GURU KASHI UNIVERSITY
PUNJAB - INDIA

Program Syllabus Booklet

Master of Science in Information Technology
(M.Sc. (IT)-303)

Session: 2019-20

University College of Computer Applications
Guru Kashi University, Talwandi Sabo

GURU KASHI UNIVERSITY
PUNJAB - INDIA

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Annexure -1

Program: Master of Science in Information Technology (M.Sc. IT)

Program Code: 303

Program Outcomes (PO): The PO for the Master of Science in Information Technology (M.Sc. IT) 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 Master of Science in Information Technology (M.Sc. IT) 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 Application 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 Techniques, and Multimedia Web designing Code and Data Analytics for efficient design of computer-based system 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	A304202	Digital Electronics	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	50	50	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						

Semester: 3rd										
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	A303301	Object Oriented Programming using C++	T	4	1	0	5	50	50	100
2	A303302	System Analysis and Design	T	4	1	0	5	50	50	100
3	303306	Design and Analysis of Algorithms	T	4	0	0	4	50	50	100
4		**Elective-1**	T	4	0	0	4	50	50	100
5	A303305	S/w Lab-VI(Object Oriented Programming using C++)	P	0	0	8	4	60	40	100
6	303309	S/w Lab-VII(Workshop on Java Programming)	P	0	0	6	3	100	NA	100
Total No. of Credits				25						

Elective-I (Select one of the following subjects)		
S.no	**Subject Code**	**Subject Name**
1	303307	Artificial Intelligence
2	303308	Machine Learning
3	303303	Parallel Processing

Semester: 4th										
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	A303401	Computer Graphics and Multimedia	T	4	1	0	5	50	50	100
2	A303402	Software Engineering	T	4	1	0	5	50	50	100
3	A303408	System Software	T	4	1	0	5	50	50	100
4	303408	Mobile Applications Development	T	4	1	0	5	50	50	100
5		**Elective-II**	T	4	0	0	4	50	50	100
6	A303405	S/w Lab-VIII(Computer Graphics using C)	P	0	0	4	2	60	40	100
7	303409	S/w Lab-IX(Mobile Applications Development)	P	0	0	4	2	60	40	100
8	A303407	Major Project	P	0	0	4	2	60	40	100
Total No. of Credits				30						

Elective-II (Select one of the following subjects)		
Sr.	**Subject Code**	**Subject Name**
1	303410	Data Mining
2	303411	Big Data
3	303412	Advanced Database Management System

Annexure -3

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	Develop confidence for self-education and ability for life-long learning needed for Computer language.
CO2	Handle possible errors during program execution.
CO3	Consider the logic building used in Programming.
CO4	Convert algorithms into programs using C.
CO5	Design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.

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. KanetkarYashvant.*Let us C*, Seventh Edition, BPB Publications, New Delhi.
2. BalagurusamyE, *Programming in C*,Tata McGraw Hill.
3. GottfriedByron S.*Programming in C*, Second Edition, McGraw Hills.
4. Kernighan & Richie.*The C Programming Language*, Second Edition, PHI Publication.
5. SalariaR. 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**	**1.8**	**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	Develop and utilize vocabulary of key terms related to the computer and software program.
CO2	Recognize functions of mouse and keyboard.
CO3	Apply commands of window and menu.
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. SinhaP.K,*Computer Fundamentals.*
2. RajaramanV,*Fundamentals of Computers***,**Prentice Hall.

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	3	2	1	2	3	2	3	3	3	3	2
CO2	3	2	1	2	3	2	-	1	2	2	2	3	2	3	3
CO3	3	1	3	1	2	3	2	2	3	1	3	2	3	2	2
CO4	3	1	2	1	2	3	1	1	2	1	2	3	2	3	3
CO5	3	2	1	1	3	2	1	1	2	2	3	3	3	2	1
Average	**3**	**1.4**	**2.2**	**1.2**	**2.6**	**2.4**	**1.6**	**1.4**	**2.4**	**1.4**	**2.6**	**2.8**	**2.6**	**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: 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	Simplify Boolean expressions.
CO4	Understand of 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 Organisatio**n*.** Prentice-Hall of India.
3. William Stallings.(2002).*Computer Organisation 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	2	2	2	3	2	1	1	2	1	3	2	1	3	2
CO2	3	1	3	2	2	2	1	1	3	1	3	3	2	2	3
CO3	3	1	2	1	3	3	1	2	1	2	3	2	3	1	2
CO4	3	3	3	1	2	2	1	1	1	1	2	3	2	2	3
CO5	2	1	3	1	3	3	-	2	2	1	3	2	1	2	1
Average	**2.8**	**1.6**	**2.6**	**1.4**	**2.6**	**2.4**	**1**	**1.4**	**1.8**	**1.2**	**2.8**	**2.4**	**1.8**	**2**	**2.2**

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	Learn 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 protocols 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. (2010).*Computer Networks*, 3rd Edition, Pearson Prentice Ltd.
2. Behruoz A Forouzan.2009). *Data Communication and Networking*,4th Edition, Tata.
3. McGraw Hill, 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	3	1	1	2	2	2	3	1	3	1	3	2	1	1	3
CO2	1	2	3	3	3	3	1	2	3	2	3	3	2	2	1
CO3	2	2	3	2	3	2	1	1	1	2	2	3	3	3	2
CO4	1	3	3	3	2	3	1	1	2	3	2	2	2	2	3
CO5	3	3	1	2	3	2	2	2	3	3	3	3	1	2	3
Average	**2**	**2.2**	**2.2**	**2.4**	**2.6**	**2.4**	**1.6**	**1.4**	**2.6**	**2.2**	**2.6**	**2.6**	**1.8**	**2**	**2.4**

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	Know the functioning of the Operating System and various types of OS.
CO2	Analyze the various device and resource management techniques for timesharing and distributed systems.
CO3	Examine the mutual exclusion, deadlock detection and agreement protocols of distributed operating system.
CO4	Understands the use of different process scheduling algorithm and synchronization techniques to avoid deadlock.
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.

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	1	3	1	2	3	1	1	2	2	3	2	3	1	3
CO2	2	1	2	1	3	2	1	1	3	1	3	3	2	3	2
CO3	2	1	2	1	2	2	1	1	2	2	2	3	3	2	3
CO4	2	1	3	1	3	3	1	2	3	2	3	2	2	3	2
CO5	3	1	2	1	2	2	1	1	2	2	3	2	1	2	3
Average	**2.4**	**1**	**3**	**1**	**2.4**	**2.4**	**1**	**1**	**2.4**	**1.8**	**2.8**	**2.4**	**2.2**	**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-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	Familiarizing with Open Office (Word processing, Spreadsheets and Presentation).
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	3	2	2	1	3	2	2	1	2	1	3	2	3	2	1
CO2	3	1	1	1	1	2	2	-	1	2	1	2	2	3	2
CO3	3	2	1	2	2	2	1	1	2	1	1	3	1	2	3
CO4	2	1	1	1	2	2	1	1	2	2	2	3	3	2	3
CO5	3	1	2	2	1	2	1	1	2	3	3	2	1	3	2
Average	**2.8**	**1.4**	**1.3**	**1.4**	**1.6**	**2**	**1.4**	**1**	**1.8**	**1.8**	**2**	**2.4**	**2**	**2.4**	**2.2**

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

Course Name: S/W Lab-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	Design an algorithmic solution for a given problem.
CO2	Convert the C program for a given algorithm.
CO3	Debug a given Program.
CO4	Identify solution to a problem and apply control structures and use defined function for solving the problem.
CO5	Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.

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	1	3	1	2	2	1	1	2	1	2	2	2	3	2
CO2	3	2	2	1	2	3	1	1	2	1	3	2	3	2	3
CO3	3	3	3	3	3	2	2	1	3	3	2	3	2	1	1
CO4	3	2	1	2	3	3	1	1	2	1	3	2	1	3	3
CO5	3	1	2	1	3	2	2	1	3	1	2	3	3	2	1
Average	**3**	**1.8**	**2.2**	**1.6**	**2.6**	**2.4**	**1.4**	**1**	**2.4**	**1.4**	**2.4**	**2.4**	**2.2**	**2.2**	**2**

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 complexity.
CO2	Learn & implement searching and sorting techniques.
CO3	Attain knowledge of tree and graph concepts.
CO4	Implement link list and its applications in data structures.
CO5	Apply the different liner data structures like stack and queue to various computing problem.

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. SchaumSeries.*Data Structure***.**

2**.** NiclausWirth.*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	1	2	3	1	3	3	1	3	2	3	2	3	3	1
CO2	3	3	2	3	3	3	2	1	3	1	2	2	1	2	2
CO3	3	1	1	2	2	3	1	1	2	1	3	3	3	3	3
CO4	3	2	2	2	1	2	2	1	2	1	3	2	2	2	3
CO5	3	3	3	2	2	3	1	1	2	2	2	3	1	3	2
Average	**3**	**2**	**2**	**2.4**	**1.8**	**2.2**	**1.8**	**1**	**2.4**	**1.4**	**2.6**	**2.4**	**2**	**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	Solve the conversions of various number systems.
CO2	Learn the basic of Logic Gates.
CO3	Analyze and Design various combinational and sequential circuits.
CO4	Analyze and prevent various hazards and timing problems in a digital design.
CO5	Understand the basic digital circuits and to verify their operations.

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. Mano D. Morris,*Digital Circuits of logic design*, (PHI)
2. 2.T.C. Bartee.*Digital and electronic circuits* (McGraw Hill)

3. Malvino,*Digita. computer electronics*
4. Floyd.*Digital fundamentals*
5. Jain R.P.,*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	1	1	1	1	1	1	-	2	1	3	2	3	2	3
CO2	1	1	1	1	3	3	2	-	1	1	2	3	1	3	1
CO3	3	2	3	1	3	2	1	-	2	1	2	3	3	2	2
CO4	3	1	3	1	3	2	1	1	2	1	3	2	1	2	3
CO5	2	3	3	3	3	2	2	1	2	2	3	2	2	3	2
Average	**2.4**	**1.6**	**2.2**	**1.4**	**2.6**	**2**	**1.4**	**1**	**1.8**	**1.3**	**2.6**	**2.4**	**2**	**2.4**	**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	Develops an Entity-Relationship model based on user requirements.
CO2	Implements the role of the database administrator and his responsibilities.
CO3	Study the physical and logical database designs.
CO4	Apply Normalization techniques to normalize a database.
CO5	Declares and enforces integrity constraints on a database

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	3	1	3	1	3	2	2	-	3	1	3	2	2	1	2
CO2	3	1	1	1	1	2	1	-	2	1	3	2	3	2	3
CO3	3	2	1	1	1	2	1	-	2	1	2	2	2	1	2
CO4	3	2	2	2	2	2	1	1	3	1	2	2	3	2	3
CO5	3	2	2	2	2	2	1	1	3	1	2	2	1	3	2
Average	**3**	**1.6**	**1.8**	**1.4**	**1.8**	**2**	**1.2**	**1**	**2.6**	**1**	**2.4**	**2**	**2.2**	**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: 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	Recognize the basic HTML Tags, List, Types of lists, Adding graphics to HTML documents.
CO2	Apply knowledge to create tables, linking documents and frames.
CO3	Design forms with various attributes, Buttons, Text Area and 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

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

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

3.ElizabethCastro,*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	3	1	2	1	3	1	1	-	2	1	3	2	2	3	1
CO2	3	1	3	1	3	2	1	-	2	1	3	2	3	2	2
CO3	3	1	3	1	2	3	1	-	3	1	2	3	1	2	3
CO4	3	2	3	1	3	3	1	-	2	1	3	3	2	1	3
CO5	3	1	2	1	2	3	1	-	3	1	3	2	2	3	2
Average	**3**	**1.3**	**2.6**	**1**	**2.6**	**2.4**	**1**	**-**	**2.4**	**1**	**2.7**	**2..4**	**2**	**2.2**	**2.2**

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 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	1	3	1	3	3	1	-	2	1	3	2	2	3	2
CO2	3	3	3	3	3	3	1	-	2	1	3	2	3	1	3
CO3	3	3	3	2	2	2	1	-	2	1	2	3	1	2	1
CO4	3	2	3	2	3	2	-	-	2	1	3	2	2	3	3
CO5	3	3	3	2	3	2	1	-	2	1	3	2	2	1	2
Average	**3**	**2.4**	**3**	**2**	**2.7**	**2.4**	**1**	**-**	**2**	**1**	**2.7**	**2.2**	**2**	**2**	**2.2**

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

Course Name: S/W Lab-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	Populate and query a database using SQL DML/DDL commands.
CO2	Designs SQL queries to create database tables and make structural modifications.
CO3	Get practical knowledge on designing and creating relational database systems.
CO4	Design the concept of inbuilt functions.
CO5	Implement the concept of join, views and indexes.

Course Contents

1. Data Definition, Table Creation, Constraints,
2. Insert, Select Commands, Update and Delete Commands.
3. Nested Queries and Join Queries
4. Views
5. High level programming language extensions (Control structures, Procedures and Functions).
6. Front end Tools
7. Forms
8. Triggers
9. Menu Design
10. Reports.
11. 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	2	3	3	1	1	2	1	3	2	1	2	3
CO2	3	2	2	1	3	2	1	-	3	1	3	3	3	1	2
CO3	3	1	1	1	1	3	-	-	2	1	2	2	1	2	3
CO4	3	2	1	1	2	2	3	-	2	1	2	3	2	3	1
CO5	3	2	1	1	3	3	2	-	2	1	3	2	3	1	2
Average	**3**	**1.8**	**1.6**	**1.3**	**2.4**	**2.6**	**1.4**	**1**	**2.2**	**1**	**2.6**	**2.4**	**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: 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 basic HTML Tags, List and its types, Adding graphics to HTML documents .
CO2	Formulate a well formed valid XML document, DHTML.
CO3	Develop a dynamic webpage by the use of java script.
CO4	Develop website with the help of html Tags and CSS.
CO5	Design web pages that apply various dynamic effects on the web site.

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 bgcolor, 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	3	1	3	1	2	2	1	-	2	1	3	2	3	2	3
CO2	3	1	2	1	2	2	1	-	3	1	3	2	2	3	2
CO3	3	1	3	1	3	2	1	-	2	1	2	3	3	2	3
CO4	3	3	3	1	3	2	-	-	3	1	3	2	2	3	1
CO5	2	2	3	1	2	3	-	1	2	1	2	3	1	2	2
Average	**2.7**	**1.4**	**2.7**	**1**	**2.4**	**2.2**	**1**	**1**	**2.4**	**1**	**2.6**	**2.4**	**2.2**	**2.4**	**2.2**

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

Course Name: Object Oriented Programming Using C++

Course Code: A303301

Semester: 3rd

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Compare how C++ is more enhances language than c.
CO2	Creating simple programs using classes and objects in C++.
CO3	Develop applications using stream I/O and file I/O.
CO4	Implement copy constructor and class member function.
CO5	Analyze inheritance with the understanding of early binding and late binding.

Course Contents

Section –A

Introduction to C++: C++ standard library, Basics of a C++ Environment, Object Oriented Concepts, and Introduction to objects and object oriented programming, Abstraction, Encapsulation, Access Modifiers: controlling access to a class, method or variable (public, protected, private).

Classes and Data Abstraction: Introduction, structure definition, accessing members of a structure, class scope and accessing class members, separating interface from implementation, controlling access function and utility functions, Constructors, Destructors, friend function and friend classes, using "this" pointer, static class member, function overloading.

Operator Overloading: Introduction, fundamentals of operator overloading, restriction on operators overloading, operator function as class members vs. as friend functions, overloading unary operator, overloading binary operators.

Section-B

Inheritance : Introduction , inheritance: base class, protected members, casting base class pointer to derived- class pointers, using member functions, Types of Inheritance, public, protected and private inheritance, using constructors and destructors in derived classes, implicit derived class object to base class object conversion , composition Vs. inheritance.

Virtual Functions and Polymorphism: Introduction to virtual function, abstract base class and concrete class, polymorphism, dynamic binding, virtual destructor, Implementation in C++ using virtual function.

Files and I/O Streams: Files and streams, creating a sequential access file, reading data from A Sequential access file, updating Sequential Access file, Random Access File , Creating A Random Access File, Writing data Randomly To a random Access file, Reading Data Sequentially from A Random Access File.

Exception Handling: Introduction, Basic of C++ Exception Handling: Try, Catch, Throwing, Catching and Re–throwing an Exception, Exception specification, Processing Unexpected Exception.

Text Books:

1. LaforeRobert, *Object Oriented Programming in Turbo C++*,Pearson Education, New Delhi.
2. Kamthane, *Object Oriented Programming in Turbo C+ +*,Pearson Education, New Delhi.
3. H M Deiteland P J Deitel,*C + + How to Program*, Prentice Hall, India, New Delhi.
4. SchildtHerbert, *The Complete Reference in C++*,TMH, New Delhi.
5. RavichandranD,*Programming with C++*,TMH, New Delhi.
6. BalagurusamyE, *Object Oriented Programming with C++*,Tata McGraw- Hill, New Delhi.

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	2	1	2	1	1	1	2	1	1	1	3	3	1
CO2	2	3	2	2	2	1	1	1	2	1	2	2	3	2	2
CO3	3	2	1	2	2	1	1	1	1	2	2	2	3	2	3
CO4	3	2	2	1	2	1	1	1	2	1	2	2	2	3	3
CO5	2	3	2	2	3	2	1	1	1	2	1	2	3	3	2
Average	**2.6**	**2.2**	**1.8**	**1.6**	**2.2**	**1.2**	**1**	**1**	**1.6**	**1.4**	**1.6**	**1.8**	**2.8**	**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: System Analysis and Design

Course Code: A303302

Semester: 3rd

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Gather data to analyze and specify the requirements of a system.
CO2	Recognize system components and environments.
CO3	An understanding of the analysis and development techniques required as a team member of a medium-scale information systems development project;
CO4	Design a database for storing data, a user interface for data input and output, and controls to protect the system and its data.
CO5	A firm basis for understanding the life cycle of a systems development project.

Course Contents

Section-A

System Concepts: Definition, characteristics, elements & types of system.

System development life cycle: Recognition of need: Feasibility study, system analysis, introduction, information collection, interviews, questionnaires, observation, record searching and document analysis, analysis tools, data flow diagram, data dictionary, decision tree, structured English and decision table.

Section -B

System Design: The process and stages of systems design, input/output and file design; System Implementation: System implementation, system testing, implementation process and implementation methods, system maintenance.

References:

1. Awad Elias N.,*System analysis and design* (Galgotia)
2. Sen James A.,*Analysis and design of information system* (Tata McGraw)

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	1	2	1	1	2	1	1	1	1	3	3	1
CO2	1	2	2	2	2	2	2	1	2	1	1	2	2	1	2
CO3	3	3	3	2	2	1	1	1	2	1	2	2	3	3	3
CO4	2	3	2	1	2	1	1	1	2	1	2	1	2	3	3
CO5	2	3	3	2	2	1	1	1	2	1	2	1	1	2	2
Average	**2**	**2.6**	**2.2**	**1.6**	**0.8**	**0.8**	**0.8**	**0.8**	**1.8**	**1**	**1.6**	**1.9**	**2.2**	**2.4**	**2.2**

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

Course Name Design and Analysis of Algorithms

Course Code: 303306

Semester: 3rd

L T P

Credits: 04 **4 0 0**

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

CO	Statement
CO1	Analyze the performance of algorithms and choose appropriate algorithm design techniques for solving problems.
CO2	Compare between different data structures. Pick an appropriate data structure for a design situation.
CO3	Clear up troubles the usage of set of rules design methods including the grasping approach, divide and Conquer, dynamic programming, backtracking and department and certain.
CO4	Recognize the variations among tractable and intractable problems.
CO5	Analyze worst-case running times of algorithms using asymptotic analysis

Course Contents

Section-A

Introduction To Analysis of Algorithm :-Algorithm, analysis, Characteristics of an Algorithm, time complexity and space complexity, Well Known Asymptotic Functions & Notations, Big O-notation, Omega notation and theta notation, Sets and disjoint set, union and find algorithms, Heaps. Sorting in linear time.

Greedy Method :-General Strategy, Formalization of Greedy Technique, Knapsack problem, Job sequencing with Deadlines, Optimal merge patterns, Minimal Spanning Trees Prim's and Kruskal Algorithm and Dijkstra's algorithm.

Section-B

Dynamic Programming:-General Strategy, The Principle of Optimality, Multistage graphs, OBST, 0/1 Knapsack, Traveling Salesperson Problem, Make change Problem. Dynamic Programming: Flow Shop Scheduling, Chained Matrix Multiplication.

BacktrackingAndBranchAnd Bound:-Backtracking: General Strategy, 8 Queen's problem, Graph Coloring, Hamiltonian Cycles, 0/1 Knapsack, sum of subset. Branch and

Bound: General Strategy, 0/1 Knapsack, Traveling Salesperson Problem , recourse allocation problem

Text Books

1. Horowitz/Sahani,*Fundamentals of Computer Algorithms*, Galgotia Publication. (2006).
2. Sanjay Dasgupta,ChirostosPadadiminitriou, UmeshVazirani,*Algorithms*,TataMcgraw Hill, (2006).
3. Bressard, *Fundamental of Algorithm*, PHI.
4. Thomas H Cormen and Charles E.L Leiserson, *Introduction to Algorithm*,PHI.
5. Ahoand J.D. Ullman, *Design and Analysis of Algorithms*, 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	2	3	2	1	1	1	1	1	2	1	1	1	3	3	2
CO2	2	2	2	1	2	1	1	1	2	1	2	2	1	3	2
CO3	2	2	3	2	2	1	1	2	3	2	2	1	3	2	3
CO4	2	1	1	1	1	1	1	1	2	1	2	1	3	3	2
CO5	2	3	3	2	3	1	1	1	2	1	2	1	2	2	2
Average	**2**	**2.2**	**2.2**	**1.4**	**1.8**	**1**	**1**	**1.2**	**2.2**	**1.2**	**1.8**	**1.2**	**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 Artificial intelligence

Course Code: 303307

Semester: 3rd

L T P

Credits: 04 **4 0 0**

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

CO	Statement
CO1	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
CO2	Understand the basic principles of Artificial Intelligence in various applications.
CO3	Solve the problem Solving by Search.
CO4	Perform the knowledge representation, mapping and approaches to knowledge representation.
CO5	Implement the AI programming Languages using PROLOG.

Course Contents

Section- A

AI History and Applications: Defining AI: Acting Humanly (Turing Test Approach), Thinking Humanly(Cognitive Modeling Approach), Thinking Rationally (laws of thought approach), Acting Rationally(Rational Agent Approach); Foundations of Artificial Intelligence; History of AI, AI techniques, Expert Systems.

Problem Solving by Search: Defining the problem as a State Space Search Strategies: Breadth first Search, Depth- first search, Depth limited search, Iterative Depending depth first search. Heuristic Search Techniques: Hill Climbing, Simulated Annealing, Best First Search: OR Graphs, Heuristic Functions, A* Algorithm, AND –OR graphs, AO* Algorithm.

Section-B

Knowledge Representation: Representations and mappings, Approaches to knowledge Representation, Procedural versus Declarative knowledge; Predictive Logic: Representing Simple facts, Instance and Isa relationships in Logic, Proposition versus Predicate Logic, Computable Functions and Predicates- not, Rules of Inferences and Resolution-not, Forward versus Backward

Reasoning, Logic Programming and Horn Clauses. Weak slot and Filler Structure: Semantic Nets, Frames. Strong slot Filler Structures: Conceptual Dependency, scripts.

AI Programming Languages (PROLOG): Introduction, How Prolog works, Backtracking, CUT and FAIL operators, Built –in Goals, Lists, Search in Prolog. Foundations for Connectionist Networks, Biological Inspiration; Different Architectures and output functions: Feed forward, Feedback, Recurrent Networks, step, Sigmoid and different functions.

Text Books

1. Stuart Russel and Peter Norvig,*Artificial Intelligence – A Modern Approach*, 2nd Edition Pearson Education.
2. Elaine Rich and Kevin Knight,*Artificial Intelligence*, Tata McGraw Hill 2nd Ed.
3. N.P.Padhy,*Artificial Intelligence and Intelligent Systems*, Oxford Higher Education, OxfordUniversity Press.
4. Ivan Bratko,*PROLOG Programming***,** 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	2	1	1	1	2	1	1	1	1	1	1	1	2	3	2
CO2	1	2	2	1	1	1	1	1	1	1	1	1	1	2	3
CO3	1	1	2	1	1	2	1	2	2	1	1	1	2	2	1
CO4	1	1	1	1	1	1	1	1	2	1	1	1	2	2	3
CO5	1	2	2	1	1	1	1	1	2	1	1	1	3	3	2
Average	0.8	1.9	1.6	1	0.8	0.8	1	0.8	1.6	1	1	1	2	2.4	2.2

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

Course Name: Machine Learning

Course Code: 303308

Semester: 3rd

L T P

Credits: 04 **4 0 0**

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

CO	Statement
CO1	Recognize the basic concepts of Bayesian Decision Theory.
CO2	Apply structured thinking to unstructured problems.
CO3	Class conditional probability distributions.
CO4	Learn algorithmic topics of machine learning and mathematically deep enough to introduce the required theory.
CO5	Apply Multi-Layer Perceptions and Back Propagation learning.

Course Contents

Section- A

Overview and Introduction to Bayes Decision Theory: Machine intelligence and applications, pattern recognition concepts classification, regression, feature selection, supervised learning class conditional probability distributions, Examples of classifiers bayes optimal classifier and error, learning classification approaches.

Linear machines: General and linear discriminates, decision regions, single layer neural network, linear separability, general gradient descent, perception learning algorithm, mean square criterion and widrow-Hoff learning algorithm; multi-Layer perceptions: two-layers universal approximates, back propagation learning, on-line, off-line error surface, important parameters.

Section-B

Learning decision trees: Inference model, general domains, symbolic decision trees, consistency, learning trees from training examples entropy, mutual information, ID3 algorithm criterion, C4.5 algorithm continuous test nodes, confidence, pruning, learning with incomplete data

Instance-based Learning: Nearest neighbor classification, k-nearest neighbor, nearest neighbor error probability,

Machine learning concepts and limitations: Learning theory, formal model of the learnable, sample complexity, learning in zero-bayes and realizable case, VC-dimension, fundamental algorithm independent concepts, hypothesis class, target class, inductive bias, occam's razor, empirical risk, limitations of inference machines, approximation and estimation errors, Tradeoff.

Text Books

1.E. Alpaydin**,(** 2006) . *Introduction to Machine Learning*, Prentice Hall of India.

2. T. M. Mitchell (1997) .*Machine Learning*, McGraw-Hill

3.C. M. Bishop,(2006). *Pattern Recognition and Machine Learning*, Springer.

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	1	2	1	2	1	1	1	1	1	1	1	2	3	2
CO2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	3
CO3	1	1	1	1	1	1	1	1	-	1	-	-	2	3	3
CO4	1	1	1	-	-	-	1	1	-	1	-	-	3	3	3
CO5	1	1	-	-	1	1	1	1	-	-	1	-	2	2	2
Average	**0.8**	**1**	**1**	**0.6**	**1**	**1**	**1**	**1**	**0.4**	**0.8**	**0.6**	**0.4**	**2.2**	**2.4**	**2.6**

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

Course Name: Parallel Processing

Course Code: 303303

Semester: 3rd

L T P

Credits: 04 **4 0 0**

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

CO	Statement
CO1	Learn fundamental concepts of concurrency and parallelism.
CO2	Attain the major concepts and ideas in parallel computing and its applications.
CO3	Identify the basic "bottlenecks" encountered in parallel computing, e.g., I/O bottlenecks.
CO4	Measure runtime performance of parallel programs and improve performance bottlenecks.
CO5	Compare the various models of parallelism (e.g., shared versus distributed memory models) and their strengths and limitations.

Course Contents

Section -A

Introduction: Paradigms of parallel computing: Synchronous - vector/array, SIMD, Systolic; Asynchronous -MIMD,

Hardware taxonomy: Flynn's classifications, Handler's classifications.

Software taxonomy: Kung's taxonomy.

Abstract parallel computational models: Combinational circuits, Sorting network, PRAM models, Interconnection RAMs. Parallelism approaches - data parallelism, control parallelism

Performance Matrices: Laws governing performance measurements. Matrices - speedups, efficiency, communication overheads, single/multiple program performances.

Section-B

Parallel Processors: Taxonomy and topology - shared memory multiprocessors, distributed memory networks. Processor organization - Static and dynamic interconnections.Embeddings and simulations.

Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional programming.

Scheduling and Parallelization: Scheduling parallel programs, Loop scheduling, Parallelization of sequential programs, Parallel programming support environments.

References:

1. M. J. Quinn, (1994) Parallel Computing: Theory and Practice, McGraw Hill, New York.
2. T. G. Lewis and H. El-Rewini, (1992) *Introduction to Parallel Computing*, Prentice Hall, New Jersey.
3. T. G. Lewis, (1994) *Parallel Programming: A Machine-Independent Approach*, IEEE Computer Society Press, Los Alamitos.

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	1	-	1	-	1	1	1	-	1	-	1	3	3	2
CO2	3	1	1	1	1	1	1	1	1	1	-	-	3	2	1
CO3	1	1	1	1	-	1	1	1	-	1	-	1	2	2	3
CO4	1	1	1	-	-	1	1	1	-	1	-	-	2	3	2
CO5	1	1	1	-	-	1	1	1	-	1	1	1	3	2	3
Average	**1.6**	**1**	**0.8**	**0.6**	**0.2**	**1**	**1**	**1**	**0.2**	**1**	**0.2**	**0.6**	**2.6**	**2.4**	**2.2**

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

Course Name: S/W Lab-VI (Object Oriented Programming using C++)

Course Code: A303305

Semester: 3rd

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	Apply the major object oriented concept to implement object oriented programs.
CO2	Examine problem solving with concept of array and string.
CO3	Analyze a problem and construct a C++ program that solves it.
CO4	Implementation of constructors with classes.
CO5	Apply fundamental algorithmic problems including inheritance, and polymorphism.

Course Contents

1. Program to show the of use cin, cout
2. Program to implement the operators
3. Program based on decision making statement (if else)
4. Program based on the loops(while,do while)
5. Program based on loops(for),switch statement
6. Program based on structures and enumerated data types
7. Program based functions, overloaded functions
8. Program to show usage of storage classes.
9. Program to show usage of function overloading, default arguments
10. Program to show usage of classes, objects
11. Program to show usage of constructors, destructors
12. Program to manipulate arrays and array of objects
13. Program to manipulate strings.
14. Program to show usage of inheritance of various type (multiple,multilevel etc.)
15. Program to show usage of unary operator overloading
16. Program to show usage of binary operator overloading
17. Program for conversion from basic to user defined data type
18. Program for conversion from user defined to basic

19. Program to show usage of basics of pointers
20. Program to show usage of pointers and arrays.
21. Program to show usage of pointers, function arguments
22. Program to show usage of new, delete, memory management
23. Program to show usage of virtual function
24. Program to show usage of friend, static function
25. Program to show usage of overloaded assignment operator, this pointer
26. Program to read & write contents of a text file
27. Program to show usage of file pointers.
28. Program to show usage of command line arguments
29. Program to show usage of overloading of right & left shift operators.
30. Program to show usage of exception handling mechanism
31. Program to show usage of uncaught exception(), the exception and bad exception classes
32. Program to show usage of templates
33. Program to show usage of generic classes
34. Implementation of File handling
35. Implementation of Wrapper classes

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	1	1	1	-	1	-	1	1	1	-	1	3	3	1
CO2	2	1	1	-	1	-	-	1	-	1	-	1	3	2	2
CO3	2	3	1	1	1	1	1	1	1	1	1	1	2	2	3
CO4	1	1	1	1	1	-	1	-	-	1	-	1	2	2	3
CO5	1	1	1	-	-	1	-	1	-	1	1	1	2	3	3
Average	**1.6**	**1.9**	**1**	**0.6**	**0.6**	**0.6**	**0.4**	**0.8**	**0.4**	**1**	**0.4**	**1**	**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: S/W Lab VII (Workshop on Java Programming)

Course Code: (303309)

Semester: 4th

L T P

Credits: 03 **0 0 6**

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

CO	Statement
CO1	Get knowledge about the structure and model of the Java programming language.
CO2	Implement the Java programming language for various programming technologies
CO3	Develop software in the Java programming language, (application).
CO4	Read and make elementary modifications to Java programs that solve real-world problems.
CO5	Gets learning ability to connect Java programs to database using JDBC.

Course Content

1. Writing Java programs by making use of class, interface, package, etc for the following
   - Different types of inheritancestudy
   - Uses of „this‟keyword
   - Polymorphism
   - Creation of user specificpackages
   - Creation of jar files and usingthe

2. Writing window based GUI applications using frames and applets such as Calculator application, Fahrenheit to Centigrade conversion etc.
3. Application of threads examples
4. Create a Personal Information System using Swing
5. Event Handling in Swing
6. Reading and writing text files
7. Writing an RMI application to access a remote method
8. Writing a Servlet program with database connectivity for a web based application such as students result status checking, PNR number enquiry etc.
9. Creation and usage of Java bean
10. Create an Application to search Phone Number using contact Name Using Hash Map.
11. Create an Application which finds the Duplicates in E-mail using Set Interface.
12. FTP Using Sockets.

User specific exception handling

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	1	2	1	2	1	-	2	1	1	1	1	2	2	1
CO2	1	2	3	2	2	1	-	1	2	2	1	3	2	2	2
CO3	2	1	1	1	1	1	1	1	1	1	1	1	1	3	3
CO4	2	1	1	1	2	1	-	1	1	2	1	-	2	3	2
CO5	3	2	1	1	2	1	-	1	2	1	2	1	2	3	2
Average	2	1.9	1.6	1.2	1.8	1	0.2	1.2	1.9	1.9	1.2	1.2	1.8	2.6	2

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

Course Name: Computer Graphics and Multimedia

Course Code: A303401

Semester: 4th

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Recognize various input/output devices used for Computer Graphics.
CO2	Understand the application of computer graphics concepts in the development of computer games, information visualization, and business applications.
CO3	Implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
CO4	Create, edit, and optimize graphic images for use in various multimedia applications and the various delivery possibilities;
CO5	Relate the primary features of pixel resolution and color depth issues of graphics development to multiple modes of delivery

Course Contents

Section -A

Input devices: Keyboard, Touch panel, light pens, Graphic tablets, Joysticks, Trackball, Data glove, Digitizers, Image scanner, Mouse, Voice & Systems.

Hard copy devices: Impact and non-impact printers, such as line printer, dot matrix, laser, inkjet, electrostatic, flatbed and drum plotters.

Video Display Devices Refresh cathode ,ray tube, raster scan displays, random scan displays, color CRT, monitors, direct view storage tube, flat, panel displays; 3,D viewing devices, raster scan systems, random scan systems, graphics monitors and workstations.

Scan conversion algorithms for line, circle and ellipse, Bresenham's algorithms, area filling techniques, character generation.

Section -B

2Dimensional Graphics: Cartesian and Homogeneous coordinate system, Geometric transformations (translation, Scaling, Rotation, Reflection, Shearing), Two-dimensional viewing transformation and clipping (line, polygon and text).

3Dimensional Graphics: Geometric transformations (translation, Scaling, Rotation, Reflection, Shearing), Mathematics of Projections (parallel & perspective). 3D viewing transformations and clipping.

References:

1. D. Hearn and M.P. Baker(1995)*Computer Graphics*, PHI New Delhi;Second Edition,
2. J.D. Foley, A.V. Dam,(1994) *Introduction to Computer Graphics*,S.K. Feiner,J.F. Hughes, Addison,Wesley Publishing company,R.L. Phillips. N.Y.; Second Edition.
3. R.A. Plastock and G. Kalley,(1986) *Computer Graphics*, McGraw Hill.

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	2	1	2	1	-	2	2	1	1	1	2	3	2
CO2	2	1	2	1	2	1	-	1	2	1	1	1	3	1	1
CO3	2	2	2	1	1	1	1	1	1	1	1	1	2	3	3
CO4	2	1	1	1	1	1	1	1	1	1	1	1	2	3	3
CO5	2	2	2	1	2	2	-	2	2	1	1	1	2	2	3
Average	**2.2**	**1.6**	**1.8**	**1**	**1.6**	**1.2**	**0.4**	**1.9**	**1.6**	**1**	**1**	**1**	**2.2**	**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: Software Engineering

Course Code: A303402

Semester: 4th

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
CO2	Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
CO3	Communicate effectively with a range of audiences
CO4	Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
CO5	Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objective.

Course Contents

Section- A

Introduction: Programs Vs. Software Products, Emergence Of Software Engineering, Software Life Cycle, Models; Waterfall, Prototype, Evolutionary And Spiral Model, Software Characteristics, Applications, Software Crisis.

Software Project Management: Project Management Concepts, Software Process And Project Metrics Project Planning, Project Size Estimation Metrics, Empirical Estimation Techniques, Cocomo, A Heuristic Estimation Techniques, Staffing Level Estimation, Team Structures, Staffing, Risk Analysis And Management, Project Scheduling And Tracking.

Requirement Analysis And Specification: Requirements Engineering, Partitioning Software, Prototyping, Prototyping Methods And Tools, Specification Principles, Representation, The Software Requirements Specification And Reviews, Analysis Modeling,

Section-B

Testing And Maintenance: Software Testing Techniques, Software Testing Fundamentals: Objectives Principles, Testability; Test Case Design, Unit Testing: White Box Testing, Basis Path Testing: Control Structure Testing: Black Box Testing, Testing For Specialized Environments, Architectures And Applications. Software Testing Strategies; Verification And Validation, Integration Testing, Validation Testing, Alpha And Beta Testing, System Testing: Recovery Testing, Security Testing, Stress Testing, Performance Testing; The Art Of Debugging, Process Debugging Approaches. Software Re-Engineering: Reverse Engineering, Restructuring, Forward Engineering.

Software Reliability And Quality Assurance: Quality Concepts, Software Quality Assurance: Sqa Activities; Software Reviews; Cost Impact Of Software Defects, Defect Amplification And Removal; Formal Technical Reviews: The Review Meeting, Review Reporting Record Keeping, Review Guidelines; Formal Approaches To Sqa;

Text Book/Reference Books:

1. Roger S. Pressman, *Software Engineering - A Practitioner's Approach*,MGH Publications, New Delhi.
2. Ian Summerville, *Software Engineering*,5th Edition, Pearson Education, New Delhi.
3. PankajJalote, *an Integrated Approach to Software Engineering*, Narosa Publications, New Delhi.
4. Rajib Mall, *Fundamentals of Software Engineering*, PHI, New Delhi.
5. Ali Bethforooz and Frederick J. Hudson, *Software Engineering Fundamentals*, Oxford University.

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	1	2	1	-	1	2	1	1	1	2	2	1
CO2	2	2	3	2	2	2	2	2	2	2	2	2	1	3	2
CO3	2	2	1	1	1	1	1	1	1	3	1	1	2	3	1
CO4	2	1	2	1	2	1	1	1	2	2	2	2	2	2	3
CO5	2	1	1	2	2	2	-	2	3	1	1	2	1	2	1
Average	**2**	**1.6**	**1.8**	**1.9**	**1.6**	**1.9**	**0.8**	**1.9**	**2**	**1.8**	**1.9**	**1.6**	**1.6**	**2.4**	**1.6**

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

Course Name: System Software

Course Code: A303408

Semester: 4th

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Understand the structure and design of assemblers, linkers and loaders.
CO2	Communicate with Assembler and macro processor for simple assembly level language.
CO3	Analyze the basics of system programs like editors, compiler, and debugger.
CO4	Understand the concepts and theory behind the implementation of high level programming languages.
CO5	Develop code of assembly language programs and macro.

Course Contents

Section- A

Introduction to software processors; elements of assemble language programming; assembly scheme; single pass and two pass assembler; general design procedure of a two pass assembler

Software Tools: Text editor and its design. Macros and microprocessor: macro definition, macro expansion, Nested macro calls, features of macro facility, design of a macro pre-processor.

Interpreters: use of interpreter, pure and impure interpreter

Loaders: Compile and go loader, Absolute loader, Relocating loader, and direct linking loader.

Section-B

Compilers: Aspects of compilation, lexical analysis, syntax analysis, memory allocation, compilation of expressions; intermediate code for expressions, compilation of control structures, Code optimization – local and global optimization. Linkers – translated linked and load time addresses, relocation and linking concepts. Design of a linker, self relocating programs.Basic concepts of an operating system and its functions.

Memory management: contiguous, non-contiguous memory allocation, Paged allocation, Demand paged allocation, segmented paged allocation.

Processor management: Scheduler, traffic controller, race condition. Information management: Structure and features of file systems, objectives of segmented environment.

References:

1. Dhamdhere, *Systems Programming and operating systems*, TMH.

2. Donovan,*System Programming*, (MC Graw Hill)

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	1	2	1	2	1	-	1	2	1	1	1	2	2	3
CO2	2	1	1	1	1	1	-	1	2	1	1	1	2	2	2
CO3	2	1	1	2	1	1	1	2	1	2	1	1	2	1	3
CO4	2	1	1	1	1	1	2	1	1	1	2	1	1	2	3
CO5	2	2	2	1	2	2	-	2	2	2	2	2	2	2	1
Average	**2**	**1.2**	**1.9**	**1.2**	**1.9**	**1.2**	**0.6**	**1.9**	**1.6**	**1.9**	**1.9**	**1.2**	**1.8**	**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: Mobile Applications Development

Course Code: 303408

Semester: 4th

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Apply knowledge of fundamentals Java for android application development.
CO2	Implement the Apple and Window mobile OS Architecture.
CO3	Learn the activity life cycle.
CO4	Design the android application Using UI resources, string resources, Image resources.
CO5	Define event handling.

Course Content

Section-A

Android Basics

Fundamentals of Java for Android Application Development, Introduction to Mobility, Mobile Platform, App development approaches, Android Platform Architecture, Development Environment for Android, Android app project structure, Logical components of Android app, Android Tool Repository, Introduction of Apple and Window mobile OS Architecture

UI Components & Event Listeners

Activity life cycle, UI resources, String resources, Image resources, Common attributes of View, Event handling associated with Button, Edit Text, Checkbox, List View, Image View, Alert Dialog, Navigation between Activities, Fragments, Life cycle of Fragment, Interaction between Fragments, Action Bar, Menu, Introduction to Material Design Pattern, Layouts, Recycler View, Fragments, Intents

Section-B

Data Storage Management

Internal and External File storage Operation, Shared Preference, SQLite database, Remote database operations, Notification, Thread, AsynTask, JSON data access.

Graphics Animations & Multimedia

Graphics and Animation, Multimedia, Audio, Video, Camera

Text Book:

1. Joseph AnnuzziJr, Lauren Darcey, Shane Condor,((2016)*Android Application Development***,** *Android Essentials*, 5th Edition, Pearson Education.
2. Jonathan Simon, *Head First Android Development*, O'Reilly Media, Inc.,
3. *Beginning Android™ Application Development*, Published by Wiley

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	2	1	2	1	-	2	1	1	1	1	3	2	3
CO2	1	1	2	1	1	1	-	1	2	1	1	1	2	3	2
CO3	2	1	2	2	1	1	1	1	1	1	1	2	2	2	3
CO4	2	2	3	2	2	1	1	1	1	2	1	1	2	2	2
CO5	2	1	1	1	1	1	-	1	1	1	1	1	2	3	2
Average	**2**	**1.9**	**2**	**1.9**	**1.9**	**1**	**0.4**	**1.2**	**1.2**	**1.2**	**1**	**1.2**	**2.2**	**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: Data Mining

Course Code: 303410

Semester: 4th

L T P

Credits: 04 **4 0 0**

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

CO	Statement
CO1	Extract knowledge using data mining techniques.
CO2	Identify the various Data warehouse Models & Architecture.
CO3	Analyze the Association rules of Data Mining.
CO4	Learn various Classification & Prediction Data Mining Techniques.
CO5	Explore recent trends in data mining such as web mining, spatial-temporal mining

Section A

Introduction to data mining Data mining primitives, Techniques:- Clustering, classification, association rules, linear and multiple regression, Feature selection, Mining text databases, multimedia databases, data pre-processing: data summarization, data cleaning ,data reduction. Text Mining, Mining Spatial ,Data Mining Application

Mining Frequent Pattern

Basic concept, market basket analysis ,frequent pattern mining, frequent itemset mining methods, mining frequent itemset using candidate generation, mining frequent itemset without candidate generation methods, mining various kind of association rules.

Section B

What is cluster analysis, types of cluster analysis ,a categorization of major clustering method ,partition, hierarchical ,density based, grid based method, outlier analysis

Text Books:

1. Margaret H. Dunham, (2002). *Data Mining: Introductory and Advanced Topics*.

2. Jiawei Han and MichelineKamber,((2006). *Data Mining: Concepts and Techniques*(2nd ed.), Morgan Kaufmann,

3. ArunPujari, *Data Mining Techniques*, University Press.

4. D. Hand, H. Mannila and P. Smyth, (2001).*Principles of Data Mining*, Prentice-Hall of India.

5. G.K. Gupta, (2006). *Introduction to Data Mining with Case Studies*, Prentice-Hall of India.

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	1	2	1	3	1	-	1	2	1	2	1	2	2	2
CO2	2	1	1	1	1	1	1	1	2	1	1	1	3	2	2
CO3	2	3	1	1	1	1	1	1	1	2	1	1	1	3	2
CO4	2	2	1	1	1	1	-	1	1	1	1	1	3	3	1
CO5	2	2	2	1	1	1	-	1	1	1	1	1	3	2	2
Average	**2**	**1.8**	**1.9**	**1**	**1.9**	**1**	**0.4**	**1**	**1.9**	**1.2**	**1.2**	**1**	**2.4**	**2.4**	**1.8**

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

Course Name: Big Data

Course Code: 303411

Semester: 4th

L T P

Credits: 04 **4 0 0**

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

CO	Statement
CO1	Recognize basic concept of Big Data.
CO2	Compare conventional and modern analytical tools.
CO3	Understand basic concepts of Statistics.
CO4	Access and Process Data on Distributed File System.
CO5	Learn various Filtering Stream algorithms.

Course Contents

Section-A

Introduction to Big Data : Introduction to Big Data Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error

Mining Data Streams: Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – EstimatingMoments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP)Applications – Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

Section-B

Hadoop Environment : History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Hadoopfilesystems-Java interfaces to HDFS- Basics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce

Features - Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation – Hadoop Configuration-Security in Hadoop

Data Analysis Systems and Visualization : Link Analysis – PageRank - Efficient Computation of PageRank- Topic-Sensitive PageRank – Link Spam- Recommendation Systems- A Model for Recommendation Systems- Content-Based Recommendations - Collaborative Filtering- Dimensionality Reduction- Visualizations - Visual data analysis techniques-interaction techniques- Systems and applications.

Text Books:

1. Chris Eaton, Dirk deroos et al. (2012). *Understanding Big data* , McGraw Hill
2. SimaAcharya, SubhashiniChhellappan, *BIG Data and Analytics* ,Willey.
3. Kyle Banker,PiterBakkum , Shaun Verch, *MongoDB in Action*, Dream tech Press.
4. Tom White, *HADOOP (*2012).*The definitive Guide*, O Reilly.

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	1	1	1	1	1	-	1	1	1	1	1	1	3	1
CO2	2	1	1	1	1	1	1	1	1	1	1	3	1	3	2
CO3	1	1	1	-	-	1	-	-	-	1	1	1	2	1	3
CO4	2	1	1	1	-	1	-	1	2	2	1	1	2	3	3
CO5	2	2	2	1	2	1	-	1	2	1	1	1	2	3	1
Average	**1.6**	**0.8**	**1.2**	**0.8**	**0.8**	**1**	**0.2**	**0.8**	**1.2**	**1.2**	**1**	**1.9**	**1.6**	**2.6**	**2**

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

Course Name: Advanced Database Management System

Course Code: -303412

Semester: 3rd

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Learn the basic concepts and explore the applications of database systems.
CO2	Understand the basics of SQL and construct queries using SQL.
CO3	Make familiar with a commercial relational database system (Oracle) by writing SQL using the system.
CO4	Get knowledge of the relational database theory, and be able to write relational algebra expressions for queries.
CO5	Grasp the design principles for logical design of databases, including the E-R method and normalization approach.

Course Contents

Section - A

Introduction: Overview of Database Management System: Various views of data Models, Schemes and Introduction to database Languages & Environments, Advantages of DBMS over file processing systems, Responsibility of Database Administrator. Three level architecture of Database Systems. Data Models: E-R Diagram (Entity Relationship), mapping Constraints, keys, Reduction of E-R diagram into tables.

Normalization: Integrity constrains, functional dependencies & Normalization, 1st, 2nd, 3rd and BCNF.

Network, Hierarchical and Relational Data Models: Network Models, Hierarchical Models, Relational Models, Relational Algebra & various operations (set operations, select, project, join, division), Order.

Section - B

Security and Recovery in Database: Database protection: Recovery, concurrency,

security, integrity and control

Parallel and Distributed Databases and Client-Server Architecture: Architecture for parallel database; Distributed database concepts, Data fragmentation, Replication, and allocation techniques, Overview of Client-Server Architecture.

Enhanced Data Models for Advanced Applications: Active database concepts, Temporal database concepts, Spatial databases, Deductive databases; Emerging Database Technologies: Mobile databases, Multimedia Databases

SQL: Introduction and Basic commands of SQL.

Text Books/ Reference Books:

1. ElmasriRamez,NavatheShamkant B.(2007). *Fundamentals of Database Systems*, 5thEdition,Pearson Education, New Delhi.

2.Date C.J.,(2002) *An Introduction to Database Systems*, 7th Edition, Pearson Education, New Delhi.

3. Silberschatz A., Korth H.F., Sudarshan S., *Database System Concept*", 3rd Edition, McGraw-Hill, InternationalEdition.

4.HansenG.W,(1999) *Database Management and Design*, 2nd Edition, Prentice-Hall of India, NewDelhi.

5.MajumdarA,.K., Bhattacharyya P(2007)*Database Management Systems*5th Edition, Tata McGraw-Hill Publishing Company, NewDelhi.

6.. Data,C. and Darwen, H.(2003) *A Guide to the SQL Standard*3rd Edition, Addison- Wesley Publications, NewDelhi.

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	1	2	1	-	2	1	1	1	1	1	2	2
CO2	2	3	3	2	2	1	1	1	1	2	1	1	3	3	1
CO3	2	1	1	1	1	1	-	1	2	1	2	1	3	3	3
CO4	1	1	1	1	1	1	1	1	2	1	1	1	2	2	3
CO5	1	2	1	1	1	1	-	2	1	1	2	2	3	3	2
Average	1.6	1.8	1.6	1.2	1.9	1	0.4	1.9	1.9	1.2	1.9	1.2	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: S/w Lab-VIII (Computer Graphics using C)

Course Code: A303405

Semester: 4th

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	Implement algorithmic development of graphics primitives like: line, circle etc.
CO2	Design scans conversion problems using C++ programming.
CO3	Implementation of various scan & clipping algorithms.
CO4	Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
CO5	Learn various algorithms for scan conversion and filling of basic objects and their comparative analysis.

Course Contents

Implement the Following Algorithms using C/C++.

1. Line Drawing Algorithm like DDA, Bresenham.
2. Draw a circle using Bresenham Algorithm.
3. Draw an ellipse using Bresenham Algorithm.
4. To move a character along circle.
5. To rotate a character.
6. To show 2D Clipping and Windowing.

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	1	2	1	-	2	1	1	1	1	1	2	2
CO2	2	3	3	2	2	1	1	1	1	2	1	1	3	3	1
CO3	2	1	1	1	1	1	-	1	2	1	2	1	3	3	3
CO4	1	1	1	1	1	1	1	1	2	1	1	1	2	2	3
CO5	1	2	1	1	1	1	-	2	1	1	2	2	3	3	2
Average	**1.6**	**1.8**	**1.6**	**1.2**	**1.9**	**1**	**0.4**	**1.9**	**1.9**	**1.2**	**1.9**	**1.2**	**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: S/w Lab-IX (Mobile Applications Development)

Course Code: 303409

Semester: 4th

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	Install and configure the android application.
CO2	Recognize design and develop user interfaces for the Android Platform.
CO3	Build user interfaces using views, Menus, and notifications.
CO4	Saving Key-value pairs of the simple data type.
CO5	Learning Android Emulator to emulator Android apps on various devices.

Course Contents

List of Experiments:

1. Installing Android Machine
2. Creating a simple "Hello World" application
3. Adding an action bar to android app to make application interactive
4. Build user interfaces using Views, Menus and Notifications
5. Saving key-value pairs of simple data types in a shared preferences file and saving arbitrary files in Android's file system.
6. Handle file operations in Android application program.
7. Build an android application with multiple screens.
8. Learning Android Emulator to emulate android apps on various devices.
9. Use of Internal Intents to perform basic interaction with apps.
10. Use of External Intents to perform basic interaction with apps.
11. Using Android styles and themes to make application
12. Learn to use Android Debug Bridge to debug system and application.

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	1	2	1	2	1	-	2	1	1	1	1	2	2	1
CO2	1	2	3	2	2	1	-	1	2	2	1	3	2	2	2
CO3	2	1	1	1	1	1	1	1	1	1	1	1	1	3	3
CO4	2	1	1	1	2	1	-	1	1	2	1	-	2	3	2
CO5	3	2	1	1	2	1	-	1	2	1	2	1	2	3	2
Average	**2**	**1.9**	**1.6**	**1.2**	**1.8**	**1**	**0.2**	**1.2**	**1.9**	**1.9**	**1.2**	**1.2**	**1.8**	**2.6**	**2**

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

Course Name: Major Project

Course Code: A303407

Semester: 4th

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	Construct a Java class based on a UML class diagram.
CO2	Implements the programming language concepts and basics of Software Development Life Cycle model for the implementation of the project.
CO3	Plan, analyze, design and implement a software project using SDLC model
CO4	Learn the work as a team and to focus on getting working project done within a stipulated period of time.
CO5	Problem identification, formulation and solution.

Note: The marks distribution for the practical will be as under

- Viva Voce 10 marks
- System development 30 marks

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	1	2	2	2	2	1	1	1	1	1	1	2	2	1
CO2	2	2	3	2	2	1	1	1	2	2	2	2	3	3	2
CO3	2	2	2	2	2	2	1	2	2	1	2	1	3	2	3
CO4	2	1	2	2	2	1	1	1	3	2	3	2	1	2	3
CO5	2	3	2	2	1	2	-	2	2	1	1	1	3	2	2
Average	**2**	**1.8**	**2.2**	**2**	**1.8**	**1.6**	**0.8**	**1.9**	**2**	**1.9**	**1.8**	**1.2**	**2.4**	**2.2**	**2.2**

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

Total Number of Course	32
Number of Theory Course	22
Number of Practical Course	10
Total Number of Credits	103

Annexure-4

Academic Instructions

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.