Virtual function, pure virtual function, abstract class, dynamic binding.

Unit-4
Exception handling.
Part - II Object Oriented Design
Object Oriented Design Approaches: Object Model, Dynamic Model, and Functional Model. (Objet Diagram, State Diagram, and DFD).

Unit-5
Phases of Object Oriented Development: Object Analysis, System Design, Object Design.

Books/References:

1. Herbert Schild : The Complete Reference to C++, Osborne McGrawHill.
1. Rambaugh et al. : Object Oriented Modeling and Design, PHI(EEE).
2. Grady Booch: Object Oriented Analysis and Design, Pearson Education.
3. Bjarne Stroustrup: The C++ Programming Language, Addison Wesley

PGDCA 205: CA Lab-II
Object Oriented Programming (in C++)

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Writing an algorithm and drawing Flow chart of at least three programs;
Writing programs for:
    computing Expressions; declaration of data type; Input-Output Statements
Writing programs using:
    Class declarations and object
Writing programs for:
    Implementation of Constructor, Destructor, Member function, Friend Function
Writing programs:
    Implementation of Inheritance-single and multiple
Writing programs:
    Polymorphism: Operator overloading, function overloading

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PGDCA 206: PROJECT

To be allotted by the Guide