Program Syllabus Booklet

Post Graduate Diploma in Computer Application (PGDCA-304)

Session: 2019-20

University College of Computer Applications
Guru Kashi University, Talwandi Sabo

GURU KASHI UNIVERSITY
PUNJAB - INDIA

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Program: Post Graduate Diploma in Computer Applications (P.G.D.C.A)
Program Code: 304
Program Outcomes (PO): The PO for the Post Graduate Diploma in Computer Applications (P.G.D.C.A) is as follows:

PO	Statement
PO1	**Computer knowledge:** To apply the knowledge of mathematics, Computer fundamentals, and a web based specialization to the solution of complex programming problems.
PO2	**Problem analysis:** To identify, formulate, design, and analyze complex problems reaching substantiated conclusions using first principles of database, mathematics, data structure, and software engineering and development.
PO3	**Design/development of solutions:** To design solutions for contemporary problems and design system components or processes that meet the specified needs with appropriate consideration to investigate, understand and propose integrated solutions using emerging technologies
PO4	**Conduct investigations of complex problems**: To use IT-based knowledge and problem solving methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** To create, select, and apply appropriate techniques, resources, and modern applications and IT tools including prediction and modeling to complex web based activities with an understanding of the limitations.
PO6	**The Programmer and society:** To apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Programmer practice.
PO7	**Environment and sustainability:** To understand the impact of the professional programming solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** To apply ethical principles and commit to professional ethics and responsibilities and norms of the computer practice.

PO9	**Individual and team work:** To function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** To communicate effectively on complex activities with the IT community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** To demonstrate knowledge and understanding of the Programmer and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:** To recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcome (PSO): The PSO for the Post Graduate Diploma in Computer Applications (P.G.D.C.A) are as follows:

PSO	Statement
PSO1	To become a Software Engineer to fulfill the IT industry requirements.
PSO2	To attain technical Knowledge in varied areas of Computer Applications and learn about programming skills for thriving career and higher studies in IT sector.
PSO3	To implement computer programs in the allied areas with the help of algorithms, System Software, Multimedia, Web Design code and Data Analytics for efficient design of computer-based systems of varying complexity.

Annexure -2

Semester: 1st										
Sr.	**Subject Code**	**Subject Name**	**Type of Subject T/P**	**(Hours Per Week)**			**No. of Credits**	**Internal Marks**	**External Marks**	**Total Marks**
				L	**T**	**P**				
1	A304101	Programming Using C	T	3	1	0	4	50	50	100
2	A304102	Fundamentals of Computers & Information Technologies	T	3	1	0	4	50	50	100
3	A304103	Computer Organization & Architecture	T	3	1	0	4	50	50	100
4	A304104	Data Communication	T	3	1	0	4	50	50	100
5	A304105	Operating Systems	T	3	1	0	4	50	50	100
6	A304106	S/w Lab-I(Fundamentals of Computers & Information Technologies)	P	0	0	4	2	60	40	100
7	A304107	S/w Lab-II(C programming)	P	0	0	6	3	60	40	100
Total No. of Credits				25						

Semester: 2nd										
Sr.	**Subject Code**	**Subject Name**	**Type of Subject T/P**	**(Hours Per Week)**			**No. of Credits**	**Internal Marks**	**External Marks**	**Total Marks**
				L	**T**	**P**				
1	A304201	Data Structures	T	3	1	0	4	50	50	100
2		**Elective-I**	T	3	1	0	4	50	50	100
3	A304203	Database Management Systems	T	3	1	0	4	50	50	100
4	A304204	Internet Concepts and Web Designing	T	3	1	0	4	50	50	100
5	A304205	S/w Lab-III(Data Structures using C/C++)	P	0	0	8	4	60	40	100
6	A304206	S/w Lab-IV(Database Management Systems)	P	0	0	4	2	60	40	100
7	A304207	S/w Lab-V(Internet Concepts and Web Designing)	P	0	0	6	3	60	40	100
Total No. of Credits				25						

	Elective-I	
1	A304202	Digital Electronics
2	304208	Microprocessor
3	304209	Digital System Design

Course Name: Programming Using C

Course Code: A304101

Semester: 1st

L T P

Credits: 04 **3 1 0**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Adequately explain the functioning of computer components.
CO2	Understand the process of problem - solving using a computer.
CO3	Design an algorithmic solution for a given problem.
CO4	Learn the concepts of programming Languages
CO5	Write a C program for a given algorithm

Course Contents

SECTION -A

Introduction: ANSI C standard, Overview of Compiler and Interpreters, Structure of C Program, Programming rules, Execution

Basic structure of C program: Character set, Identifiers and keywords, constants, variable, Data types, input and output, type conversion,

Operators and expressions: Arithmetic, Unary, Logical and Relational operators, assignment operators, Conditional operators, type conversion. Library functions.

Input/ Output in C: Formatting input & output functions.

Decision making statements – if, else if

Control statements: branching, looping using For, While and Do-While statements, nested control structures, switch, break and continue statements.

SECTION-B

Arrays: Definition, declaration, assignment, one dimensional and two dimensional arrays.

Strings: input/output of strings, string handling functions, table of strings.

Pointers: pointer data type, pointer declaration, initialization, accessing values using pointers.

Functions: prototype, definition and call, formal and actual arguments, methods of parameter passing to functions, recursion versus iteration.

Structures and unions: using structures and unions, comparison of structure with arrays and union.

Files: opening and closing files, Basic I/O operation on files.

Storage Classes: automatic, external, static and register variables.

Text Books:

1. Kanetkar Yashvant. *Let us C,* Seventh Edition, BPB Publications, and New Delhi.
2. Balagurusamy E. *Programming in C***,** Tata McGraw Hill.
3. Gottfried Byron S.*Programming in C,* Second Edition, McGraw Hills.
4. Kernighan & Richie. *The C Programming Language,* Second Edition, PHI Publication
5. Salaria R. S. *Problem Solving and Programming in C,* Second Edition

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	1	2	1	-	2	1	-	3	1	3	1	2
CO2	1	3	3	2	2	1	1	1	2	2	3	3	1	2	1
CO3	3	3	3	2	2	1	1	2	3	2	3	2	2	3	3
CO4	3	3	3	2	2	1	1	1	2	2	3	3	3	2	3
CO5	3	3	3	2	3	2	-	2	3	3	3	2	2	1	2
Average	**2.6**	**2.6**	**3**	**1.8**	**2.2**	**1.2**	**1**	**1.6**	**2.2**	**2.25**	**3**	**2.2**	**2.2**	**1.8**	**2.2**

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Fundamentals of Computer& Information Technologies

Course Code: A304102

Semester: 1st

L T P

Credits: 04 **3 1 0**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Understand a vocabulary of key terms related to the computer and to software program menus.
CO2	Recognize functions of mouse and keyboard.
CO3	Apply window and menu commands.
CO4	Compose, format and edit a word document.
CO5	Send email messages (with or without attachments).

Course Contents

SECTION - A

Information concepts and processing: Evolution of information processing, data, information language and communication.

Elements of computer processing system: Hardware-CPU, storage devices and media. VDU, input-output devices, data communication equipment, Software-system software, application software.

Programming Language: classification, machine code, assembly language, higher level languages, and fourth generation languages.

Introduction to Operating System: its need and Operating System services; Operating System classification- single user, multi-user, simple batch processing, Multiprogramming, Multitasking, Parallel system, Distributed system, Real time system. Typical commands of DOS, GUI - Windows.

SECTION – B

Computers and Communication: Single user, multi-user, work station, client server systems, Computer networks, network protocols, LAN, MAN, WAN.

Introducing the Internet: Description of the Internet–Working, Surfing, Internet Domain Names and Addresses

Connecting LAN to Internet: Protocols, IP Address and Web Server.

Internet Applications : Email , Working of email , Advantages of email, Understanding of Internet Email, Net news ,Search Engines, Introducing to Usenet ,organization of Usenet articles, reading, saving ,mailing, writing and posting of an articles.

WWW- World Wide Web

Working of WWW, Hypertext and Hypermedia, URL, Searching the WWW, Web access using web browser, locating information on the Web.

Text Books:

1. Sinha P.K. *Computer Fundamentals*
2. Rajaraman V. *Fundamentals of Computers***,** Prentice Hal

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	2	1	-	-	1	2	2	2	1	2	1
CO2	3	2	2	2	3	1	-	1	2	1	2	3	2	2	3
CO3	3	2	3	3	2	2	-	-	2	2	1	2	2	2	3
CO4	3	2	2	2	2	3	-	-	3	3	3	3	3	1	2
CO5	3	2	2	3	3	2	1	1	2	3	2	2	3	3	3
Average	**2.8**	**2**	**2.2**	**2.4**	**2.4**	**1.8**	**1**	**1**	**2**	**2.2**	**2**	**2.4**	**2.2**	**2**	**2.4**

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Computer Organization & Architecture

Course Code: A304103

Semester: 1st

L T P

Credits: 04 **3 1 0**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Design the process of combinational and sequential circuits
CO2	Learn the design of ALU.
CO3	Learn the functioning of the control unit and memory organization.
CO4	Understanding the instruction pipelining and RISC architectures
CO5	Design basic Gates, Sequential & Combinational circuits.

Course Contents

SECTION-A

Boolean Algebra: Boolean operations, Truth Tables, Boolean Laws, K-maps (2,3 and 4 variable maps, don't care conditions).

Basic Gates, Combinational logic design: half-adder, full adder, parallel adder.

Sequential circuits: concept, flip-flops (D, RS, JK, T), counters (Ripple, Asynchronous, Synchronous).Instruction codes, Instruction formats, Instruction cycle, addressing modes.

SECTION -B

Register Transfer Language, Arithmetic, Logic and Shift micro-operations, Arithmetic Logic Shift unit

Control Memory: Design of control unit, Micro programmed and hardwired control unit (overview only), Features of RISC and CISC

Memory Organization: memory hierarchy, Memory types: cache, associative and other types. I/O organization: I/O interface, Modes of data transfer: Programmed I/O, Interrupt initiated I/O, DMA.

Block diagram depicting architecture of 8085 machine.

Text Books:

1. M.M. Mano**,** (2002). *Computer System Architecture***.** Third Edition, Prentice-Hall of India.
2. A.S.Tannenbaum,(1999). *Structured Computer Organization***.** Prentice-Hall of India.
3. William Stallings, (2002). *Computer Organization and Architecture*. 6th Edition, Pearson Education.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	3	1	2	-	-	2	2	3	2	2	3	3
CO2	3	2	3	2	1	2	-	-	3	2	3	3	3	2	3
CO3	3	2	2	3	1	1	1	-	2	2	2	2	2	2	2
CO4	3	2	2	2	3	3	-	1	3	3	3	3	3	1	3
CO5	2	3	3	2	2	1	-	-	2	2	2	2	2	2	3
Average	**2.8**	**2**	**2.2**	**2.4**	**1.6**	**1.8**	**1**	**1**	**2.4**	**2.2**	**2.6**	**2.4**	**2.4**	**2**	**2.8**

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Data Communication

Course Code: A304104

Semester: 1st

L T P

Credits: 04 **3 1 0**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Understand the concepts of data communication within the network environment
CO2	Know the conflicting issues and resolution techniques of data transmission
CO3	Learn the general principles of circuit and packet switching
CO4	Recognize the functioning of Data Link Layer, Physical Layer & Network Layer
CO5	Analyze the services and features of various protocol layers in data networks.

Course Contents

SECTION -A

Introduction to Data Communication, Analog vs Digital Communication; Fourier Analysis, Band Width Limitation, Data rate of a channel, Error Detection and Correction: Nature of errors, Parity Check, CRC, Hamming Code, Modulation techniques :AM, PM, FM, Synchronous and Asynchronous Modulation, Multiplexing : SDM, FDM, TDM, STDM.

SECTION - B

Introduction to Computer networks and applications; Network structure and Architecture, OSI reference model, Network standardization,

Physical Layer: Circuit switching, Packet Switching, Message Switching, Terminal Handling, Telephone system, modems, congestion, Multi channel Access, Transmission media.

The Data Link Layer : Design Issues, Elementary Data Link Protocols, Sliding Windows Protocol, Protocol performance, Protocol Specification & verification, DLL in X.25, HDLC/SDLC.

The Network Layer: Design Issues, Routing Algorithms, Congestion Control Algorithms, Internet working, Example of Network layer in ARPANET, X.25 Protocol.

Application Layer

Text Books:

1. Tanenbaum Andrew S.(2000).*Computer Networks*, 3rd Edition, Pearson Prentice Ltd.

2. Behruoz A Forouzan.(2009). *Data Communication and Networking*, 4th Edition, Tata McGraw Hill.
3. Larry L.Peterson.(2008) *Computer Networks*, A System Approach, 4th Edition, Elsevier Publication.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	2	2	1	2	-	-	2	2	3	2	3	2	3
CO2	2	1	3	2	2	1	-	-	3	2	3	3	3	2	3
CO3	1	2	2	3	2	3	1	1	2	1	2	2	1	3	2
CO4	3	2	3	1	1	2	-	-	3	2	3	3	2	3	2
CO5	1	2	2	1	3	2	-	-	2	3	2	2	2	3	3
Average	**1.6**	**1.8**	**2.4**	**1.8**	**1.8**	**2**	**1**	**1**	**2.4**	**2**	**2.6**	**2.4**	**2.2**	**2.6**	**2.6**

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Operating Systems

Course Code: A304105

Semester: 1st

L T P

Credits: 04 **3 1 0**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Analyze and design the applications to run in parallel either using process or thread models of different OS
CO2	Understand the various device and resource management techniques for timesharing and distributed systems.
CO3	Know the mutual exclusion and agreement protocols of distributed operating system.
CO4	Attain the knowledge about deadlock detection algorithms..
CO5	Learn different memory management techniques like paging ,segmentation and demand paging etc.

Course Contents

SECTION-A

Introduction: Operating System, Role as resource manager, Operating system strategies, Factors in operating system design, operating system functions and services.

Process Management: The system view of processes, Process descriptor, Process state diagram, Resource abstraction, Process hierarchy, Process scheduling strategies, Process synchronization, Deadlock handling

SECTION-B

Memory Management: Factors in memory design, Memory hierarchies, Memory manager strategy, Memory allocation strategies, Paging, Demand paging and Segmentation techniques

Device Management: Device management approaches, Device allocation considerations, Disk scheduling.

Information Management: File system, its layered structure and general model, Allocation methods, free space management.

Text Books/References:

1. Silberschatz Galvin. *Operating System concepts*

2. Milan Milenkovic. *Operating System*

3. Deital H.M. *An Introduction to Operating System* **(**Addison Wesley)

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	2	3	-	-	2	2	3	2	3	3	2
CO2	1	1	2	2	2	3	-	1	3	3	2	3	3	2	2
CO3	1	2	3	1	1	3	-	-	2	2	2	2	2	3	3
CO4	2	2	3	1	3	2	1	-	3	2	2	3	3	2	3
CO5	3	1	1	2	1	2	-	-	2	2	2	2	2	3	2
Average	**2**	**1.6**	**2.4**	**1.8**	**1.8**	**2.6**	**1**	**1**	**2.4**	**2.2**	**2.2**	**2.4**	**2.6**	**2.6**	**2.4**

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: S/W Lab-I (Fundamentals of Computer & Information Technology)

Course Code: A304106

Semester: 1st

L T P

Credits: 02 **0 0 4**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Compose, format and edit a word document
CO2	Send email messages (with or without attachments)
CO3	Navigate and search through the internet.
CO4	Familiarize with PC and WINDOWS commands, File creation, Editing, Directory creation.
CO5	Utilize the MS PowerPoint.

Course Contents

1) [MS-WORD] Creating, opening, closing, saving and editing a word Document.
2) [MS-WORD] Insert header and footer in the document.
3) [MS-WORD] Create a link between two files using Hyperlink.
4) [MS-WORD] Create a mail-merge and add data of 5 recipients.
5) [MS-WORD] Protect a document.
6) [MS-WORD] Implement macro.
7) [MS-POWERPOINT] Create duplicate slides in PowerPoint. Give an example.
8) [MS-POWERPOINT] Make a master slide.
9) [MS-POWERPOINT] Design a chart of population.
10) [MS-POWERPOINT] Insert Animation.
11) [MS-POWERPOINT] Insert a background in PowerPoint.
12) [MS-EXCEL] How you can filter your data.
13) [MS-EXCEL] Sort data in ascending and descending order.
14) [MS-EXCEL] To show the use of goal seek
15) [MS-EXCEL] To show the use of scenarios.
16) [MS-EXCEL] Perform any 5 Date and Time functions.
17) [MS-EXCEL] Perform any 5 Math & Trig functions.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	3	-	-	2	2	3	3	3	1	3
CO2	1	3	2	3	3	1	-	-	3	2	2	3	2	2	1
CO3	3	1	3	2	3	2	-	1	2	2	2	2	2	2	3
CO4	3	2	2	2	2	3	1	-	3	2	2	2	3	1	2
CO5	3	2	2	2	3	3	-	-	2	2	2	2	3	3	3
Average	**2.4**	**2.2**	**2**	**2.4**	**2.6**	**2.4**	**1**	**1**	**2.4**	**2**	**2.2**	**2.4**	**2.6**	**1.8**	**2.4**

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: S/W Lab-II(C Programming)

Course Code: A304107

Semester: 1st

L T P

Credits: 03 **0 0 6**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Enhance skill on problem solving by constructing algorithms.
CO2	Convert C program for a given algorithm.
CO3	Debug a given Program.
CO4	Identify solution to a problem and apply control structures and user defined functions for solving the problem
CO5	Apply skill of identifying appropriate programming constructs for problem solving

Course Contents

1. Program to find sum of two numbers.
2. Program to test whether an entered number is even, odd or zero.
3. Program to test whether an entered number is prime number or not.
4. Program to print N terms of a Fibonacci Series.
5. Program to find the reverse of number.
6. Program to check whether a given Number or a given string is palindrome or not.
7. Program to reverse a given string.
8. Program to check whether a given number is prime or not.
9. Program to find the prime numbers up to N.
10. Program to print:

```
*

**

***

****
```

*****

11. Program to search a string in an array using read-data.

12. Program to find the frequency of vowels in a given string.

13. Program to find the frequency of each character in a given string.

14. Program to find greatest in a matrix using subroutine.

15. Program for Matrices Addition. And subtraction.

16. Program for Matrix Transpose.

17. Program to find sum of rows and column of a matrix.

18. Program to find sum of both diagonals of the matrix.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	-	-	2	2	3	3	3	2	2
CO2	2	2	3	1	2	1	-	-	3	2	2	3	2	3	1
CO3	2	1	2	2	1	2	-	-	2	2	2	2	3	3	3
CO4	3	3	2	2	2	3	1	-	3	2	2	2	2	2	2
CO5	2	2	1	2	1	2	-	1	2	2	2	2	3	3	1
Average	**2.4**	**2**	**2.2**	**1.8**	**1.8**	**2**	**1**	**1**	**2.4**	**2**	**2.2**	**2.4**	**2.6**	**2.6**	**1.8**

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Data Structures

Course Code: A304201

Semester: 2nd

L T P

Credits: 04 **3 1 0**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Analyze algorithms and algorithm correctness.
CO2	Learn searching and sorting techniques
CO3	Apply the different linear data structures like stack and queue to various computing problems.
CO4	Attain knowledge of tree and graphs concepts.
CO5	Implement link list and it s application in Data Structures

Course Contents

SECTION-A

Basic concept and notations: Data structures and data structures operations, mathematical notation and functions, algorithmic complexity, Big 'O' notations and time space trade off.

Arrays: Linear array, representation of linear array in memory, Traversing linear array, insertion and deletion in an array, multi-dimensional array: row-major, column major order, sparse array.

Stacks: Push and Pop in stack. Representation of stack in memory (linked and sequential) applications of Stack: conversion from infix notation to post fix notations, evolution of postfix notation, matching of Parenthesis, recursion, Tower of Hanoi.

Queue: Queues and Dequeues, Priority Queues, Operations on queues.

SECTION-B

Linked list: Representation of linked list using static and dynamic data structures, Comparison of Linear and non-linear data structures, Insertion and deletion of a node from a linear linked list, Introduction to doubly and circular linked lists, Application of linked lists.

Searching and Sorting: Linear and binary search, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Radix Sort and Quick Sort comparison of various searching and sorting algorithms.

References:

1. Schaum Series. *Data Structure.*

2. Niclaus Wirth. *Algorithm and Data Structures & Programs.*

3. Tanenbaum, *Data Structures.*

4. Trembley & Soreson. *An Introduction to Data Structures Applications*

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	3	1	2	-	-	2	2	3	2	3	2	2
CO2	2	2	2	1	2	2	-	-	3	2	3	3	2	3	2
CO3	2	2	3	3	1	2	1	-	2	3	2	2	3	3	3
CO4	1	3	1	2	2	3	-	-	3	2	3	3	2	2	1
CO5	2	2	3	3	2	3	-	1	2	3	2	2	2	3	3
Average	2	2.2	2	2.4	1.6	2.4	1	1	2.4	2.4	2.6	2.4	2.4	2.6	2.2

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Digital Electronics

Course Code: A304202

Semester: 2nd

L T P

Credits: 04 **3 1 0**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Apply the fundamental concepts and techniques used in digital electronics.
CO2	Understand the basic digital circuits and to verify their operation.
CO3	Analyze and design various combinational and sequential circuits.
CO4	Convert different type of codes and number systems which are used in digital communication and computer systems..
CO5	Learn the basics of Logic gates.

Course Contents

SECTION-A

Information Representation: Number systems, Integer and floating point representation, character codes (ASCII, EBCDIC).

Digital IC's: Logic gates, flip-flops, clocks and timers, shift registers, counters.

Boolean Algebra & Circuit Design: Basic laws of Boolean algebra, circuit design using standard (NAND) gates, Adder, coder / De-multiplexer, encoder / multiplexer design.

SECTION-B

MOS & LSI Digital Systems: Semiconductor memory, static and dynamic devices, read only &random access memory chips, PROMS and EPROMS. Address selection logic. Read and write control timing diagrams for memory ICs.

Logical Families: TTL, STTL, CMOS logic families.

Digital Peripherals: Keyboard, multiplexed seven segment display, CRT display schemes, Printers, Control interfaces (parallel and serial) for the peripheral units.

References:

1. D. Morris Mano. *Digital Circuits of logic design* (PHI)
2. T.C. Bartee.*Digital and electronic circuits* (McGraw Hill)
3. Malvino.*Digital computer electronics*
4. Floyd. *Digital fundamentals*
5. R.P. Jain. *Modern digital electronics*
6. Tauls and Schillings. *Digital integrated electronics*

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	2	-	-	2	2	3	2	3	2	2
CO2	3	2	2	3	2	1	-	-	3	2	3	3	3	2	2
CO3	3	3	1	1	2	2	1	-	2	2	2	2	3	3	3
CO4	3	2	3	2	2	2	-	1	3	2	3	3	3	2	3
CO5	2	3	2	2	3	2	-	-	2	3	2	2	2	2	2
Average	2.8	2.6	2	2	2.2	1.8	1	1	2.4	2.2	2.6	2.4	2.8	2.2	2.4

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Microprocessor

Course Code: 304208

Semester: 2nd

L T P

Credits: 04 **3 1 0**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Analyze the architectures of microprocessors
CO2	Identify the different ways of interfacing memory and I/O with microprocessors.
CO3	Learn the concepts of interfacing with processors and controllers.
CO4	Understand the basic concept of digital fundamentals to Microprocessor based personal computer system.
CO5	Develop assembly language programs using various programming tools.

Course Contents

Section-A

Introduction to computer-I: Definition of computer, classification of computers; concept of Microprocessor, concept of hardware and software, operating system; Data and control paths concepts, registers and memory organization, Instruction set basics and assembly language programming: Instruction structure and addressing modes.

MICROPROCESSORS: Evolution of Microprocessors, Historical background, Overview of 8086 Family (till Intel i series), the microprocessor-based personal computer system.

8086 MICROPROCESSOR: 8086 CPU Architecture, Machine language Instructions, concept of interpreter, compiler and debugger, Instruction execution timing.

Section-B

INSTRUCTION SET OF 8086: Addressing modes, Assembler instruction format, data transfer and arithmetic, branch type, loop, NOP & HALT, flag manipulation, Logical and shift and rotate instructions, Illustration of these instructions with example programs, Directives and operators.

BYTE AND STRING MANIPULATION: String instructions, REP Prefix, Table translation, Number format conversions, Procedures, Macros, Programming using keyboard and video display.

8086 INTERRUPTS: 8086 Interrupts and interrupt responses, Hardware interrupt applications, Software interrupt applications, Interrupt examples, study of Programmable Interrupt Controller 8259A & Interrupt Priority Management using 8259A.

Reference Books:

1. Hall D.V (2008) *Microprocessor and Interfacing-Programming and Hardware*, 2nd Ed., Tata McGraw-Hill Publishing Company Limited.

2. Gaonkar R.S. (2007) *Microprocessor Architecture, Programming and Applications,* 5th Ed., Penram International.

3. Stewart (1990) Microprocessor *Systems- Hardware, Software and Programming*, Prentice Hall International Edition.

4. Short K. L. (2008) *Microprocessors and Programmed Logic*, 2nd Ed., Pearson Education.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	3	2	1	-	2	1	3	2	3	1	3
CO2	2	2	3	1	2	2	1	-	2	1	2	3	3	2	1
CO3	3	1	3	1	3	2	1	-	3	1	3	2	2	2	3
CO4	3	2	3	1	3	2	1	1	2	1	2	3	1	2	3
CO5	3	2	2	1	3	2	1	1	2	1	3	2	2	3	2
Average	2.8	1.8	2.8	1	2.8	2	1	1	2.2	1	2.6	2.4	2.2	2	2.4

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Digital System Design

Course Code: 304209

Semester: 2nd

L T P

Credits: 04 **3 1 0**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Learn the concept of digital and binary systems
CO2	Design and analyze combinational logic circuits.
CO3	Understand the basic software tools for the design and implementation of digital circuits and systems.
CO4	Classify different logic families, semiconductor memories and PLD devices.
CO5	Analyze and breakdown a complex digital system

Course Contents

Section-A

Introduction to Digital Design: Specification and Implementation of digital design - Structured and Trial-Error methods in design - Digital Computer Aided Design (CAD) tools

Digital Logic : Binary Number System - Octal, Hexa-decimal and BCD Codes - Number System Conversion - Use of different number systems in digital design - Logic gates – AND, OR, NOT, NAND, NOR etc. - NAND and NOR implementation of real life digital circuits - Digital Circuit Characterization – Fan-in/Fan-out, Switching functions, Switching times, Noise margin etc.

Boolean Algebra : AND, OR and other relations - DeMorgan's law - Karnaugh Maps - Minimization of Sum of Products and Product of Sums - Design of minimal two-level gate networks - Design of multiple output two level gate networks

Section-B

Combinational Circuit Design : Design Procedure - Design of Multiplexer, Decoder, Encoder, Comparator - Design of Seven-segment display, Parity generator - Design of large circuits using the above modules

Synchronous Sequential Circuit Design: Design of sequential modules – SR, D, T and J-K Flip-flops - Flip-flop applications – Clock generation, Counters, Registers - Basic State machine concepts

Design of Programmable Logic: Introduction to Programmable circuits - Design of Read-Only Memory (ROM), Programmable Logic Arrays (PLA), Programmable Array Logic (PAL)

References books:

1. John M Yarbrough (2011). *Digital Logic Applications and Design,* Cengage Learning
2. Donald DGivone (2002). *Digital Principles and Design,* McGraw Hill Education 1st Edition.
3. M. Morries Mano and Charles Kime (2014). *Logic and computer design Fundamentals,* Pearson Learning 4th Edition.
4. Charles H Roth, JR and Larry L. Kinney Cengage (2013). *Fundamentals of logic design, Learning* 6th Edition.
5. A. Anand Kumar (2010). *Fundamentals of Digital Circuits,* PHI 3rd Edition

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	3	-	-	1	1	2	3	2	3	1
CO2	3	3	3	3	3	2	1	-	2	1	3	2	3	2	3
CO3	3	1	3	2	3	3	1	1	2	1	3	2	2	1	2
CO4	3	2	3	2	3	2	1	-	3	1	3	2	3	3	3
CO5	3	2	3	2	1	3	1	-	2	1	2	2	2	1	2
Average	3	2	3	2.2	2.4	2.6	1	1	2	1	2.6	2.2	2.4	2	2.2

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Database Management System

Course Code: A304203

Semester: 2nd

L T P

Credits: 04 **3 1 0**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
CO2	Know the role of the database administrator and his responsibilities.
CO3	Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.
CO4	Design ER-models to represent simple database application scenarios
CO5	Understand the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL

Course Contents

SECTION-A

Traditional file processing system: Characteristics, limitations, Database: Definition, composition.

Database Management System: Definition, Characteristics, advantages over traditional file processing system, User of database, DBA and its responsibilities, Database schema, instance.

DBMS architecture, data independence, mapping between different levels.

Database languages: DDL, DML, DCL.

Database utilities, Data Models, Keys: Super, candidate, primary, foreign.

SECTION-B

Entity relationship model: concepts, mapping cardinalities, entity relationship diagram, weak entity sets, strong entity set, aggregation, generalization, Overview of Network and Hierarchical model.

Relational Data Model: concepts, constraints. Relational algebra: Basic operations, additional operations.

Database Design: Functional dependency, decomposition, problems arising out of bad database design, Normalization- Normal forms based on primary keys (1 NF, 2 NF, 3 NF, & BCNF), multi-valued dependency, Database design process, data base protection, database integrity.

Database concurrency: Definition and problems arising out of concurrency.

References:

1. C.J. Date .*An Introduction to Data Base Systems*, Narosa Publications.

2. Henry F. Korth.*Database System Concepts*, McGraw Hill.

3. Naveen Prakash.*Introduction to Database Management*, TMH

4. Bipin C. Desai.*An Introduction to Database System,* Galgotia Publications.

5. Ullman.*Principles of Database Systems*, Galgotia Publications

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	1	2	-	-	2	2	3	2	2	3	3
CO2	1	2	2	2	1	3	1	-	3	2	3	3	3	2	2
CO3	2	3	3	2	2	2	-	1	2	3	2	2	2	3	3
CO4	2	3	3	2	2	1	-	-	3	2	3	3	3	2	2
CO5	3	1	3	2	3	2	-	-	2	3	2	2	2	2	2
Average	2	2.2	2.4	2	1.8	2	1	1	2.4	2.4	2.6	2.4	2.4	2.4	2.4

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Internet Concepts and Web Designing

Course Code: A304204

Semester: 2nd

L T P

Credits: 04 **3 1 0**

Course Outcomes: **On completion of this course, the successful students will be able to:**

CO	Statement
CO1	Understand the basic HTML Tags, List, Types of lists, Adding graphics to HTML documents.
CO2	Apply knowledge using tables, linking documents and frames.
CO3	Design forms with various attributes, Buttons, Text Area, and Radio Button.
CO4	Develop web site with the use of HTML tags and CSS.
CO5	To create web elements like buttons and forms.

Course Contents

SECTION -A

Introduction The World Wide Web (WWW) , History, Hypertext and Hypertext Markup Language, Microsoft Front Page, HTML Documents, various Tags.

Elements of an HTML Document: Text Elements, Tag Elements, Special Character elements Structural elements of HTML documents: Header tags, Body tags, Paragraphs, Titles, Numbered list, Non, Numbered lists, Definition lists.

Formatting HTML Documents: Logical styles (source code, text enhancements, variables), Physical Styles (Bold, Italic, underlined, crossed).

Managing images in Html: Image format (quality, size, type), Importing images (scanners), Tags used to insert images, Frames.

Tables in HTML documents Hypertext and Link in HTML Documents, URL/FTP/HTTP

Types of links: Internal Links, External Links, Link Tags, Links with images and buttons, Links that send email messages

Special effects in HTML documents: Text fonts, Sensitive Images, Tip tables, Page background (Variable, Fixed), Rotating messages (Marquee)

Managing forms: Interactive forms, creating data entry forms

SECTION –B

Cascading Style Sheets: ways of inserting a style sheet:

- External style sheet
- Internal style sheet

- Inline style

CSS Id and Class, Inheritance in CSS

Scripting and websites: Java scripting

PHP: This course is an introduction to the PHP programming language. Topics include installation and configuration with the Apache http server, variables and data types, language syntax, control structures, functions, strategies and tools for handling input and generating output, error handling, sending email, manipulating dates and times, string manipulation and regular expressions, SQL and MySQL database access, object oriented programming (OOP),.Though primarily focused on PHP 5.X. We will emphasize security and sound coding practices throughout.

References:

1.Mark Surfas, Mark Brown and John Juge. *Special Edition Using Intranet HTML*

2.JefDouyer – Hayden development group. *Dynamic HTML Web Magic*

3.Elizabeth Castro.*HTML 4 for the World Wide Web*

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	1	3	2	-	-	2	2	3	2	2	1	2
CO2	1	2	3	2	3	2	-	-	3	2	3	3	3	2	1
CO3	3	2	1	1	2	3	-	1	2	2	2	2	2	1	3
CO4	3	3	3	3	3	2	-	-	3	2	3	3	1	2	3
CO5	1	3	3	2	3	3	1	-	2	2	2	2	2	3	1
Average	2	2.4	2.6	1.8	2.8	2.4	1	1	2.4	2	2.6	2.4	2	1.8	2

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: S/W Lab-III (Data Structure Using C/ C++)

Course Code: A304205

Semester: 2nd

L T P

Credits: 04 **0 0 8**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Design and analyze the time and space efficiency of the data structure.
CO2	Identify the appropriate data structure for given problem.
CO3	Implement appropriate sorting/searching technique for given problem.
CO4	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data.
CO5	Gain practical knowledge of the data structures and its applications .

Course Contents

1. Write a program to insert an element into an array
2. Write a program to delete an element from an array.
3. Write a program to implement linear search algorithm
4. Write a program to implement binary search algorithm
5. Write a program to implement bubble sort algorithm.
6. Write a program to implement selection sort algorithm.
7. Write a program to implement PUSH operation in stacks.
8. Write a program to implement POP operation in stacks.
9. Write a program to implement Queues.
10. Write a program to insert an element in the beginning of the link list.
11. Write a program to insert an element in the middle of the link list.
12. Write a program to insert an element in the end of the link list.
13. Write a program to delete an element from the beginning of the link list.
14. Write a program to delete an element from the end of the link list.
15. Write a program for implementation of a graph.
16. Write a program for implementation of binary search tree.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	-	1	2	2	3	2	3	2	3
CO2	1	1	1	1	2	2	-	-	3	2	3	3	3	2	3
CO3	2	3	1	2	2	2	-	1	2	3	2	2	3	2	3
CO4	1	2	2	3	2	1	1	-	3	2	3	3	3	2	3
CO5	2	1	3	1	3	3	-	-	2	2	2	2	3	2	3
Average	1.8	1.8	2	1.8	2.4	2	1	1	2.4	2.2	2.6	2.4	3	2	3

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: S/W Lab-IV (Database Management System)

Course Code: A304206

Semester: 2nd

L T P

Credits: 02 **0 0 4**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Apply the basic concepts of Database Systems and Applications
CO2	Design SQL queries to create database tables and make structural modifications
CO3	Get practical knowledge on designing and creating relational database systems.
CO4	Know the concept of inbuilt functions.
CO5	Analyze and Select storage and recovery techniques of database system.

Course Contents

- Data Definition, Table Creation, Constraints,
- Insert, Select Commands, Update and Delete Commands.
- Nested Queries and Join Queries
- Views
- High level programming language extensions (Control structures, Procedures and Functions).
- Front end Tools
- Forms
- Triggers
- Menu Design
- Reports.
- Database Design and implementation (Mini Project).

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	2	2	1	1	1	1	2	3	2	3	2
CO2	3	1	2	1	2	3	1	1	2	1	3	2	2	1	3
CO3	3	2	3	2	3	2	1	1	2	1	2	3	2	2	3
CO4	3	3	3	3	3	2	1	-	2	1	3	2	3	2	3
CO5	3	2	3	1	2	2	1	-	2	1	3	2	2	2	2
Average	3	2	2.8	1.6	2.4	2.2	1	1	1.8	1	2.6	2.4	2.2	2	2.6

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: S/W Lab-V (Internet Concepts and Web Designing)

Course Code: A304207

Semester: 2nd

L T P

Credits: 03 **0 0 6**

Course Outcomes: On completion of this course, the successful students will be able to:

CO	Statement
CO1	Understand the basic HTML Tags, List and its types, Adding graphics to HTML documents.
CO2	Apply knowledge to create tables, linking documents and frames.
CO3	Design forms with various attributes, Buttons, Text Area, Radio Button.
CO4	Develop web site with the help of HTML tags and CSS.
CO5	Apply the fundamentals of PHP to develop a dynamic website.

Course Contents

1. Design the page with an attractive background color, text color and background image.
2. Design the page with an attractive color combination, with suitable headings and horizontal rules.
3. Write an HTML document with an example of Ordered List and Unordered List.
4. Write an HTML document with an example of Table format to print your Bio-Data.
5. Write an HTML document with an example of Table format to print your Telephone Bill.
6. Develop a complete web page using Frames and Frameset.
7. Write an HTML code for designing the subscription form of mail account in the e-mail website with appropriate fields.
8. Write an example of Style Sheet.
9. Design a webpage with colors in bicolor, text and link, try out different sizes.

10. Design a single page web site for a university containing a description of the courses offered, it should also contain some general information about the university such as its history.
11. Write a HTML code for specifying the heading BS or cities in the HTML document.
12. Write a HTML Code for Nested list.
13. Write HTML code to develop a web page having background in blue and title "Welcome to my home page" in red other color.
14. Create an HTML document of giving details of your name, age, telephone no, address and enrolment no, aligned in proper order.
15. Design a web page that provides links to five different web pages or to entirely different websites.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	3	1	2	-	-	2	2	3	2	3	3	2
CO2	3	1	2	1	2	2	-	-	3	2	3	2	2	3	3
CO3	2	2	3	3	3	1	`1	-	2	2	2	2	3	3	3
CO4	3	2	2	2	1	2	-	1	3	2	3	3	3	2	2
CO5	2	2	2	3	1	1	-	-	2	3	2	2	2	2	3
Average	2.4	1.8	2.2	2.4	1.6	1.6	1	1	2.4	2.2	2.6	2.2	2.6	2.6	2.6

The correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Total Number of Course	16
Number of Theory Course	11
Number of Practical Course	5
Total Number of Credits	50

Annexure-4

ACADEMIC INSTURCTIONS

Attendance Requirements

A student shall have to attend 75% of the scheduled periods in each course in a semester; otherwise he / she shall not be allowed to appear in that course in the University examination and shall be detained in the course(s). The University may condone attendance shortage in special circumstances (as specified by the Guru Kashi University authorities). A student detained in the course(s) would be allowed to appear in the subsequent university examination(s) only on having completed the attendance in the program, when the program is offered in a regular semester(s) or otherwise as per the rules.

Assessment of a course

Each course shall be assessed out of 100 marks. The distribution of these 100 marks is given in subsequent sub sections (as applicable).

	Internal (50)						**External (50)**	**Total**
Components	**Attendance**	**Assignment**			**MST 1**	**MST2**	**ETE**	
		A1	A2	A3				
Weight age	10	10	10	10	30	30	50	
Average Weight age	10	10			30		50	100

Passing Criteria

The students have to pass both in internal and external examinations. The minimum passing marks to clear in examination is 40% of the total marks.