MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL – 624 102

MCA SYLLABUS

(FROM JUNE 2018-2019 ONWARDS)

COURSE OBJECTIVES

1. To develop academically competent and professionally motivated Computer professionals equipped with specific Goals, critical thinking and ethical values.

2. To produce Industry standard and employable Computer Professionals with sound knowledge on Computer Applications and related subjects.

3. To develop skilled manpower in the various areas of Computer Applications Software Development, Computer-Languages, Software engineering, Data base management, Web based applications etc.

SPECIFIC OUTCOMES FOR MCA

PSO1: Understand of the Opportunities and Challenges in Industry enabled Computers Applications.

PSO2: Apply effectively the principles and methods of Computer Technology to a wide range of applications.

PSO3: Design and implement software systems that meet specified design, development and Performance requirements

PSO4: Develop foundational and advanced skills to install and maintain computer the Software problems.

PSO5: Apply advanced algorithmic and mathematical concepts to the design and analysis of software.

PSO6: Adhere to do higher studies or progress as an entrepreneur.

PSO7: Get confidence to avail opportunity and get succeed in IT industry.

PSO8: Get proficiency of computing, and to prepare themselves for a continued professional development.

PSO9: Apply sound principles to the synthesis and analysis of computer systems

C/E	SUBJECT CODE	THEORY/PRACTICAL	SUBJECT NAME	TOTAL HOURS	CREDIT
FIRST SEMESTER					
C	PCAT11	Theory	C and Data Structures	4	4
C	PCAT12	Theory	System Software	4	4
C	PCAT13	Theory	Digital Principles & Computer Organization	4	4
C	PCAP11	Practical	C Programming Lab	6	5
C	PCAP12	Practical	Microprocessor Lab	6	4
E	PCAE11	Theory	Elective-I	4	4
SECOND SEMESTER					
C	PCAT21	Theory	Programming in C++	4	4
C	PCAT22	Theory	Operating System	4	4
C	PCAT23	Theory	Multimedia and Applications	4	4
C	PCAP21	Practical	C++ Programming Lab	6	5
C	PCAP22	Practical	Multimedia Lab	6	4
E	PCAE22	Theory	Elective-II	4	4
THIRD SEMESTER					
C	PCAT31	Theory	JAVA Programming	4	4
C	PCAT32	Theory	Software Engineering	4	4
C	PCAT33	Theory	Mathematical Foundation of Computer Science	4	4
C	PCAP31	Practical	JAVA Programming Lab	6	5
C	PCAP32	Practical	Object Oriented Programming Lab	4	4
E	PCAE33	Theory	Elective-III	4	4
FOURTH SEMESTER					
C	PCAT41	Theory	RDBMS	4	4
C	PCAT42	Theory	Computer Networks	4	4
C	PCAT43	Theory	Computer Graphics	4	4
C	PCAP41	Practical	RDBMS Lab	6	5
C	PCAP42	Practical	Python Lab	4	4
E	PCAE44	Theory	Elective-IV	4	4
FIFTH SEMESTER					
C	PCAT51	Theory	Web Programming	4	4
C	PCAT52	Theory	Data Mining	4	4
C	PCAT53	Theory	Digital Image Processing	4	4
C	PCAP51	Practical	Web Programming Lab	6	5
C	PCAP52	Practical	Mini Project	4	4
E	PCAE55	Theory	Elective-V	4	4
SIXTH SEMESTER					
C	PCAP61	Project	Major Projects	20	15
			Total Hours	150	
			Total Credits		140

ELECTIVE PAPER LIST

1. **ACCOUNTING AND FINANCIAL MANAGEMENT**
2. **NUMERICAL METHODS**
3. **OBJECT-ORIENTED ANALYSIS AND DESIGN**
4. **RESOURCES MANAGEMENT TECHNIQUES(OR)**
5. **PRINCIPLES OF COMPLIER DESIGN**
6. **CLOUD COMPUTING**
7. **MOBILE COMPUTING**
8. **SOFTWARE PROJECT MANAGEMENT**
9. **NETWORK SECURITY**
10. **ADVANCED DATABASES**
11. **PARALLEL PROCESSING**
12. **MANAGEMENT INFORMATION SYSTEM**

SCHEME OF EXAMINATION

Internal (Theory) - **25**

Test - **15**

Attendance - **5**

Assignment / Technical Quiz - **5**

Total - **25**

External (Theory) - **75**

The Internal assessment for Practical : 25

The External assessment for Practical : 75

QUESTION PATTERN

1.	**PART A**	**10*1 Marks=10** **(Objective Type/Multiple Choice)** 2 Question from each Unit	**10**
2.	**PART B**	**5*4 Marks =20** (From each Unit Either or Choice)	**20**
3.	**PART C**	**3*15 Marks =45** **(Open Choice)** (Any three Question out of 5,onequestion from each unit)	**45**
		Total	**75**

PCAT11	C AND DATA STRUCTURES		
	Semester I	**Credits: 4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:** Analyze		
Objectives	1. To understand and develop well-structured C programs. 2. To provide the foundation and practical implementation of Algorithms 3. To familiarize with linear and non-linear data structures 4. To construct the Problem solving Skills using C Language		

UNIT I:

Introduction to Programming – Features of good programming – Introduction to C Language – Program Structure of C – components of a program: tokens, variables, statements – Types of Statements: Sequence, Selection and Looping

UNIT II:

Functions-User defined and standard functions, Formal and Actual arguments, Functions category, function prototypes, parameter passing, Call-by-value, Call-by-reference, Recursion, Storage Classes.

Arrays and Strings- One dimensional Array, Multidimensional Array declaration and their applications, String Manipulation.

UNIT III:

Pointers : Pointer variable and its importance, Pointer Arithmetic, passing parameters by reference, pointer to pointer, linked list, pointers to functions, dynamic memory allocation.

Structures, Unions: Declaration of structures, declaration of unions, pointer to structure &unions.

File Handling: Console input output functions, Disk input output functions, Data files.

UNIT IV:

Data Structures: Arrays - Representation of arrays, Sparse matrices-Multi-dimensional Arrays.

Stack: Definition & Implementation of Stack – Applications of Stack

Queues: Definitions & Implementations of Queues-Circular queues-Application of Queues

UNIT V:

Linked Lists: Introduction – Single Linked List – Circular Linked List- Doubly Linked list - Applications of Lists Binary Trees– Representation of Binary Tree – Binary Tree Traversal .

Applications Graphs: Definitions-Undirected & Directed Graphs- Traversal.

TEXT BOOKS:

1. E.Balagurusamy, "Programming in C" – Edistion – McGraw Hill Publication
2. Robert L Kruse- "Data Structures & Program Design"- 2nd edition2001- Pearson education

REFERENCES BOOKS:

1. Dromey- "Problem Solving & Algorithm Design", Pearson Education India, 2008
2. How to Solve It by Computer (Prentice-Hall International Series in Computer Science) by R.G. Dromey(Jul 1982)
3. Ellis Horowitz &SartajSahni- "Fundamentals of Data Structures", Computer Science press, 1983. 5. Anton Spraul, "Think Like a Programmer: An Introduction to Creative Thinking", No Starch Press, 2012.

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Understand the flow of data and instructions in programming **K2**

CO2: Manage with data structures based on problem subject domain **K2**

CO3: Practically implement Algorithms **K2**

CO4: Write program to a specific environment **K3**

CO5: Study, analyze and apply the programming concept to any environment **K4**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	S	M	S	S	M
CO2	S	S	M	S	M	S	M	S	S	M
CO3	M	S	S	M	S	M	S	M	M	S
CO4	S	M	M	S	S	M	S	S	M	S
CO5	S	M	M	S	S	M	S	M	M	S

S – Strongly Correlating **M- Moderately Correlating**

PCAT12	SYSTEM SOFTWARE		
	Semester I	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply		
Objectives	1. To understand the basic concepts of the various System Software 2. To familiarize the functions and design of Assemblers 3. To understand the basic functions of Loaders and Editors 4. To inculcate the ability to analyze and design System Software Packages		

UNIT I

System Software - General concepts- Assembly and Machine language programming, System software and application software- Operating System

UNIT II

Assemblers:- Elements of Assembly language programming, A simple assembly scheme, Pass structure of assemblers, Design of two pass assemblers

UNIT III

Macros and macro processors:- Macro definition and call, Macro expansion, Nested macro calls, advanced macro facilities, design of macro pre processor -2 pass and single pass algorithms-self relocating programs.

UNIT IV

Loaders – Types of loaders - reloadable loaders and direct linking loaders. – design of simple loader. Linker-Relocation and linking concepts. Editor-Types of editors-Components of editor-Debug monitor

UNIT V

Software tools – tools for program development – design of software tools – program generators, editors, debug monitors – programming environments and user interfaces.

TEXT BOOKS:

1. System Programming by John J.Donovan-McGram Hill Publication
2. System Programming and operating Systems- D.M.Dhamdhere Tata McGraw Hill

REFERENCES:

1. Compilers Principle, Techniques and Tools- Alfred V Aho, Ravi Sethi, Jeffrry D Ullman (Modules 3, 4 &5)
2. System Software- Leland L Beck, Addison Wesley Publishing Company

Course Outcomes:

After successful completion of the course, Student shall be able to

CO1: Understand the basic functions and designs of system software **K2**
CO2: Understand the various concepts of assemblers and macro processors **K2**
CO3: Familiarize with the various editors and debugging techniques **K2**
CO4: Design simple assembler, linker and loader for simple instruction computer **K3**
CO5: Design elementary macro processor for simple assembly level language **K3**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	M	M	M	M	S	M	M
CO2	S	S	S	M	M	M	M	S	S	M
CO3	S	S	S	M	M	M	M	S	S	M
CO4	M	S	S	S	M	M	M	S	M	S
CO5	M	S	S	S	M	M	M	S	M	S

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PCAT13	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION		
	Semester I	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse		
Objectives	1. To learn the organization of a computer and its principle components. 2. To understand the function of computer hardware and their building blocks. 3. To understand and appreciate Boolean algebraic expressions to digital design 4. To understand the hardware components of a digital system.		

UNIT I

Introduction to computer – Number Systems – Data types – Data Representations – Fixed Point, Floating Point, Gray, Excess – 3, Alphanumeric codes – Binary codes – Error Detection Codes.

UNIT II

Arithmetic Logic Unit: Binary Half Adder, Full adder and their Designs – Positive and Negative Numbers Binary Addition & Subtraction Using 1s, 2s, 9s Complements, Binary Multiplication.

UNIT III

Memory Unit: Classification of Memory; Primary – Secondary – Cache Memory – Associate Memory – virtual Memory –RAM, ROM

Control Unit: General Register Organization, Stack Organization, Instruction Formats, Addressing Modes – Data Transfer and Manipulation Instructions.

UNIT IV

I/O Devices: Punched Tape, Tape Recorders, Punched cards – Card Readers- Printers – CRT Devices – digital to analog Converters, Analog to Digital Converters.

UNIT V

Introduction to Parallel Processing – Parallelism in Uni-processor Systems – Parallel Computer Structure.

TEXT BOOKS:

1. Albert Paul Malvino, Donald P. Leach – Digital Principles and Appli9cations McGraw Hill
2. Thomas C. Bartee – Digital Computer Fundamentals, McGraw Hill

REFERENCE BOOKS:

1. M .Morris Mano – Computer System, architecture, Prentice Hall of India

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Understand the processing of Computer and the function of Memory and its types **K2**

CO2: Know about the function and organization of Input Output devices **K2**

CO3: Understand the digital representation of data in a computer system **K2**

CO4: Identify, understand and apply different number systems and codes **K3**

CO5: Understand computer arithmetic formulate and solve problems **K3, K4**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	M	M	M	M	M	S
CO2	S	M	S	M	M	M	M	M	M	S
CO3	S	M	S	M	M	M	M	S	M	S
CO4	S	S	S	M	S	M	M	S	M	S
CO5	M	S	M	S	S	M	M	S	S	M

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PCAP11	C PROGRAMMING LAB		
	Semester I	**Credits:6**	**Hours: 5**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse **K6:** Create		
Objectives	1. To understand the logic and algorithm of a program. 2. To learn to write effective C programs. 3. To learn problem solving techniques. 4. Able to write effective C Programs using Structures, Pointers, Arrays, Strings and Functions.		

LIST OF PROGRAMS

1. To reverse a given number and check if it is a palindrome.
2. To evaluate Sine Series.
3. To find the nth Fibonacci number.
4. To check if a number is Prime or not.
5. To Sort an Array.
6. To count the occurrences of a number in a set.
7. To check if a number is Adam or Not.
8. To reverse a given String and check if it is a Palindrome.
9. To find Factorial value, Fibonacci, GCD value using Recursion
10. To add and subtract two Matrices
11. To multiply two Matrices
12. To find row wise sum of a matrix of order m X n
13. To solve Quadratic Equation –Switch
14. To perform binary search using Function
15. To find NCR and NPR values using Function
16. To calculate mean, variance and standard deviation using function
17. To prepare Pay Bill – Structure
18. To prepare Mark Sheet – Structure
19. To perform inventory calculations- Structure
20. To demonstrate the use of bitwise operators
21. To prepare Mark Sheet – File
22. To prepare EB Bill- file

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Understand the logical operations of C Program **K2**

CO2: Choose appropriate methods to represent data items in real world problems **K2**

CO3: Analyze and learn Problem solving techniques in C **K4**

CO4: Write the code for a large program after overcoming the time and space complexity. **K3**

CO5: Create a C program using Structure, arrays and pointers **K6**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	S	M	S	M	S	S	S
CO3	S	S	M	M	M	S	M	S	M	S
CO4	M	S	M	S	M	S	M	S	S	S
CO5	S	M	S	S	M	M	M	M	S	S

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PCAP12	MICROPROCESSOR LAB		
	Semester I	**Credits:4**	**Hours: 6**
Cognitive Level	**K1:** Recall **K2:** Understand **K3:** Apply **K6:**Create		
Objectives	1. To get hands on experience with Assembly Language Programming. 2. To **s**tudy interfacing of peripheral devices with 8086 microprocessors. 3. To understand techniques for faster execution of instructions. 4. Able to understand and provide better performance on Microprocessors programming		

LIST OF PROGRAMS

1. Basic arithmetic and Logical operations
2. Move a data block without overlap
3. Code conversion, decimal arithmetic and Matrix operations.
4. Floating point operations, string manipulations, sorting and searching
5. Password checking, Print RAM size and system date
6. Counters and Time Delay
7. Square and Cube program, Find 2"s complement of a number
8. Unpacked BCD to ASCII

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Familiar to handle assemble language program **K1**

CO2: Understand the importance of peripheral devices with 8086 microprocessors **K2**

CO3: Manage and handle the techniques for executing the instructions quicker **K3**

CO4: Understand and provide better performance on Microprocessor programming **K2**

CO5: Create an assemble language program in 8086 processor **K6**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	S	M	S	M	S	S	S
CO3	S	S	M	M	M	S	M	S	M	S
CO4	M	S	M	S	M	S	M	S	S	S
CO5	S	M	S	S	M	M	M	M	S	S

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SECOND SEMENSTER

PCAT21	PROGRAMMING IN C++		
	Semester II	**Credits:4**	**Hours: 4**
Cognitive Level	**K1:** Recall **K2:** Understand **K3:** Apply **K4:**Analyse		
Objectives	1. To learn the syntax and semantics of the C++ programming language. 2. To learn the concepts of inheritance, virtual functions ,polymorphism and Exception Handling. 3. To implement dynamic binding and Exception Handling mechanisms. 4. Able to deal with the object-oriented programming concept		

UNIT I:

Oriented Programming concepts – Introducing Function Overloading – constructor and Destructor Function – Constructors take parameters – Introducing Inheritance – Object Pointers – In line Functions – Automatic in lining.

UNIT II:

Assigning Object – Passing Object to Functions – returning Object from Functions – an introduction to friend – arrays of objects – using pointers to objects – using new and delete – references – passing references to objects – returning references – independent references and restrictions.

UNIT III :

Overloading constructor functions – creating and using a copy constructor – using default arguments – Overloading and ambiguity – Finding the address of an overload function – the basis of operator overloading – overloading binary operators – overloading the relational and logical operators – overloading a Unary operator – using friend operator function – a closer at the assignment operator – overloading the subscript() operator.

UNIT IV:

Base class access control – using protected members – constructors, Destructors and Inheritance- multiple inheritance-virtual base classes – some C++ I/O basics – formatted I/O using width(), precision() and fill() – using I/O manipulators – creating your own inserters – creating extractors.

UNIT V:

Creating own manipulators – File I/O basis – unformatted, binary I/O – more unformatted I/O functions – random access – checking the I/O status – customized I/O and files – Pointers and derived classes – Introduction to virtual functions – more about virtual functions – applying polymorphism – Exception handling.

TEXT BOOKS:

1. Herbert Schildt, " TeachYour self-c++", III Edition, tataMcGrawhill 5th Reprint 2000.

REFERENCE BOOKS:

1. Robert Lafore, "Object Oriented Programming in Turbo C++", Galotia 2001
2. E. Balagurusamy "Object Oriented Programming with C++", TMH, New Delhi.

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Optimize the programming code with the help of Object oriented approach **K1**

CO2: Choose appropriate data structures to represent data items in real world problems **K2**

CO3: Analyze the time and space complexities of algorithms **K4**

CO4: Write the code for a large program after overcoming the time and space complexity. **K3**

CO5: Analyze and implement various searching and sorting techniques. **K4**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	S	M	S	M	S	S	S
CO3	S	S	M	M	M	S	M	S	M	S
CO4	M	S	M	S	M	S	M	S	S	S
CO5	S	M	S	S	M	M	M	M	S	S

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PCAT22	OPERATING SYSTEM		
	Semester II	**Credits:4**	**Hours: 4**
Cognitive Level	**K1:** Recall **K2:** Understand **K3:** Apply **K4:**Analyse		
Objectives	1. To understand the basic concepts and working of various Operating Systems. 2. To use the computer system resources in an efficient way. 3. To facilitate with effective development and implementation of new system functions. 4. Mastering in various process management concepts including scheduling, synchronization and deadlocks		

UNIT I :

Introduction - Evolution of Operating Systems, Types of operating systems.

Process Management: Processes—States & Life cycle of process, Schedulers, Context Switching, Process scheduling policies—Preemptive vs. Non-preemptive, CPU scheduling algorithms, Inter-process Communication (IPC) Mechanisms—Concurrent processes, Process synchronization, Critical Section, Semaphores.

UNIT II :

Deadlock—Basic causes of deadlock, Conditions for deadlock, resource allocation graph, Wait for graph, Strategies for handling deadlocks, Starvation, deadlock avoidance & detection, Safe state, Dijikstra's Banker's Algorithm.

UNIT III :

Memory Management: Main Memory, Static & Dynamic Partition schemes, multiple partitions schemes, Fragmentation, Compaction, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Virtual Memory: Demand Paging, Thrashing.

UNIT IV:

Device management – Techniques for Device Management – Dedicated, Shared and Virtual Device – Virtual Systems – Design of Spooling System – OS Security – Security Measures and Cryptography

UNIT V:

Case Studies: DOS, UNIX and WINDOWS Operating Systems

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, “Operating System Concepts”, Eighth Edition, 2009, Wiley India Pvt. Ltd., New Delhi.

Reading Chapters: 1-15 & 19-22 (excluding chapters: 16, 17, 18, and 23).

2. Stuart E. Madnick John J. donovan, Operating Systems, McGraw-Hill

REFERENCE BOOKS:

1. Harvey M. Deitel, Paul J. Deitel, David R. Choffnes, “Operating Systems”, Third Edition, 2004, Pearson Education Inc., New Delhi.
2. Andrew S. Tanenbaum, “Modern Operating Systems”, Third Edition, 2008, PHI Course Pvt. Ltd., / Pearson Education Inc., New Delhi.
3. RamezElmasri, A. G. Carrick, David Levine, “Operating Systems: A Spiral Approach”, First Edition, 2009, McGraw-Hill Education (India), New Delhi.
4. Ann McIver Hoes and Ida M. Flynn, "Understanding Operating Systems”, Fifth Edition, 2009, CENGAGE Learning India Pvt. Ltd., New Delhi.
5. Gary Nutt, “Operating Systems”, 3rdEdition, 2004, Pearson Education Inc., New Delhi.
6. William Stallings, “Operating Systems: Internals and Design Principles”, Sixth Edition, 2009, PHI Learning Pvt. Ltd., / Pearson Education Inc., New Delhi.

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Exhibit familiarity with the fundamental concepts of operating systems and process management. **K2**

CO2: Apply different optimization techniques for the improvement of system performance. **K4**

CO3: Discuss various protection and security aspects. **K2**

CO4: Use the computer system resources in an efficient way. **K1**

CO5: Apply different deadlock prevention techniques **K3**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	M	S
CO2	S	S	M	M	M	S	M	S	S	M
CO3	S	S	S	M	M	M	S	S	M	M
CO4	S	S	S	M	M	M	S	S	M	M
CO5	M	S	S	M	M	S	M	S	S	M

S – Strongly Correlating **M- Moderately Correlating**

PCAT23	MULTIMEDIA AND ITS APPLICATIONS		
	Semester II	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse		
Objectives	1. To understand the multimedia concept and to deal with multimedia devices. 2. To learn the theoretical and practical aspects of designing multimedia applications. 3. To develop an interactive multimedia presentation by using multimedia devices 4. Able to design and develop an effective e-content package.		

UNIT-I

Introduction concepts: Multimedia - definitions, CD - ROM and the multimedia highway, Uses of multimedia, introduction to making multimedia - the stages of project, the requirements to make good multimedia, multimedia skills and training, Training Opportunities in multimedia. Motivation for multimedia usage, frequency domain analysis, Application domain & ODA etc.

UNIT-II

Multimedia – hardware and software: multimedia hardware – macintosh and windows Production platforms, hardware peripherals – connections, memory and storage devices, Media software – basic tools, making instant multimedia, multimedia software and Authoring tools, production standards.

UNIT-III

Multimedia – making it work – multimedia building blocks – text , sound , images , animation and video , digitization of audio and video objects , data compression: different algorithms Concern to text , audio , video and images etc., working exposure on tools like dreamweaver , 3D effects , flash etc.,

UNIT-IV

Multimedia and the internet: history , internet working , connections, internet services, The world wide web, tools for the WWW – web server, web browsers, web page makers and Editors, plug-ins and delivery vehicles, HTML, VRML, designing for the WWW – working on The web, multimedia applications- media communication, media consumption, media Entertainment , media games.

UNIT-V

Multimedia – looking towards future: digital communication and new media, interactive Television, digital broadcasting, digital radio, multimedia conferencing, assembling and delivering a project – planning and costing, designing and producing, content and talent, Delivering, CD-ROM technology.

TEXT BOOKS

1. Steve Heath, "Multimedia & Communication Systems" , Local Press, UK, 1999.
2. Tay Vaughan, " Multimedia: Making It Work", TMH, 1999.
3. Steve Rimmer, " Advanced Multimedia Programming", MHI, 2000.

REFERENCES BOOKS

1. Keyes, "Multimedia Handbook" , TMH, 2000.
2. Ralf Steinmetz and Klaranaharstedt, "Multimedia: Computing, Communications & Applications" Pearson, 2001.
3. Steve Rimmer , "Advanced Multimedia Programming" , MHI , 2000.

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Understand different multimedia tools and their usage. **K2**

CO2: Understand the process of digitizing different analog signals **K2**

CO3: Implement various multimedia standards and compression technologies **K3**

CO4: Develop an interactive multimedia presentation by using multimedia devices **K3**

CO5: Design and develop an effective e-content package. **K3 & K4**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	M	M
CO2	S	S	M	M	M	M	M	S	M	M
CO3	M	S	S	S	M	M	S	S	S	M
CO4	M	M	S	S	M	S	S	M	M	S
CO5	M	M	S	S	M	S	S	M	M	S

S – Strongly Correlating M- Moderately Correlating

PCAP21	C++ PROGRAMMING LAB		
	Semester II	**Credits:5**	**Hours: 6**
Cognitive Level	**K1:** Recall **K2:** Understand **K3:** Apply **K4:**Analyse		
Objectives	1. To learn the syntax and semantics of the C++ programming language. 2. To understand the concept of data abstraction and encapsulation. 3. To learn how to overload functions and operators in C++. 4. Able to design and implement generic classes with C++ templates.		

LIST OF PROGRAMS

1. Program to demonstrate all manipulators in C++
2. Call by value & Call by reference method
3. Inline function in C++
4. Classes and Objects.
5. Constructors and Destructors
6. Operator Overloading.
7. Function overloading.
8. Default Arguments.
9. Program using Inheritance.
10. Virtual Functions
11. Exception handling
12. File Concepts

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Optimize the programming code with the help of Object oriented approach **K1**

CO2: Choose appropriate data structures to represent data items in real world problems **K2**

CO3: Analyze the time and space complexities of algorithms **K4**

CO4: Write the code for a large program after overcoming the time and space complexity. **K3**

CO5: Analyze and implement various searching and sorting techniques **K4**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	S	M	S	M	S	S	S
CO3	S	S	M	M	M	S	M	S	M	S
CO4	M	S	M	S	M	S	M	S	S	S
CO5	S	M	S	S	M	M	M	M	S	S

S – Strongly Correlating **M- Moderately Correlating**

PCAP22	MULTIMEDIA LAB		
	Semester II	**Credits:4**	**Hours: 6**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse		
Objectives	1. To learn the concepts of Text, Audio and video tools. 2. To acquire knowledge on image enhancement and transformation techniques. 3. To understand and design web pages. 4. Able to create an effective and interactive multimedia package.		

Lab Work to be assigned in the following topics:

1. Creation of two dimensional objects and applying simple transformations like Translation, Scaling, Rotation and applying Composite transformations.

2. Clipping and windowing of a part of the created two dimensional object using any one of the clipping algorithm.

3. Creation of simple three dimensional objects like cube, cone and cylinder and applying simple transformations like Translation, Scaling, Rotation, Composite transformations, projections –Parallel, Perspective.

4. Finding out visible surfaces and removal of hidden surfaces in simple objects using object space and image space algorithms.

5. Image enhancement, Image transformation from color to gray scale and vice versa, Image manipulation and Image optimization for web - Usage of editing tools, layers, filters, special effects and color modes. Creation of simple Gif animated images with textual illustrations, Image Compression.

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Understand different multimedia tools and their usage. **K2**

CO2: Understand the process of digitizing different analog signals **K2**

CO3: Implement various multimedia standards and compression technologies **K3**

CO4: Develop an interactive multimedia presentation by using multimedia devices **K3**

CO5: Design and develop an effective e-content package. **K3& K4**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	M	M
CO2	S	S	M	M	M	M	M	S	M	M
CO3	M	S	S	S	M	M	S	S	S	M
CO4	M	M	S	S	M	S	S	M	M	S
CO5	M	M	S	S	M	S	S	M	M	S

S – Strongly Correlating **M- Moderately Correlating**

THIRD SEMESTER

PCAT31	JAVA PROGRAMMING		
	Semester III	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse		
Objectives	1. To understand the of object-oriented paradigm in the Java programming language. 2. To use the Java SDK environment to create, debug and run simple Java programs. 3. To develop an engineering approach to solve problems. 4. Able to develop software with Java programming language.		

UNIT I

An overview of Java - Java language fundamentals - Class and objects - Constructors- Garbage collection - The finalize method - method overloading – Recursion - this, static and final usage - Nested and Inner classes – Arrays – Inheritance – Method overriding – abstract methods and abstract classes – final methods and final classes.

UNIT II

Packages-Interfaces- Exception Handling-String Handling-Object class – Exploring Java.lang package.

UNIT III

Utilpackages- Multithreading - Thread priorities - Inter Thread communications – Synchronization - Dead locks.

UNIT IV

AWT: AWT controls – layout managers – event handling – applets – applet architecture – html applet tag – passing parameters to applet.

UNIT V

I/O Streams: Byte Stream class-Character stream class-Serialisation – JDBC-Data Manipulation-data navigation.

TEXT BOOK

1. Herbert Scheldt, “Java 2 complete Reference”, Tata McGraw Hill, Fourth Edition, 2001.

2. Ivan Bayross, “Java 2.0 (Web Enabled Commercial Application Development”– BPB Publications India, Edition 2000, ISBN: 81-7656- 356-0.

REFERENCEBOOKS

1. Peter Norton & William stanck, “Guide to Java programming”, First Edition, 1997, Techmedia Publications, New Delhi.

2. Laura Lemay, Charles l, Perkins, “Teach Yourself Java 1.1”, First Edition, 1998,Techmedia Publications, New Delhi.

3.Lay S. Horstmann, Gray Cornell. “Core Java 2 – Fundamentals” 2nd Edition,2000.

4.Scottdaks& Henry “Java threads”, 2nd Edition, Shroff Publishers & Distributors Pvt Ltd.

5.Elliotte Rusty Harold, “Java Network Programming”, First Edition, 2000, Shroff Publications & Pvt Ltd.

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Design, create, build, and debug Java applications and applets **K3, K3& K5**

CO2: Write programs using OOPs concept, graphical user interface (GUI) components and Java's Event Handling Model **K3**

CO3: Solve inter-disciplinary applications using the concept of inheritance **K3 & K4**

CO4: Apply JDBC to provide a program level interface for communicating with database using Java programming **K3**

CO5: Develop software with Java programming language **K3**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	S	M	M	S	M	S
CO2	M	S	S	M	M	S	M	S	S	M
CO3	M	M	M	S	S	M	S	M	M	S
CO4	M	M	M	S	S	M	M	S	S	M
CO5	M	M	M	S	S	S	S	M	S	S

S – Strongly Correlating **M- Moderately Correlating**

PCAT32	SOFTWARE ENGINEERING		
	Semester III	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse		
Objectives	1. To understand the concepts and methods required for the construction of an effective Software. 2. To understand the issues affecting the organization, planning and control of software. 3. To identify, formulate, and solve software engineering problems using a well-defined engineering process 4. Able to demonstrate the ability to work effectively as a team leader/ Software Analyst in professional environments.		

UNIT I

Introduction to Software Engineering: Definition and size factors – Quality and productivity factors – managerial issues.

UNIT II

Planning as Software project: Defining the problem – developing a solution strategy – Planning the development process – planning and organizational structure – other planning activities.

UNIT III

Software cost estimation: software cost factors – software cost estimation techniques – staffing level estimation – estimating software maintenance costs.

Software requirements: definition, software requirements specification – formal specification techniques – languages and pre processors for requirement specification

UNIT IV

Software design: fundamental design concept – module and modularization criteria – design notations – design techniques – detailed design considerations – real time and distributed system design. – Testplans and milestones. Walkthroughs and inspections – design guidelines.

UNITV

Verification and validation: Quality assurance – walkthroughs and inspections, static analysis – symbolic execution – unit testing and debugging – system testing – formal verification.

Software Maintenance: Enhancing maintainability during development – managerial aspects of software maintenance – configuration management – source code metrics – other maintenance tools and techniques.

TEXT BOOKS

1. Richard E. Fairley – Software Engineering Concepts, McGraw-Hill Book Company, 1985.

REFERENCE BOOKS

1. H.C. Shooman – Software Engineering Design.

Course outcomes

After successful completion of the course, Student shall be able to:

CO1: Understands the process to be followed in the software development life cycle **K2**
CO2: Find practical solutions to the problems **K4**
CO3: Adapt the basic software engineering methods and practices in their appropriate applications **K3**
CO4: Distinguish the various software process models **K4**
CO5: Analyze, design and maintain software systems **K3 & K4**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	M	M
CO2	M	S	M	M	S	M	S	M	M	M
CO3	S	S	M	S	M	M	M	S	M	M
CO4	S	M	S	M	M	M	M	S	M	M
CO5	S	M	S	M	M	S	S	M	M	S

S – Strongly Correlating **M- Moderately Correlating**

PCAT33	MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE		
	Semester III	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse		
Objectives	1. To learn mathematical definitions and proofs along with applicable methods. 2. To familiarize with the basic terminology of functions, relations and demonstrate knowledge of their associated operations. 3. To understand the concepts of formal languages. 4. Able to solve mathematical problems, apply various methods of mathematical proof and communicate solutions in writing.		

UNIT I

Logic: IF Statements – Connectives – Atomic and Compound Statements – WFF – Truth Table of a Formula – Tautology – Tautological Implications and Equivalence of Formulae.

UNIT II

Normal Forms – Principal Normal Forms – Theory of Inference – Open Statements – Quantifiers – Valid Formulae and Equivalence – Theory of Inference for Predicate Calculus.

UNIT III

Graph Theory: Basic Concepts – Matrix representation of Graphs: Trees: Definition – Spanning Trees – Rooted Trees – Binary Trees

UNIT IV:

Formal languages: Four class of grammars(phase structure, context sensitive, context free, regular) context free language – generation trees. Finite Automata: Representation of FA – Acceptability of a string by FA – Non deterministic FA (NDFA).

UNIT V:

Lattices and Boolean algebra: Lattices – properties – new lattices –modular and distribution lattices. Boolean algebra: Boolean polynomials.

TEXT BOOK

1. Discrete Mathematics – M.K.Venkatraman, N.Sridharan, N.Chandrasekaran, The National Publishing Company,2001. Chapters 9.1-9.56, 11.1-11.81, 12.1-12.20, 12.43-12.61, 7.1-7.39,7.48-7.53,10.1-10.42,10.71 460

REFERENCE BOOK

1.Modern Algebra by S.Arumugam&A.ThangapandiIssac, New Gamma Publishing House, Palayamkottai(for Units I,III)

2.Invitation to Graph Theory by S.Arumugam and S.Ramachandran, Scitech Publications, Chennai.(for Units IV, V)

Course Outcomes:

After successful completion of the course, student shall be able to:

CO1: Understand the complexity of computational problems **K2**

CO2: Think about the design of formal language which would be able to address any real time problem and improve the working flow of computational models. **K4**

CO3: Use tree and graph algorithms to solve problems **K3**

CO4: Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra **K4**

CO5: Solve mathematical problems, apply various methods of mathematical proof and communicate solutions in writing. **K3**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	S	M	M	M
CO2	S	S	S	M	M	M	S	S	M	M
CO3	M	S	M	S	M	M	S	M	S	M
CO4	S	S	M	M	M	M	M	S	M	M
CO5	M	S	M	S	S	S	S	M	M	S

S – Strongly Correlating M- Moderately Correlating

PCAP31	JAVA PROGRAMMING LAB		
	Semester III	**Credits:5**	**Hours: 6**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse		
Objectives	1. To understand the of object-oriented paradigm in the Java programming language. 2. To use the Java SDK environment to create, debug and run simple Java programs. 3. To develop an engineering approach to solve problems. 4. Able to develop programs using API as well as java Standard Library.		

LIST OF PROGRAMS

1. Classes and objects, constructors
2. Method overloading , Inheritance
3. Polymorphism
4. Packages and interfaces
5. String handling
6. Exception handling
7. Multithreading
8. Input/output streams
9. Networking (TCP, UDP)
10. Applets with AWT controls
11. JDBC

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Design, create, build, and debug Java applications and applets **K3, K3& K5**

CO2: Write programs using OOPs concept, graphical user interface (GUI) components and Java's Event Handling Model **K3**

CO3: Solve inter-disciplinary applications using the concept of inheritance **K3 & K4**

CO4: Apply JDBC to provide a program level interface for communicating with database using Java programming **K3**

CO5: Develop software with Java programming language **K3**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	S	M	M	S	M	S
CO2	M	S	S	M	M	S	M	S	S	M
CO3	M	M	M	S	S	M	S	M	M	S
CO4	M	M	M	S	S	M	M	S	S	M
CO5	M	M	M	S	S	S	S	M	S	S

S – Strongly Correlating **M- Moderately Correlating**

PCAP32	OBJECT-ORIENTED ANALYSIS AND DESIGN		
	Semester II	**Credits:4**	**Hours: 4**
Cognitive Level	**K2 –** Understand **K4 –** Analyze **K5 -** Evaluate		
Objectives	1. To understand the Object-based view of Systems 2. To inculcate necessary skills to handle complexity in software design 3. To develop robust object-based models for Systems 4. Ability to analyse and model software specifications.		

Objectives:

1. To understand a software development problem and express it precisely.
2. To identify the objects of a system and to establish their relationships.
3. To implement a module structure which executes efficiently.
4. Able to generate a design which can be converted into applications with OO languages

1. Classes and objects.

2. Methods

3. Inheritance

4. Interfaces

5. Strings

6. Exceptions

7. Packages and visibility issues.

8. Using the AWT

9. Applets

10. Threads

11. Communications

COURSE OUTCOMES

After completion of the course, student shall be able to

CO1: Understand the object oriented life cycle, Use-case design, Object Oriented Design process, software quality and usability. **K2**

CO 2: Identify objects, relationships, services and attributes through UML .**K2, K4**

CO 3: Apply UI design concepts in real-time applications. **K4**

CO 4: An ability to apply knowledge of OOPs concepts in Object Oriented Design. **K5**

CO 5: An ability to analyze the case study and apply the UML notations. **K5**

MAPPING OF COS WITH POS AND PSOS :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	M	M
CO2	S	S	S	M	M	M	S	S	M	M
CO3	S	M	S	S	S	M	S	M	S	M
CO4	S	S	M	S	M	M	S	S	M	M
CO5	M	M	S	S	S	S	M	M	S	S

S – Strongly Correlating **M- Moderately Correlating**

FOURTH SEMESTER

PCAT41	RDBMS RELATIONAL DATABASE MANAGEMENT SYSTEM]		
	Semester IV	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse **K6:** Create		
Objectives	1. To Learn and practice data modeling using the entity-relationship and develop database designs. 2. To understand the use of Structured Query Language (SQL). 3. To apply normalization techniques to standardize the database. 4. Able to design and implement a database schema for real time problem		

UNIT-I:

Introduction: Introduction to File and Database systems – History – Advantages, disadvantages – Data views –Database Languages – DBA – Database Architecture –Data Models – Keys – Mapping Cardinalities.

UNIT-II:

Relational Model: Relational Algebra and calculus – Query languages – SQL –Data definition – Queries in SQL – Updates – Views – Integrity and Security – triggers, cursor, functions, procedure – Embedded SQL –overview of QUEL, QBE

UNIT-III:

Database Design: Design Phases – pitfalls in Design – Attribute types – ER diagram – Database Design for Banking Enterprise – Functional Dependence – Normalization (1NF, 2NF, 3NF, BCNF, 4NF, 5NF). File Organization – Organization of Records in files –Indexing and Hashing.

UNIT-IV:

Transaction Management: Transaction concept –state – Serializability – Recoverability – Concurrency Control – Locks – Two Phase locking – Deadlock handling – Transaction management in Multi databases

UNIT-V:

Current Trends: Object – Oriented Databases –OODBMS – rules – ORDBMS – Complex Data types – Distributed databases – characteristics, advantages, disadvantages, rules – Homogenous and Heterogeneous – Distributed data Storage – XML –Structure of XML Data – XML Document – Data mining – Data warehousing – Applications and Challenges in Multimedia databases – Overview of Biological databases – Mobile databases.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth&Sudarshan, "Database System Concepts ", 5th Ed., McGraw Hill International Edition, 2006.

REFERENCE BOOKS:

1. Philip J.Pratt, Joseph J Adamski, "Database Management Systems", Cengage Learning, 2009.

2. RameezElmasri, ShamkantB.Navathe, "Fundamentals of Database Systems", 5th Ed., Pearson Education, 2009.

3. Arun K Majumdar, Pritimoy Bhattacharyya, "Database Management Systems", TMH, 2009.

4. ISRD group, "Introduction to Database Management Systems", TMH, 2008.

5. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill International Edition, 2003.

6. Ramon A Mata-Toledo, Pauline K Cushman, "Database Management Systems", TMH, 2008.

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Understand the use of Structured Query Language (SQL) **K2**

CO2: Create E/R models from application descriptions. **K3**

CO3: Apply normalization techniques to standardize the database. **K3 & K4**

CO4: Design and implement a database system for real time problem **K6**

CO5: Create databases in an RDBMS and enforce data integrity constraints and queries using SQL **K6**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	M	S	M	S	M	M
CO2	M	M	M	S	S	M	S	M	M	S
CO3	M	M	M	S	S	S	S	M	S	S
CO4	M	M	S	S	S	S	S	M	S	S
CO5	M	M	S	S	S	S	S	M	S	S

S – Strongly Correlating **M- Moderately Correlating**

PCAT42	COMPUTER NETWORKS		
	Semester IV	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse **K5:** Evaluate		
Objectives	1. To describe and analyze the hardware, software components of a network and their interrelations. 2. To learn and analyze the data link, network, and transport layer protocols 3. To design and implement data link or network layer protocols within a simulated networking environment 4. Able to use Data Communication system along with its components.		

UNIT I

INTRODUCTION : Data Communications – Networks – Protocols and Standards – Network models – Layered Tasks – The OSI model – Layers in the OSI model – TCP/IP Protocol suite – Addressing.

UNIT II

THE PHYSICAL LAYER AND MEDIA : Data And Signals: Analog and Digital – Periodic Analog signals – Digital signals – Transmission Impairment – Data rate limits – Transmission media – Guided media – Unguided media – Switching – Circuit switched Networks – Datagram Networks – Virtual – Circuit Networks – Structure of a switch – Telephone Network.

UNIT III

DATA LINK LAYER: Error detection and Correction: - Introduction – Block coding – Linear block codes – Cyclic codes – Checksum. Data Link Control: - Framing – Flow and Error control – HDLC – Point-to-Point protocols – Multiple Access: - Random Access – Controlled Access – Channelization.

UNIT IV

NETWORK LAYER: IPV4 Addresses – IPV6 Addresses – Internetworking – Network layer: Address Mapping – Error Reporting, and Multicasting – Network Layer: Delivery, Forwarding and Routing.

UNIT V

TRANSPORT LAYER AND APPLICATION LAYER Process-to-process Delivery – User Datagram Protocol (UDP) – TCP – SCTP-Congestion control and Quality of Service:- Data Traffic – Congestion – Congestion Control – Examples – Quality of Service – Techniques to improve QOS – Integrated services . Application Layer: Domain Name System (DNS) – SNMP – Security – Electronic mail

TEXT BOOK

1. Behrouz A.Forouzan, 2008, Data Communication and Networking, Fifth Edition, Tata McGraw Hill, New Delhi.

REFERENCE BOOKS

1. Tanenbaum, A.S., 2001, Computer Networks, PHI, New Delhi, 3rd Edition.
2. Halsall, Fred, 2001, Data communication Computer Network and Open System, , 4th Edition , Pearson education.
3. Black, Uyless.D, 1997, Computer Networks: Practical Standards and Interfacing, 2nd Edition,PHI, New Delhi.
4. Comer Douglas. E, 1999, Computer Networking and Internets, 2nd Edition,PHI, New Delhi.

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Have a good understanding of the OSI Reference Model and TCP/IP Model and in particular have a good knowledge of Layers. **K2**

CO2: Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies. **K4**

CO3: Design and implement network layer protocols within a simulated networking environment **K3**

CO4: Explore the basis of computer networks and various protocols and understand the world wide web concepts **K5**

CO5: Administrate a network and flow of information and predict ethical, legal, security and social issues related to computer networks **K4**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	M	S	M	M	M	S
CO2	M	S	S	M	M	M	M	S	M	M
CO3	M	M	S	S	S	M	S	M	M	S
CO4	S	M	S	M	M	S	M	M	M	S
CO5	M	M	S	S	S	M	S	M	M	S

S – Strongly Correlating M- Moderately Correlating

PCAT43	COMPUTER GRAPHICS		
	Semester IV	**Credits:4**	**Hours: 4**
Cognitive Level	**K3:** Apply **K4:**Analyse **K6:** Create		
Objectives	1. To learn the core concepts of computer graphics. 2. To create effective OpenGL programs to solve graphics programming issues. 3. To use the facilities of standard API to express advanced transformation techniques. 4. Able to apply graphics programming techniques to the real-world environment.		

UNIT I

Overview of Graphics System – output primitives: points and lines – line drawing algorithm – circle generating algorithm – ellipse generating algorithm – filled area primitives – character generation.

UNIT II

Two Dimensional transformation: basic transformation – Matrix representation – composite transformation and other transformation – window-to-viewport transformation, viewing – clipping – interactive input methods.

UNIT III

Three dimensional transformation: 3 D concepts – 3 D representation: polygon surfaces, curved line and surfaces, quadric surfaces – spline representation – cubic spline interpolation – Bezier curves – B Spline Curves and surfaces and Beta spline – fractal-geometric methods.

UNIT IV

Three dimensional geometric and modeling transformation – 3 D viewing – Visible surface detection methods – illumination models and surface-rendering methods.

UNIT V

Color Models and color applications: properties of light – standard primaries and the chromaticity diagram – all color models – conversion between HSV and RGB Models - Color selection – Design and animation sequences – general computer animation functions – computer animation languages – Key frame system – Motion specification.

TEXT BOOK

1. Donald Hearn and M.Pauline Baker – Computer Graphics, Pearson Education, Second Edition.

REFERENCE BOOK

1.StevenHarringonton – Computer Graphics -A Programming Approach, McGRAW-Hill International Editions.

2.Peter Cooley – The Essence of Computer Graphics, Pearson Education.

Course Outcomes

After successful completion of the course, Student shall be able to:

CO1: Analyze the performance characteristics of various applications of computer graphics **K4**

CO2: Analyze the major components of OpenGL used to build interactive models **K4**

CO3: Create interactive graphics applications in C++ using one or more graphics application programming interfaces. **K6**

CO4: Write programs that demonstrate computer graphics animation and 2D image processing techniques. **K3**

CO5: Create effective OpenGL programs to solve graphics programming issues **K6**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	M	S	M	S	M	M	M
CO2	S	M	M	M	S	M	S	M	M	S
CO3	M	S	M	S	S	S	M	S	S	S
CO4	M	S	M	S	S	S	M	S	S	S
CO5	M	S	M	S	S	S	M	S	S	S

S – Strongly Correlating M- Moderately Correlating

PCAP41	RDBMS LAB		
	Semester IV	**Credits:5**	**Hours: 6**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse **K6:** Create		
Objectives	1. To understand the concepts and techniques relating to ODBC. 2. To understand and analyze the underlying concepts of database technologies 3. To present SQL and procedural interfaces to SQL 4. Able to Design and implement a database schema for a given problem-domain.		

LIST OF PROGRAMS

1. Creation of base tables and views.

2. Data Manipulation INSERT, DELETE and UPDATE in Tables. SELECT, Sub Queries and JOIN

3. Data Control Commands

4. High level language extensions – PL/SQL. Or Transact SQL – Packages

5. Use of Cursors, Procedures and Functions

6. Embedded SQL or Database Connectivity.

7. Oracle or SQL Server Triggers – Block Level – Form Level Triggers

8. Working with Forms, Menus and Report Writers for a application project in any domain

9. Front-end tools – Visual Basic.

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Understand the use of Structured Query Language (SQL) **K2**

CO2: Create E/R models from application descriptions. **K3**

CO3: Apply normalization techniques to standardize the database. **K3 & K4**

CO4: Design and implement a database system for real time problem **K6**

CO5: Create databases in an RDBMS and enforce data integrity constraints and queries using SQL **K6**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	M	S	M	S	M	M
CO2	M	M	M	S	S	M	S	M	M	S
CO3	M	M	M	S	S	S	S	M	S	S
CO4	M	M	S	S	S	S	S	M	S	S
CO5	M	M	S	S	S	S	S	M	S	S

S – Strongly Correlating **M- Moderately Correlating**

PCAP42	PYTHON LAB		
	Semester I	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse **K6:** Create		
Objectives	1. To create simple Python programs. 2. To understand the scripting language of Python. **3.** Toapply object-oriented programming methodology using Python. 4. Able to design and program Python applications.		

LIST OF PROGRAMS

1.Compute the GCD of two numbers.

2. Find the square root of a number (Newton's method)

3. Exponentiation (power of a number)

4. Find the maximum of a list of numbers

5. Linear search and Binary search

6. Selection sort, Insertion sort

7. Merge sort

8. First n prime numbers

9. Multiply matrices

10. Programs that take command line arguments (word count)

11. Find the most frequent words in a text read from a file

12. Simulate elliptical orbits in Pygame

13.Simulate bouncing ball in Pygame

Course Outcomes

After completion of the course, Student will be able to

CO1: Explain the basic principles of Python programming language **K2**

CO2: Understand and implement modular approach using python **K2 & K3**

CO3: Implement various data structures provided by python library **K3**

CO4: Develop real-world applications using oops, files and exception handling provided by python **K6**

CO5: Make their code robust by handling errors and exceptions properly **K3 & K4**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	M	M
CO2	S	S	S	M	S	M	S	S	M	M
CO3	M	S	S	S	S	M	M	S	M	S
CO4	M	M	S	S	S	S	S	M	M	S
CO5	M	S	S	M	S	S	S	M	S	S

S – Strongly Correlating **M- Moderately Correlating**

FIFTH SEMESTER

PCAT51	WEB PPROGRAMMING		
	Semester III	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse **K6:** Create		
Objectives	1. To learn markup languages for processing, identifying, and presenting information in web pages. 2. To use scripting languages and web services to transfer data and add interactive components to web pages. 3. To create and manipulate web media objects using editing software 4. Able to design Web based applications.		

UNIT – I: HTML & CSS

HTML Introduction – Basic HTML – The Document Body – Text –Hyperlinks – Adding MoreFormatting – Lists – Tables – Using Color and Images – Images –Multimedia Objects – Frames –Forms – The HTML Document Head in Detail – XHTML – CSS Introduction – Using Styles – Definingyour Own Styles – Properties and Values in Styles – Formatting Blocks – Layers.

UNIT – II: XML & Ajax

Basic XML – Document Type Definition – XML Schema – Document Object Model – Presenting XML –Using XML Parser - Essential Ajax - Ajax and the DOM, XML, CSS and Dynamic HTML.

UNIT – III: JAVA Script

What is Dynamic HTML – Java Script Basics – Variables – String Manipulation – Mathematical Functions – Statements – Operators – Arrays – Functions – Data and Objects – Regular Expressions –Exception Handling – Built-in Objects – Events –Dynamic HTML with Java Script

UNIT – IV: PHP & MySQL

Why PHP and MySQL - Server-Side Web Scripting - Getting Started with PHP - Adding PHP to HTML -Syntax and Variables - Control and Functions - Passing Information between Pages – Strings – Arrays and Array Functions – Numbers - MySQL Database Administration - PHP/MySQL Functions -Displaying Queries in Tables - Building Forms from Queries.

UNIT –V: Perl

The Basic Perl Program – Scalars – Arrays – Hashes Control Structures –Processing Text – Regular Expressions – Using Files – Subroutines – Bits and Pieces –Handling XML with Perl – Handling the DOM with Perl.

TEXT BOOKS

1. Web Programming (Building Internet Applications), Chris Bates 2nd edition, Wiley India private Ltd; New Delhi- 2002. Chapters Covers: 1-8, 14

2. Ajax Bible,StevenHoizner,Wiley India private Ltd;NewDelhi-2007Chapters Covers1,8-11

3. PHP5 and MySQL Bible, Tim Converse and Joyce Park with Clark Morgan, Wiley Publishing, Inc. 2004. Chapters Covers: 1-10, 14-17

REFERENCE BOOKS

1. Steven M. Schafer, “HTML, CSS, JavaScript, Perl, Python and PHP - Web standards Programmer’s Reference”, Wiley Publishing, Inc. 2005.

2. Mitch Conrad, Kay Ether, Michal D. Thomas, "XML problem Design – solution”, Wiley India private Ltd; New Delhi- 2006.

COURSE OUTCOMES:

After successful completion of the course, Student shall be able to:

CO1: Develop a dynamic webpage by the use of java script and DHTML **K6**

CO2: Connect a java program to a DBMS and perform insert, update and delete operations on DBMS table **K3**

CO3: Expertise to create web media object using Editing Software **K3**

CO4: Familiarize and apply the Perl concept with MySQL **K2, K4**

CO5: Aware about the WWW architecture and its communication protocol **K2**

MAPPING OF COS WITH POS AND PSOS :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	M	S	M	M	M	S
CO2	M	S	S	M	M	M	M	S	M	M
CO3	M	M	S	S	S	M	S	M	M	S
CO4	S	M	S	M	M	S	M	M	M	S
CO5	M	M	S	S	S	M	S	M	M	S

S – Strongly Correlating **M- Moderately Correlating**

PCAT52	DATA MINING		
	Semester V	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K4:**Analyse **K5:** Evaluate		
Objectives	1. To introduce the basic concepts of Data Mining techniques. 2. To familiarize the types of the data to be mined and apply preprocessing methods on raw data. 3. To identify and address problems with Data Mining Methods 4. Able to understand and analyze supervised and unsupervised models and estimate the accuracy of the algorithms.		

UNIT I:

Data mining: Introduction – Data as a Subject - Definitions- KDD vs. Data mining- DM techniquesAssociation Rules: Concepts- Methods to discover Association rules- A priori algorithm – Partition algorithm- Pioneer search algorithm –Dynamic Item set Counting algorithm- FP-tree growth algorithm-Incremental algorithm-Border algorithm-Generalized association rule. Analysis of association rule using orange.

UNIT II:

Clustering techniques: Clustering paradigms – Partition algorithm-K- Medeoid algorithms – CLARA- CLARANS –Hierarchical DBSCAN- BIRCH- CURE-Categorical clustering algorithms - STIRR-ROCK-CACTUS-Other techniques: Implementation of Clustering techniques using orange tool. Introduction to neural network - learning in NN-Genetic algorithm-Case studies.

UNIT III:

Classification Technique: Introduction – Decision Trees: Tree Construction Principle - Decision Tree construction Algorithm – CART – ID3 - Rainforest - CLOUDS - BOAT, Pruning Technique. Implementation of Classification techniques using orange tool.

UNIT IV:

Web mining: Basic concepts – Web content mining – Web structure mining – Web usage mining – text mining – text clustering.

UNIT V:

Temporal and Sequential Data mining: Temporal Association rules – Sequence Mining – The GSP algorithm – SPADE – SPIRIT – WUM – Spatial mining – Spatial mining tasks – Spatial clustering – Spatial trends.

TEXT BOOKS

1. Jaiwei Han and MichelineKamber,"Data Mining Concepts and Techniques", Morgan Kaufmann Publishers, 2011, 3rd Edition.

REFERENCES

1. Arun K. Pujari, "Data mining Techniques", Third Edition, Universities Press (India) Limited, Hyderabad, 2009.
3. Pieter Adriaans, Dolf Zantinge, "Data Mining", Addison Wesley, 2008.
4. Krzyszlof J Cios, WitoldPedrycz, "Data Mining: A Knowledge Discovery Approach", Springer, 2010.
5. ArijayChaudhry, Dr. P .S Deshpande, "Multidimensional Data Analysis and Data Mining", Dreamtech press, 2009.
6. Margaret Dunlom- Data Mining:Introductory and Advanced Topics, Prentice Hall,2002

7.PaulrajPonnaiah-Data Warehousing Fundamentals,Wiley Publications,2001

Course outcomes:

After successful completion of the course, Student shall be able to:

CO1: Discuss the role of data warehousing and enterprise intelligence in industry and government. **K2**

CO2: Summarize the dominant data warehousing architectures and their support for quality attributes. **K2**

CO3: Identify appropriate data mining algorithms to solve real world problems **K4**

CO4: Compare and evaluate different data mining techniques like classification, prediction, clustering etc. **K4 & K5**

CO5: Benefit the user experiences towards research and innovation **K4**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	S	S	M	S	M	M	S
CO2	M	S	S	M	M	M	M	S	M	M
CO3	S	M	M	S	M	S	S	M	M	S
CO4	S	M	M	S	S	M	S	M	S	M
CO5	S	M	M	M	S	S	S	M	M	S

S – Strongly Correlating **M- Moderately Correlating**

PCAT53	DIGITAL IMAGE PROCESSING		
	Semester I	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse **K6:** Create		
Objectives	1. To know the basic components of an image processing system. 2. To Analyze and implement image processing algorithms 3. To understand the differences between computer vision and image processing. 4. Able to develop Application-Specific Algorithms for image processing		

UNIT I

Introduction: The Origins of Digital Image Processing – Application of Digital Image processing – Fundamental Steps in Digital Image Processing – Component of Image Processing System.

Image Acquisition - Image Acquisition using a single sensor – Image Acquisition using sensor arrays.

UNIT II

Image Sampling and Quantization: Basic Concepts- Representing Digital Images – Spatial and gray level resolution – Aliasing & More Patterns– zooming and shrinking Digital Images

Basic Relationships between pixels: Neighbors of a pixel – Adjacency, connectively, regions and boundaries – Distance Measures, Image operations on a pixel Basis.

UNIT III

Color Image Processing: Fundamentals – Color Models: RGB Color model – CMY & CMYK color model – HIS model – Color Image Smoothing & Color Image Sharping

Image Enhancement in Spatial Domain: Gray level transformation: Image negatives-Log transformations – Piecewise-Linear transformation function – Enhancement using arithmetic / logic operations: Image subtraction – Image Averaging.

UNIT IV

Image Compression: Fundamentals: Coding redundancy – Interpixel redundancy – Psychovisual redundancy – Image compression models: The source Encoder and Decoder – The channel Encoder and Decoder.

UNIT V

Image Segmentation: Detection of Discontinuities: Point Detection – Line Detection - Edge Detection.

Representation of Images: Chain codes – Polygonal approximation – Signatures – Boundary Segments – Skeletons.

TEXT BOOKS:

1. Digital Image Processing – Second Edition – Rafael C. Gonzalez and Richard E.Woods

Reference Book:

1. Digital Image Processing Using MATLAB – Second Edition - Rafael C. Gonzalez, Richard E.Woods and Steven L.Eddins.
2. Digital Image Processing – Third Edition – William K.Pratt.

Course Outcomes:

After completion of the course, Student shall be able to

CO1: Explain how digital images are represented and manipulated in computer **K2**

CO2: Understand different image enhancement techniques and image transforms **K2**

CO3: Analyze the basic algorithms used for image processing and image compression with morphological image processing **K4**

CO4: Write a program to implement fundamental image processing algorithms **K3**

CO5: Develop real world applications using different image processing techniques **K6**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	M	M
CO2	S	S	S	M	M	M	S	S	M	M
CO3	S	M	S	S	S	M	S	M	S	M
CO4	S	S	M	S	M	M	S	S	M	M
CO5	M	M	S	S	S	S	M	M	S	S

S – Strongly Correlating M- Moderately Correlating

PCAP51	WEB PROGRAMMING LAB		
	Semester II	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K5: Evaluate**		
Objectives	1. To Create a web page using HTML and Java Script 2. To be familiar with the dynamic effects in Java Script 3. To learn about the web media objects using editing software 4. To design a web based application tool		

LIST OF PROGRAMS

1. Simple HTML Pages using Tables, Frames

2. Java Script for a Mathematical Calculator

3. Java Script – Games such as Number Puzzle, Magic Square, Games using Random number generation

4. Online Quiz using Java Script

5. Validation of name, mobile number, date of birth, email id using Java Script

6. Design of style sheets using CSS and using various style attributes like text-decoration, text-transform

7. Java Script for validating XML against a DTD

8. Simple Servlets for handling HTTP Get and Post Requests

9. Servlets using JDBC for display of student results

10. A Simple Search Engine using JSP

11. Creation of a login form and validating the user using JSP

12. A Page Hit Counter using JSP

13. Designing a Web page that accesses a database via JDBC.

Course Objectives:

After Successful completion of the Course, Students can able to

CO1: Familiar with the markup language and its importance **K2**

CO2: Create a web page using HTML and Script **K6**

CO3: Handle web based editing Softwares for updating web pages **K3**

CO4: Manage and create dynamic effects using Java Script **K6**

CO5: Create a dynamic web pages using JSP **K6**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	M	M
CO2	S	S	S	M	M	M	S	S	M	M
CO3	S	M	S	S	S	M	S	M	S	M
CO4	S	S	M	S	M	M	S	S	M	M
CO5	M	M	S	S	S	S	M	M	S	S

S – Strongly Correlating **M- Moderately Correlating**

Elective	ACCOUNTING AND FINANCIAL MANAGEMENT		
	Semester II	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse **K5: Evaluate**		
Objectives	1. To understand the basic concepts and processes used to determine product costs. 2. Able to solve simple problems in accountancy. 3. Able to interpret cost accounting statements. 4. Able to handle the various aspects of business operations.		

UNIT I:

Accounting: Definition, Objectives, Advantages, Accounting Concepts, Accounting Conventions. Methods of Accounting: Single Entry and Double Entry System.

Basic Books of Accounts: Journal and Ledger – Preparation of Trial Balance.

Final Accounts: Trading and Profit and Loss Account and Balance Sheet of Sole Proprietary Concern.

UNIT II:

Ratio Analysis: Meaning – Advantages – Limitations

Classification of Ratio: Profitability, Turnover and Solvency Ratios.

UNIT III:

Funds Flow Statement: Concept of Funds – Funds flow Statement – Uses and Limitations Preparation of Fund Flow Statement – Cash Flow Statement

UNIT IV:

Budget and Budgetary Control: Meaning and Definition, Objectives of Budgetary Control, Advantages and Limitations Preparation of Different Types o f Bud gets.

UNIT V:

Costing: Definition, Nature and Importance Advantages and Limitations of Cost Accounting – Classifications of Cost – Preparation of Cost Sheet-Marginal Costing: Meaning, Advantages – Cost – Volume Profit Analysis – Break Even Analysis – Uses and Assumptions – Applications of Marginal Costing.

REFERENCE BOOKS

1. N.Vinayakam, Mani Nagarajan, "Principles of Accountancy", Eurasia Publishing House, New Delhi.
2. S.N. Maheswari, "Principles of Management Accounting", Sultan Chand & Co.
3. Sharma and Sasi K. Gupta, "Management Accounting", Kalyani Publishers.
4. T.S Grewal, "Introduction to Accountancy", Sultan Chand & Co.
5. Ramachandran and Srinivasan, "Management Accounting", Sri Ram Publications, Trichy.
6. To understand the basic concepts and processes used to determine product costs.
7. Able to solve simple problems in accountancy.
8. Able to interpret cost accounting statements.

Able to handle the various aspects of business operations.

Course Outcomes:

After Completion of the Course, Students can be able to

CO1: Understand the basic concepts and processes used to determine product costs **K2**

CO2: Apply to solve simple problems in accountancy **K3**

CO3: Analyse the Funds flow using various methods in accountancy **K4**

CO4: Interpret various cost accounting statements using budgetry control **K2**

CO5: Evaluate and handle the various aspects of business operations **K5**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	S	M	S	M	M	S
CO2	M	S	M	S	S	S	S	S	M	M
CO3	S	M	S	M	S	M	S	M	M	S
CO4	S	S	M	S	M	M	S	S	M	M
CO5	M	S	S	S	M	S	S	M	S	S

S – Strongly Correlating **M- Moderately Correlating**

Elective	NUMERICAL METHODS		
	Semester II	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse **K5: Evaluate** **K6:** Create		
Objectives	1. To learn and formulate numerical methods for various mathematical operations 2. To apply numerical methods to obtain approximate solutions to mathematical problems. 3. To Analyse and evaluate the accuracy of common numerical methods. 4. Able to write efficient, well-structured programs on numerical methods.		

Unit I:

Iterative methods – Bisection Method – False position method – Newton Raphson method - Solution of Simultaneous Linear Algebraic Equations- Gauss Elimination, Gauss-Jordan , Gauss- Jacobi and Gauss- Seidel iterative methods.

Unit II:

Definition – Forward and backward differences – Newton's formula for interpolation – Operators – Properties and relationship among them – Missing terms and summation of series – Montmort's theorem.

Unit III:

Divided differences – Newton's divided difference formula – Lagrange's interpolation formula – Inverse interpolation.

Unit IV :

Numerical Differentiation and Integration - Trapezoidal and Simpson's 1/3 rule – Difference equations and Methods of solving.

Unit V :

Taylor's series – Euler's method – Modified Euler's method – RungeKutta methods – Picard's method of successive approximation – Predictor and Corrector methods – Milne's and Adam's Bashforth Methods.

TEXT BOOK :

1. P.Kandasamy, K.Thilagavathy, K.Gunavathi, "Numerical Methods",S.Chand Company Ltd, Revised edition,2005.

REFERENCES :

1. S.Narayanan, S.Viswanathan, " Numerical Analysis",1994.
2. S.S.Sastry, "Introductory Methods of Numerical Analysis" PHI,1995.

Course Outcomes:

After Completion of the Course, Students can be able to

CO1: Understand the methods and operations in Numerical Methods **K2**

CO2: Apply numerical methods for obtaining solutions in mathematical issues **K3**

CO3: Analyse the approximation accuracy of common problems **K4**

CO4: Create a program using numerical methods efficiently **K6**

CO5: Evaluate and identify the importance and features of numerical differentiation methods **K5**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	S	M	S	M	M	S
CO2	M	S	M	S	S	S	S	S	M	M
CO3	S	M	S	M	S	M	S	M	M	S
CO4	S	S	M	S	M	M	S	S	M	M
CO5	M	S	S	S	M	S	S	M	S	S

S – Strongly Correlating **M- Moderately Correlating**

Elective	OBJECT-ORIENTED ANALYSIS AND DESIGN		
	Semester II	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse **K6:** Create		
Objectives	1. To understand the Object-based view of Systems 2. To inculcate necessary skills to handle complexity in software design 3. To develop robust object-based models for Systems 4. Ability to analyse and model software specifications.		

UNIT I

Introduction to object oriented development – modeling as a design technique: Modeling – object modeling techniques – object modeling – objects and classes – links and association – advanced link and association concepts – generalization and interface – grouping constructs – a sample object model – advanced object modeling: aggregation – abstract classes – generalization as extension and restriction - multiple inheritance .

UNIT II

Dynamic modeling: events and states –operations – nested state diagrams – concurrency – advanced dynamic modeling concepts – a sample dynamic model – relation of object and dynamic models – functional modeling – functional models – data flow diagram – specifying operation – constraints.

UNIT III

Analysis: overview of analysis – problem statement – automated teller machine example – object modeling – dynamic modeling – functional modeling adding operation iterating the analysis.

UNIT IV

System design: overview of system - breaking a system into subsystems – identifying concurrency – allocating subsystems to process and tasks – management of data stores – handling boundaries conditions – setting trade –off priorities.

UNIT V

Object design: overview of object design – combining the three models – designing algorithms – design optimization – implementation of control – adjustment of inheritance – design of association – object representations – physical packaging – documenting design decisions.

REFERENCE BOOK

1. James Rumbaugh Michael Blaha, William Premerlani, Federick Eddy, William Lorensen – Object Oriented Modeling and Design, Prentice-hall of india New Delhi, 2002..

Course Outcomes

After Successful completion of the course, Students can be able to

CO1: Understand the modeling techniques of Object **K2**
CO2: Obtain knowledge to handle Complexity in Software design **K2**
CO3: Create a robust object based models for Software Systems **K6**
CO4: Analyse the model Software specifications **K4**
CO5: Manage to implement controls in Software design **K3**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	M	M	M	M	S	M
CO2	S	S	M	S	M	M	M	M	S	M
CO3	M	S	S	S	M	M	S	M	S	M
CO4	M	M	S	M	M	M	S	M	M	S
CO5	M	M	M	M	S	S	S	M	M	S

S – Strongly Correlating M- Moderately Correlating

Elective	RESOURCE MANAGEMENT TECHNIQUES		
	Semester II	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse **K5:** Evaluate		
Objectives	1. To understand the mathematical tools that are needed to solve optimization problems. 2. To provide Basic skills and knowledge of operations research and its application 3. Toapply the techniques used in operations research to solve real life problem 4. Able to develop operational research models from the description of the real-world systems.		

UNIT-I:

Development of OR- Definition OR- General methods for solving OR models –Phases of OR study – tools, techniques and methods – scientific methods in OR .

UNIT-II:

Linear Programming Problem – Mathematical formation of LPP – Stack and surplus variables – graphical solution of LPP

UNIT-III:

Simplex method – Computational procedure –Two phase method – Duality in LPP

UNIT-IV:

Mathematical Formulation of transportation problem – optimal solution of T.P – Methods for obtaining an initial feasible solution – Optimal solution – Handling Degeneracy in T.P

UNIT-V:

Mathematical Formulation of Assignment problem – Solution to assignment problems – optimal solution of assignment problem – Unbalanced Assignment solution PERT and CPM – Events – Time Estimate – Floats – Critical path, Probability of Meeting Deadline – Project Cost

TEXT BOOK:

1. Operation Research – S.D.Sharma(KedarnathRamanath& COBOL) Chapter 1 to 6 (all section).

REFERENCE BOOK:

1. Gross and Crandall - E.W. 1975 Management for Modern Families, Wiley Eastern Pvt. Ltd. New Delhi.

2. Nickell Paulena and Jean Muir Dorsey, 1976, 4th Edition 'Management in Family Living', Wiley Eastern Limited, New Delhi.

3. Devadas R.P., 1968, Textbook of Home Science, Ministry of Food and Agriculture, Community Development and Co-operation, New Delhi.

Course Outcomes:

After completion of the course, student shall be able to

CO1: Solve optimization problems using mathematical tools **K2 & K3**

CO2: Solve transportation and assignment problems **K4**

CO3: Apply integer programming and linear programming to solve real life applications **K4**

CO4: Design simple operation research models to improve decision making **K3**

CO5: Solve networks problems using CPM/PERT **K4 & K5**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	M	M	M	M	S	M
CO2	S	S	M	S	M	M	M	M	S	M
CO3	M	S	S	S	M	M	S	M	S	M
CO4	M	M	S	M	M	M	S	M	M	S
CO5	M	M	M	M	S	S	S	M	M	S

S – Strongly Correlating M- Moderately Correlating

Elective	COMPILER DESSIGN		
	Semester I	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse		
Objectives	1. To learn the concepts of a compiler and its components. 2. To learn the various phases of a compiler such as the scanner, parser, code generator, and optimizer. 3. To understand the similarities and differences between various parsing techniques. 4. Able to use the knowledge of patterns, tokens & regular expressions in solving a real time problem		

UNIT I

Introduction of Complier – Programming Languages – finite automata and lexical analysis – syntactic specification of programming Languages.

UNIT II

Basic Parsing Techniques – Automatic Construction of efficient parsers – syntax-directed translation – more about translation.

UNIT III

Symbol tables – runtime storage administration: Implementation of a simple stack allocation scheme – implementation of block structured languages – storage allocation in block structured languages – Error detection and recovery: errors, lexical phase errors, syntactic-phase errors and semantic errors.

UNIT IV

Code Optimization: Principal sources of optimization – loop optimization – the DAG representation of Basic Blocks and global data-flow analysis. Loop optimization: dominators – reducible flow graphs – depth first search – loop invariant computations – induction variable elimination – some other loop optimization.

UNIT V

Code Generation: object programs – problem in code generation – a machine model – a simple code generator – register allocation and assignment – code generation from DAG's – peephole optimization.

TEXT BOOK

1. Alfred V.Aho and Jeffrey D. Ullman – Principles of Complier Design, Narosa Publishing House, New Delhi.

REFERNCE BOOK

1.AlfredV.Aho and Sethi -Compiler Principles Techniques and Tools-2004

Course Outcomes:

After completion of Course, Students can be able to

CO1: Familiar with the concepts of Compiler and its Components **K2**

CO2: Gain knowledge about the phases of Compiler and its operational behavior **K2**

CO3: Understand the importance and procedures of Parsing techniques **K2**

CO4: Handle code optimization techniques with loop **K3**

CO5: Manage and identify the similarities of Parsing techniques **K4**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	M	M	M	S	M	M
CO2	M	M	S	S	M	S	S	M	M	M
CO3	M	M	S	S	M	S	S	M	M	M
CO4	S	S	M	M	M	M	M	S	M	M
CO5	S	S	M	M	M	S	S	M	M	M

S – Strongly Correlating M- Moderately Correlating

Elective	CLOUD COMPUTING		
	Semester III	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse		
Objectives	1. To understand the principle of cloud virtualization, cloud storage, data management and data visualization. 2. To learn the key dimensions and challenges of Cloud Computing. 3. To facilitate to choose the appropriate technologies, algorithms, and approaches for the related issues. 4. Able to develop and deploy cloud application using popular cloud platforms.		

UNIT I

Introduction: Cloud Computing – History – Working of cloud computing – Cloud computing today – Pros and cons of Cloud Computing – Benefits of cloud computing – Non users of Cloud computing – Developing cloud services – Pros and Cons of Cloud service Development – Types of Cloud Service Development – Discovering Cloud Services development services and tools.

UNIT II

Cloud Computing for Everyone: Centralizing Email Communications – Collaborating of Grocery lists – Collaborating on To-Do lists – Collaborating on Household budgets – Collaborating on Contact lists – Communicating across the community – Collaborating on Schedules – Collaborating on group projects and events – Cloud computing for corporation.

UNIT III

Cloud Services: Exploring online calendar applications – Exploring online scheduling applications – Exploring online planning and task management – Collaboration on event management – Collaboration on Contact Management – Collaboration on Project Management – Collaborating on Word Processing and Databases – Storing and Sharing files and other online content.

UNIT IV

Issues in Cloud: Federation in cloud – Four levels of federation – Privacy in cloud – Security in Cloud –Software as a security service – Case Study: Aneka – service level agreementsCloud Storage: Over view of cloud storage – Cloud storage providers – Amazon S3 – Cloud file system – Map Reduce – Hadoop

UNIT V

Cloud Deployment Tools: Study of open source cloud platforms – Eucalyptus - Nimbus – Open Nebula

TEXT BOOKS:

1. Michael Miller, "Cloud computing – Web based applications that change the way you work and collaborate online", Pearson Education Inc., 2008
2. John W.Rittinghous, James F.Ransome, "Cloud Computing: Implementation, Management and Security", CRC Press 2010.

REFERENCEBOOKS:

1. Danielle Ruest and Nelson Ruest, "Virtualization: A Beginners's Guide", McGraw Hill,2009.
2. Tom White, "Hadoop: The Definitive Guide", O'RIELLY Media 2009.
3. RajkumarBuyya, James Broberg, AndrezjGoscinski, "Cloud computing – Principles and Paradigms", John Wiley and Sons, 2011.

Course Outcomes

After Successful completion of the course, Student shall be able to:

CO1: Identify the architecture, infrastructure and delivery models of cloud computing **K2**

CO2: Design Cloud Services and Set a private cloud **K3**

CO3: Analyze the virtualization and cloud computing concepts **K4**

CO4: Understand the key dimensions and challenges of cloud computing **K2**

CO5: Familiarize with open source cloud computing software and free/commercial cloud services **K2**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	M	M	M	S	M	M
CO2	M	M	S	S	M	S	S	M	M	M
CO3	M	M	S	S	M	S	S	M	M	M
CO4	S	S	M	M	M	M	M	S	M	M
CO5	S	S	M	M	M	S	S	M	M	M

S – Strongly Correlating M- Moderately Correlating

Elective	MOBILE COMPUTING		
	Semester IV	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K6:** Create		
Objectives	1. To impart fundamental concepts in the area of mobile computing 2. To understand a mobile computing system, its hardware and networks. 3. To inculcate problem solving approaches and decision making. 4. Able to apply the fundamental design paradigms and technologies to mobile computing applications.		

UNIT I

Medium Access Control – Motivation for Specialized MAC – SDMA – FDMA – TDMA – CDMA– Comparison of Access Mechanisms – Tele communications – GSM – DECT – TETRA – UMTS – IMT – 200 – Satellite Systems Basics – Routing – Localization – Handover – Broadcast Systems Overview – Cyclic Repetition of Data – Digital Audio Broadcasting – Digital Video Broadcasting.

UNIT II

Wireless LAN Infrared Vs Radio Transmission – Infrastructure Networks – Ad hoc Networks – IEEE 802.11 – HIPERLAN – Bluetooth – Wireless ATM Working Group – Services – Reference Model – Functions – Radio Access Layer – Handover – Location Management – Addressing Mobile Quality of Service – Access Point Control Protocol.

UNIT III

Mobile IP Goals – Assumptions and Requirement – Entities – IP Packet Delivery – Agent Advertisement and Discovery – Registration – Tunneling and Encapsulation – Optimization – Reverse Tunneling – IPv6 – DHCP – Ad hoc Networks.

UNIT IV

Traditional TCP – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit/ Fast Recovery – Transmission/ Timeout Freezing – Selective Retransmission – Transaction Oriented TCP.

UNIT V

Architecture – Datagram Protocol – Transport Layer Security – Transaction Protocol – Session Protocol – Application Environment – Wireless Telephony Application.

REFERENCES BOOKS:

1. J.Schiller, Mobile Communication, Addison Wesley, 2000.
2. William Stallings, Wireless Communication and Networks, Pearson Education, 2003.
3. Singhal, WAP: Wireless Application Protocol, Pearson Education, 2003.
4. LotherMerk, Martin S. Nicklaus and ThomasStober, Principles of Mobile Computing, 2nd Edition, Springer, 2003.
5. William C. Y. Lee, Mobile Communication Design Fundamentals, John Wiley, 1993.

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Understand the characteristics and limitations of mobile hardware devices including their user-interface modalities. **K2**

CO2: Design and development of context-aware solutions for mobile devices. **K3**

CO3: Awareness of professional and ethical issues relating to security and privacy of user data and user behavior **K2**

CO4: Apply the fundamental design paradigms and technologies to mobile computing applications **K3**

CO5: Develop mobile computing applications by analyzing their characteristics and requirements **K6**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	S	M	S	M	M	S
CO2	M	S	M	S	S	S	S	S	M	M
CO3	S	M	S	M	S	M	S	M	M	S
CO4	S	S	M	S	M	M	S	S	M	M
CO5	M	S	S	S	M	S	S	M	S	S

S – Strongly Correlating **M- Moderately Correlating**

Elective	SOFTWARE PROJECT MANAGEMENT		
	Semester I	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K4:**Analyse **K5:** Evaluate **K6:** Create		
Objectives	1. To Understand the fundamental principles of Software Project management 2. To learn the Familiar methods and techniques used for project management. 3. To facilitate with the knowledge of issues and challenges of Software project Management 4. Able to handle Project Scheduling, Quality management and Cost estimation using different techniques.		

UNIT I

Project Evaluation and Project Planning: Importance of Software Project Management – Activities Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.

UNIT II

Project Life Cycle and Effort Estimation: Software process and Process Models – Choice of Process models – mental delivery – Rapid Application development – Agile methods – Extreme Programming – SCRUM – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points – COCOMO II A Parametric Productivity Model – Staffing Pattern.

UNIT III

Activity Planning and Risk Management: Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Monitoring – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical patterns – Cost schedules.

UNIT IV

Project Management and Control: Framework for Management and control – Collection of data Project termination – Visualizing progress – Cost monitoring – Earned Value Analysis- Project tracking – Change control- Software Configuration Management – Managing contracts – Contract Management.

UNIT V

Staffing in Software Projects: Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham-Hackman job characteristic model – Ethical and Programmed concerns – Working in teams – Decision making – Team structures – Virtual teams – Communications genres – Communication plans.

TEXT BOOK:

1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

REFERENCE BOOKS:

1. Robert K. Wysocki "Effective Software Project Management", Wiley Publication, 2011.
2. Walker Royce: "Software Project Management", Addison Wesley, 1998.
3. Gopalaswamy Ramesh, "Managing Global Software Projects" – McGraw Hill Education (India), Fourteenth Reprint 2013.

Course Outcomes:

After completion of the Course, Students can able to

CO1: Understand the fundamental principles of Software Project Management **K2**

CO2: Familiar with project management techniques **K2**

CO3: Manage with the issues and challenges in Software project management **K4**

CO4: Handle Project Scheduling using various techniques **K5**

CO5: Manage and validate Quality checking for Software Project **K6**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	M	M	M	M	S	M	M
CO2	S	M	S	S	S	M	S	M	M	S
CO3	S	M	S	S	M	M	S	M	S	M
CO4	M	M	M	S	S	S	S	M	M	S
CO5	M	M	S	S	S	S	S	M	S	S

S – Strongly Correlating M- Moderately Correlating

Elective	NETWORK SECURITY		
	Semester I	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K4:**Analyse **K5:** Evaluate **K6:** Create		
Objectives	1. To learn the network security concepts: vulnerability, threat and attack 2. To understand symmetric and asymmetric encryption processes. 3. To learn about the various issues and treats of network security 4. Able to design security model to prevent, detect and recover from the attacks.		

UNIT-I: INTRODUCTION

Services and Mechanism: Security Attacks, Security services-Classical Encryption techniques-Cipher Principles-Data Encryption Standard-Block Cipher Design Principles and modes of Operation-Evaluation criteria for AES- AES Cipher- Triple DES- Placement of Encryption function- Traffic Confidentiality.

UNIT-II: PUBLIC KEY CRYPTOGRAPHY

Key Management- Diffie - Hellman Key Exchange-Elliptic Curve Architecture and Cryptography-Introduction to Number Theory- confidentiality using Symmetric .Encryption-public Key Cryptography and RSA.

UNIT-III: AUTHENTICATION AND HASH FUNCTION

Authentication requirements-Authentication functions-Message Authentication Codes – Hash functions-Security of Hash Functions and MACs-MD5 message algorithm-secure Hash Algorithm-RIPEMD-HMAC Digital Signatures-Authentication Protocols-Digital Signature Standard.

UNIT-IV: NETWORK SECURITY

Authentication Applications: Kerberos-X.509 Authentication Service-Electronic Mail Security- PGP-S/MIME-IP Security, Network Security: Electronic mail security, IP Security, Network Management Security

UNIT-V: SYSTEM LEVEL SECURITY

Intrusion detection-password management-Viruses and related Threats-Virus Counter measures -Firewall Design principles –Trusted Systems, SSL, SET, Intrusion Detection.

TEXTBOOKS

1. Williams Stallings " Cryptography and Network Security-Principles and Practices", prentice Hall of India, Third Edition, 2003.

References:

1. AtualKahate , Cryptography and Network Security, McGraw Hill.
2. Bruce Schenier , "Applied Cryptography', John Wiley & Sons Inc,2001.

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Understand the design issues in Network Security **K2**

CO2: Understand the network security services and mechanisms **K2**

CO3: Evaluate authentication and hash algorithms. **K4**

CO4: Identify security threats, security services and mechanisms to counter them. **K5**

CO5: Design a security model to prevent, detect and recover from the attacks. **K6**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	M	M	M	M	S	M	M
CO2	S	M	S	S	S	M	S	M	M	S
CO3	S	M	S	S	M	M	S	M	S	M
CO4	M	M	M	S	S	S	S	M	M	S
CO5	M	M	S	S	S	S	S	M	S	S

S – Strongly Correlating **M- Moderately Correlating**

Elective	ADVANCED DATABASES		
	Semester IV	**Credits:4**	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse **K6:** Create		
Objectives	1. To understand and apply database functions and packages suitable for enterprise database development and database management 2. To learn and discuss and evaluate methods of storing, managing and interrogating complex data 3. To understand the background processes involved in queries and transactions 4. Able to create & manipulate relational database		

UNIT I:

Introduction – Distributed Data Processing, Distributed Data System – Promises of DDBS-Problem Areas **Overview of Relational DBMS:** Relational Database Concepts – Normalization-Integrity-Rules-Relational Data Languages.

Distributed DBMS Architecture: Architectural Models for Distributed DBMS-DDBMS Architecture. **Distributed Database Design**: Alternative Design Strategies-Distribution Design Issues-Fragmentation-Allocation.

UNIT II:

Query Processing and Decomposition: Query Processing Objectives-Characterization of Query Processor-Layers of Query of Query Processing-Query Decomposition-Localization of Distributed Data**.**

Distributed Query Optimization: Query Optimization-Centralized Query Optimization-Distributed Query Optimization Algorithms.

UNIT III:

Transaction Management: Definition-Properties of Transaction-Types of Transaction-Distributed Concurrency Control-Serialization-Concurrency control Mechanism and Algorithms-Time Stamped and Optimistic Concurrency Control Algorithms-Deadlock Management.

UNIT IV:

Distributed Object Database Management Systems: Fundamental Object Concepts and Models-Object Distributed Design-Architectural Issues-Object Management-Distributed Object Storage-Object Query Processing.

UNIT V:

Object Oriented Data Model: Inheritance-Object Identity-Persistent Programming Languages-Persistence of object-Comparing OODBMS and ORDBMS.

TEXT BOOKS:

1. M.Texter OZSU and PatuckValduries,''Principles of Distributed Database Systems'',Pearson Edition,2001.
2. StefanCari and WillipsePeiagatti, ''Distributed Database'',McGraw Hill.
3. Henry P.Korth, A Silberschatz and Sundarshan,Database System Concepts'',McGraw Hill.
4. Raghuramakrishnan and JohanesGeheke,''Database Management Systems'',McGraw Hill.

REFERENCE BOOKS:

1. C.J.Date, A.Kannan and S.Swamynathan,"An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.
2. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education/Addison Wesley, 2007.
3. Thomas Cannolly and Carolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", Third Edition, Pearson Education, 2007.
4. Subramaniam, " Multimedia Databases", Morgan Kauffman Publishers, 2008.

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Understand the use of Structured Query Language (SQL) **K2**

CO2: Create E/R models from application descriptions. **K3**

CO3: Apply normalization techniques to standardize the database. **K3 & K4**

CO4: Design and implement a database system for real time problem **K6**

CO5: Create databases in an RDBMS and enforce data integrity constraints and queries using SQL **K6**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	M	S	M	S	M	M
CO2	M	M	M	S	S	M	S	M	M	S
CO3	M	M	M	S	S	S	S	M	S	S
CO4	M	M	S	S	S	S	S	M	S	S
CO5	M	M	S	S	S	S	S	M	S	S

S – Strongly Correlating **M- Moderately Correlating**

Elective	PARALLEL PROCESSING		
		Credits:4	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse		
Objectives	1. To understand the basic concepts and techniques of parallel processing 2. To understand the appropriate parallel programming model for the given application. 3. To understand the parallel programs using OpenMP and MPI constructs. 4. Able to apply the constructs of parallel programming model to convert a sequential program to parallel program		

UNIT-I

Introduction to parallel processing- parallel processing architecture- programmability issues

UNIT- II

Data dependency analysis- shared memory programming – thread based implementation

UNIT- III

Distributed Computing: Message Passing model,remote procedure call- algorithms for parallel machines – parallel programming languages.

UNIT- IV

Debugging Parallel Programs- other parallelism paradigms.

UNIT-V

Distributed databases- distributed operating systems.

TEXTBOOKS:

1. Introduction to parallel processing by sasikumar. M , dineshshikareanderaviprakash.P , prentice hall of india private limited, new delhi 2000

REFERENCE BOOKS:

1. Ananth Grama, George Karypis, Vipin Kumar and Anshul Gupta, "Introduction to Parallel Computing", Second Edition, Pearson Education Limited, 2003.
2. Shameem Akhter and Jason Roberts, "Multi-core Programming", Intel Press, 2006.
3. Ian Foster, "Designing and Building Parallel Programs: Concepts and Tools for Parallel Software Engineering", Addison Wesley Longman Publishing Co., USA, 1995.
4. David E. Culler, Jaswinder Pal Singh, "Parallel Computing Architecture: A hardware/ Software approach" , Morgan Kaufmann / Elsevier Publishers, 1999.

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Understand the processing of Computer and the function of Memory and its types **K2**

CO2: Know about the function and organization of Input Output devices **K2**

CO3: Understand the digital representation of data in a computer system **K2**

CO4: Identify, understand and apply different number systems and codes **K3**

CO5: Understand computer arithmetic formulate and solve problems **K3, K4**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	M	M	M	M	M	S
CO2	S	M	S	M	M	M	M	M	M	S
CO3	S	M	S	M	M	M	M	S	M	S
CO4	S	S	S	M	S	M	M	S	M	S
CO5	M	S	M	S	S	M	M	S	S	M

S – Strongly Correlating **M- Moderately Correlating**

Elective	MANAGEMENT INFORMATION SYSTEM		
		Credits:4	**Hours: 4**
Cognitive Level	**K2:** Understand **K3:** Apply **K4:**Analyse		
Objectives	1. To introduce the Management Information Systems and its application in organizations 2. To apply Management Information Systems knowledge and skills learned to facilitate the acquisition, deployment and management of information systems. 3. To communicate the strategic alternatives to facilitate decision-making. 4. Able to use information management processes for business systems		

UNIT – I

Foundation of Information System in business- IS Framework- Major role of IS-e-commerce- e-types of IS- IS Information Technology- IS Resources- IS Activites. Competing with information technology- competitive strategies – concepts- business use of IT- customer focused business- value chain- reengineering management – strategies available for virtual company- benefit for creating virtual company- knowledge creating in virtual company

UNIT- II

Computer Hardware-input technology- micro computer system- network computers- PDA- mainframe computer system- processing speed- GUI- pen based computing- speech recognition system- optical scanning method- OCR- output technologies- data storage elements- storage device- RAID storage- types of magnetic disks- optical disks.

Computer software- types of software- COTs software- Email groupware software- ASP- Software Licensing- outline of operating system- multi tasking – resource management- assembler language- high level language – object oriented language- XML

UNIT – III

Telecommunication and Networks- internet revolution- application of internet in IS- Web publishing – extranets – type of networks- optical cables- mulitplexers – VPN- PTP- wireless LAN- wireless web – protocols- network management – enterprise application – enterprise collaboration system.

Electronic business system – cross functional enterprise application- architecture- transaction processing sysem- outline for TP-cycle enterprise collaboration system- tools for

enterprise collaboration – marketing information system – trends in target marketing – computer intergrated manufacturing- HRM – finanancial management system – EDI. Enterprise business system – CRM – Trends in CRM – SCM – Trends in SCM – ERP

Electronic Commerece System-Scopr of e-commerce-categories for e-commerce-security in e-commerce-access control- content and catalogue management- workflow management in e-commerce-e-commerce success factors- collaboration and trading in e-commerce.Decision support system-introduction-decision components-reporting alternative for DSS. Structure- components management- OLAP-GIS-DVS-EIS-Expert system-benefits-neural networks- fuzzy logic system-fuzzy logic system in business-genetic algorithm.

UNIT – VI

Developing business/IT strategies-organizational planning-SWOT analysis-components for business-change management.

Developing Business/IT solutions-developing business/IT solution-SDLC-prototyping process-system analysis-functional requirement analysis-UID.

Network management-protocol-electronic business system- cross functional enterprise applications-electronic commerce system-e-commerce.

UNIT – V

Security and Ethical challenges-principles-business ethics-computer crime-software piracy-piracy issues-encryption-auditing IT security-enterprise and global management of IT-components-failure components-global data access issues-managing global IT.

TEXTBOOK:

1. Management Information System (Conceptual foundations, structure and development) – GordenB.Davis, MargretheH.Olson – Second Edition Tata McGraw Hill Pvt.,Ltd.-2000.

REFERENCE BOOK:

1. Management Information system – Dharminder Kumar, Sangeetha Gupta, I Edition – Excel Books – Anurag Jain for Excel Book- 2006.
2. Management Information System – Women &Jawadekar – III Edition Tata McGraw Hill Publishing Company – 2007.

Course Outcomes:

After completion of the course, Student shall be able to

CO1: Assess the relationship between the digital firm, E-commerce and information technology and identify managerial risks related to information system processing **K2**

CO2: Evaluate the benefits and limitations of enterprise systems and industrial networks **K4**

CO3: Compare the processes of developing and implementing information systems **K4**

CO4: Understand how various information systems work together to accomplish the information objectives of an organization **K2**

CO5: Apply Management Information Systems knowledge and skills learned to facilitate the acquisition, deployment and management of information systems **K3**

Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	M	S	S	M	M	S
CO2	M	M	S	S	S	S	S	S	M	M
CO3	M	M	S	S	S	S	S	S	M	M
CO4	M	M	S	S	S	S	S	S	M	M
CO5	M	S	S	S	S	M	M	S	S	M

S – Strongly Correlating **M- Moderately Correlating**