P.K.R ARTS COLLEGE FOR WOMEN

(Accredited with 'A' Grade by NAAC)
An Autonomous Institution – Affiliated to Bharathiar University
No.:21 Pariyur Road, Gobichettipalayam – 638 476.

Department of Computer Science

MASTER OF SCIENCE IN COMPUTER SCIENCE

BOARD OF STUDIES

for the candidates admitted from the Academic Year 2018-2019 and onwards

Under CBCS PATTERN

PG COURSE STRUCTURE (CBCS – 2018-2019)

Parts	No. of Courses	Credit(s) / Course	Total Credits	Proposed Semester
Part – III : Core Courses (Core / Elective / Project)	24	2/3/4/5	89	I - IV
Part – IV : **Skill Enhancement Course :** i. Cyber security **Core Optional**	1 1	2/3	5	II - III
Part – V : **Proficiency Enhancement :** ii. Online Course / Learning Object Repository iii. Self study Course **iv.** Certificate Course	1 1 1	2 2 2	6	I to IV III I to IV

Total : 2900 & 100 Credits

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MASTER OF COMPUTER SCIENCE

Course Scheme and Scheme of Examinations

(For students admitted from 2018-19 & onwards)

Part	Category	Course Code	Title of the Course	Contact Hours / week	Exam Duration hrs	Max. Marks CIA	Max. Marks ESE	Max. Marks Total	Credits
SESMESTER-I
III	Core: I	18CSP01	Analysis and Design of Algorithms	5	3	25	75	100	4
III	Core: II	18CSP02	Object Oriented Analysis and Design & C++	5	3	25	75	100	4
III	Core: III	18CSP03	Advanced Networks	5	3	25	75	100	4
III	Core: IV	18CSP04	Advanced Software Engineering	5	3	25	75	100	4
III	Core : V	18CSP05	Algorithm and OOPS Practical	5	3	40	60	100	4
III	Core : VI	18CSP06	Networking Practical	5	3	40	60	100	4
III	Core :VII	18CSP07	Comprehension in Computer Science -I (Self Study / Online Exam)	-	1 1/2	-	100	100	1
			TOTAL	30				700	25
SEMESTER – II
III	Core: VIII	18CSP08	Advanced Operating System	5	3	25	75	100	4
III	Core: IX	18CSP09	PHP & MySQL Programming	5	3	25	75	100	4
III	Core: X	18CSP10	Cloud Computing	4	3	25	75	100	3
III	Core: XI	18CSP11	Dot Net Programming	4	3	25	75	100	4
III	Elective: I	18CSP12A/ 18CSP12B/ 18CSP12C	(Internet of Things / Mobile Computing /Artificial Intelligence & Expert Systems	4	3	25	75	100	3
III	Core : XII	18CSP13	Dot net Programming Practical	3	3	40	60	100	3
III	Core : XIII	18CSP14	PHP & MySQL Programming - Practical	3	3	40	60	100	3
III	Core: XIV	18CSP15	Comprehension in Computer Science -II (Self Study / Online Exam)	-	1 1/2	-	100	100	1

IV	Skill Enhancement Course –I	18SEP01	Cyber Security	2	-	100	-	100	2
			TOTAL	30				900	27

SEMESTER- III

III	Core: XV	18CSP16	J2EE Programming	4	3	25	75	100	4
III	Core: XVI	18CSP17	Image Processing & Pattern Recognition	4	3	25	75	100	4
III	Core: XVII	18CSP18	Corporate Culture & Communication	4	3	25	75	100	4
III	Elective: II	18CSP19A/ 18CSP19B/ 18CSP19C	(GIS for Agriculture and Natural Resource Management/ Parallel Processing / Research Methodology)	4	3	25	75	100	4
III	Core : XVIII	18CSP20	Image Processing using Matlab Practical	4	3	40	60	100	4
III	Core : XIX	18CSP21	J2EE Practical	4	3	40	60	100	4
III	Core: XX	18CSP22	Mini Project	3	-	40	60	100	4
III	Core: XXI	18CSP23	Comprehension in Computer Science -III (Self Study / Online Exam)	-	½	-	100	100	1
IV	Core :XXII	**	Core optional	3	3	-	-	100	3
V	Proficiency Enhancement	18PEPCS1	Multimedia Systems(Self Study)	-	3	-	-	100	2
			TOTAL	30				1000	34

SEMESTER- IV

III	Core : XXIII	18CSP24	Major Project	-	-	200	100	300	10
V	Proficiency Enhancement		On-line Course / Learning Object Repository	I – IV SEMSTER					2
			Certificate Course	I – IV SEMSTER					2
			TOTAL	-	-	-	-	2900	100

P. H. L. R.

Head, Department of Computer Science
P.K.R. Arts College for Women (Autonomous)
Gobichettipalayam - 638 476.

** - CORE: XXI – CORE OPTIONAL

A student shall take up one **CORE OPTIONAL** course offered by other departments under Part: III to complete the programme. The score obtained in this course will be accounted for CGPA calculation. The enrollment is based on first come first served basis depending upon the available strength. The following is the list of optional papers offered by each department.

PG PROGRAMME 2018 – 2019 ONWARDS

S.No.	Course Code	Department	Course
1.	18TAPC01	Tamil	Naval Ilakiyam – Kalikattu Ithigasam
2.	18ENPC01	English	Business Communication
3.	18MAPC01	Mathematics	Statistical Methods
4.	18PHPC01	Physics	Concepts of Electrical Appliances
5.	18CSPC01	Computer Science	Animation Practicals
6.	18CGPC01	Commerce	Elements of Taxation
7.	18BAPC01	Management	Agri – Entrepreneurship

I SEMESTER – SYLLABUS

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core	**18CSP01**	**ANALYSIS AND DESIGN OF ALGORITHMS**	**60**	**-**	**4**

Preamble

To be able to carry out the analysis of various algorithms and to understand applications of Data Structures.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Acquire the knowledge on algorithms and dealing with complexities	K1
CO2	Understand the basic data structure techniques	K2
CO3	Obtain familiarity in searching and sorting methods	K3
CO4	Gain detailed knowledge on problem solving techniques	K4
CO5	Solving game theory applications	K5,K6

Core:I ANALYSIS AND DESIGN OF ALGORITHMS

Total hours per week: 5   **No. of Credits: 4**
Total hours in the semester: 60

Unit I :   12 Hours
Introduction

Algorithm Definition and Specification –Space complexity -Time Complexity-Asymptotic Notations - Elementary Data Structure: Stacks and Queues –Binary Tree -Binary Search Tree - Heap –Heapsort -Graph.

Unit II :   **12 Hours**
Basic Traversal And Search Techniques

Techniques for Binary Trees -Techniques for Graphs - Divide and Conquer: - General Method - Binary Search – Merge Sort – Quick Sort.

Unit III :   **12 Hours**

The Greedy Method

General Method –Knapsack Problem –Minimum Cost Spanning Tree – Single Source Shortest Path.

Unit IV: **12 Hours**

Dynamic Programming

General Method –Multistage Graphs – All Pair Shortest Path –Optimal Binary Search Trees – 0/1 Knapsacks – Traveling Salesman Problem –Flow Shop Scheduling.

Unit V :   **12 Hours**

Backtracking

General Method –8-Queens Problem –Sum Of Subsets –Graph Coloring –Hamiltonian Cycles –Branch And Bound:-The Method –Traveling Salesperson.

REFERENCE BOOKS :

1. Ellis Horowitz,"Computer Algorithms", Galgotia Publications, 2nd Edition.

2. Alfred V.Aho,John E.Hopcroft,Jeffrey D.Ullman, "Data Structures and Algorithms", Pearson

   Publications, Ist Edition.

3. Goodrich, "Data Structures & Algorithms in Java", Wiley Publication, 3rd Edition.

4. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core	18CSP02	OBJECT ORIENTED ANALYSIS AND DESIGN & C++	60	-	4

Preamble

To understand the basics of C++ language and the concepts in object models.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of object model	K1
CO2	Obtaining the knowledge thoroughly on classes and objects	K2
CO3	Deals with C++ statements and functions	K3
CO4	Gain detailed knowledge on storage methods	K4
CO5	Apply and work with memory management and file management techniques	K5,K6

Core:II OBJECT ORIENTED ANALYSIS AND DESIGN & C++

Total hours per week: 5   **No. of Credits: 4**
Total hours in the semester: 60

UNIT I :   **12 Hours**

The Object Model

The Evolution of the Object Model – Elements of the Object Model – Applying the Object Model. Classes and Objects: The Nature of an Object – Relationship among Objects.

UNIT II: **12 Hours**

Classes and Object

Nature of Class – Relationship Among classes – The Interplay of classes and Objects. Classification: The importance of Proper Classification –identifying classes and objects –Key Abstractions and Mechanism.

UNIT III :   **12 Hours**

Introduction to C++

Input and output statements in C++ - Declarations -control structures – Functions in C++.

UNIT IV: **12 Hours**

Classes and Objects

Constructors and Destructors –operators overloading –Type Conversion- Inheritance – Pointers and Arrays.

UNIT V: **12 Hours**

Memory Management Operators

Polymorphism – Virtual functions – Files – Exception Handling – String Handling - Templates.

REFERENCE BOOKS

1. Grady Booch, "Object Oriented Analysis and Design with Applications", Pearson Education, Second Edition.

2. Ashok N.Kamthane, "Object -Oriented Programming with ANSI & Turbo C++", Pearson Education, First Indian Print -2003.

3. E. Balagurusamy "Object Oriented Programming with C++", TMH, Second Edition, 2003.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core	**18CSP03**	**ADVANCED NETWORKS**	60	-	4

Preamble

To acquire a thorough knowledge on communication systems and to learn about communication links, network level security

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of data communication and networks	K1
CO2	Gain knowledge on internet protocol layer and addressing	K2
CO3	Acquire knowledge on routing techniques in network	K3
CO4	Understand the concepts of UDP and TCP	K4
CO5	Obtain knowledge on application layer	K5,K6

Core: III ADVANCED NETWORKS

Total hours per week: 5   **No. of Credits: 4**
Total hours in the semester: 60

UNIT I: **12 Hours**

Introduction to digital networks

WAN - WAN standards - Introduction TCP/IP and Internet - network technologies - TCP/IP features, protocol standards Internetworking concepts and Architectural model - Network interface layer.

UNIT II: **12 Hours**

IP layer

Internet Address - Mapping Internet Address to Physical Address - Determining an Internet address at startup - Transparent gateways and subnet addressing - multicast addressing - client-server model of interaction - bootstrap protocol - domain name system - address discovery and binding.

UNIT III :   **12 Hours**

Internet Protocol

Connectionless Datagram delivery - data Structures and input processing. Routing IP datagrams - error and control messages - protocol layering - user datagram protocol - reliable stream transport service - fragmentation and reassembly. Routing: Cores - peers and algorithms - autonomous systems – interior gateways protocols - routing table and routing algorithms

UNIT IV: **12 Hours**

UDP

User datagrams. TCP: Data structures and Input processing - finite state machine implementation - output processing – timer management - flow control and adaptive retransmission - urgent data processing and the push function - socket level interfaces

UNIT V: **12 Hours**

Application layer

Remote login - File transfer Access - electronic mails - Internet management. X.25 networks and support protocols.

REFERENCE BOOKS

1. Douglas E. Comer, "Internetworking with TCP/IP Volume I", Prentice Hall Publications, Edition 1991.
2. Douglas E. Comer, David L. Stevens, "Internetworking with TCP/IP Volume II", Prentice Hall, Edition 1991.
3. Uyless Black, "TCP/IP & Related Protocols" McGraw-Hill Publications, Edition 1995.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core	18CSP04	ADVANCED SOFTWARE ENGINEERING	60	-	4

Preamble

      To understand the principles of Software Quality Control and to enable the students to learn the concepts of Software Engineering

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of software engineering and its models	K1
CO2	Acquire the basic knowledge on the requirement analysis and software quality management	K2
CO3	Obtaining the knowledge thoroughly on software project management	K3
CO4	Gain detailed knowledge on software design and its techniques	K4
CO5	Obtain knowledge on test plan and maintenance	K5,K6

Core:IV ADVANCED SOFTWARE ENGINEERING

Total hours per week: 5   **No. of Credits: 4**
Total hours in the semester: 60

UNIT – I: **12 Hours**
Introduction
The Problem Domain – Software Engineering Challenges - Software Engineering Approach – Software Processes: Software Process – Characteristics of a Software Process – Software Development Process Models – Other software processes.

UNIT– II: **12 Hours**
Software Requirements Analysis and Specification
Requirement engineering – Type of Requirements – Feasibility Studies – Requirements Elicitation – Requirement Analysis – Requirement Documentation – Requirement Validation – Requirement Management – SRS - Formal System Specification – Axiomatic Specification – Algebraic Specification - Case study: Student Result management system. Software Quality Management – Software Quality, Software Quality Management System, ISO 9000, SEI CMM.

UNIT– III: **12 Hours**

Software Project Management

Responsibilities of a software project manager – Project planning – Metrics for Project size estimation – Project Estimation Techniques – Empirical Estimation Techniques – COCOMO – Halsteads software science – Staffing level estimation – Scheduling – Organization and Team Structures – Staffing – Risk management – Software Configuration Management – Miscellaneous Plan.

Unit-IV: **12 Hours**

Software Design

Outcome of a Design process – Characteristics of a good software design – Cohesion and coupling - Strategy of Design – Function Oriented Design – Object Oriented Design - Detailed Design - IEEE Recommended Practice for Software Design Descriptions.

UNIT–V: **12 Hours**

Software Testing

A Strategic approach to software testing – Terminologies – Functional testing – Structural testing – Levels of testing – Validation testing - Regression testing – Art of Debugging – Testing tools - Metrics-Reliability Estimation.Software Maintenance - Maintenance Process - Reverse Engineering – Software Re-engineering - Configuration Management Activities.

REFERENCE BOOKS:

1. Pankaj Jalote "An Integrated Approach to Software Engineering" Narosa Publishing House,
   Delhi, 3rd Edition.
   (Unit – I Chapters: 1.1 to 1.3, 2.1 to 2.4) (Unit – IV Chapters 8.1 to 8.3)
   (Unit – V Chapter 10.6)
2. Rajib Mall ,"Fundamentals of Software Engineering", PHI Publication, 3rd Edition.
   (Unit –II Chapters 4.1 to 4.9, 11.3 to 11.6) (Unit – III Chapters 3.1 to 3.14)
   (Unit – V Chapters 5.1 to 5.3)
3. K.K. Aggarwal and Yogesh Singh,"Software Engineering" –, New Age International
   Publishers, 3rd Edition.
   (Unit – II Chapters 4.2 to 4.5) (Unit – IV Chapters 5.3 to 5.6)
   (Unit – V Chapters 8.1 to 8.8, 9.1 to 9.2, 9.5 to 9.8)
5. R. S. Pressman ,"A Practitioners Approach- Software Engineering", McGraw Hill
   Publications, 6th Edition.
6. Carlo Ghezzi, M. Jarayeri, D. Manodrioli, "Fundamentals of Software Engineering"
   PHI Publication, 2nd Edition.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core lab	18CSP05	ALGORITHM AND OOPS PRACTICAL	-	60	4

Core:V ALGORITHM AND OOPS PRACTICAL

Subject Description: This course provides hand on experience of Algorithm and OOPs concepts

Goal : To enable the students to learn about the usage of OOPS and Algorithm concepts

Objectives :

To understood the Concepts of OOPS and to gain the knowledge to solve Data Structure Problems

1) Write a program to solve the tower of Hanoi using recursion.

2) Write a program to traverse through binary search tree using traversals.

3) Write a program to perform various operations on stack using linked list.

4) Write a program to perform various operations in circular queue.

5) Write a program to sort an array of an elements using quick sort.

6) Write a program to solve number of elements in ascending order using heap sort.

7) Write a program to solve the knapsack problem using greedy method

8) Write a program to search for an element in a tree using divide & conquer strategy.

9) Write a program to place the 8 queens on an 8X8 matrix so that no two Queens Attack.

10) Write a C++ program to perform Virtual Function

11) Write a C++ program to perform Parameterized constructor

12) Write a C++ program to perform Friend Function

13) Write a C++ program to perform Function Overloading

14) Write a C++ program to perform Single Inheritance

15) Write a C++ program to perform Employee Details using files

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core lab	18CSP06	NETWORKING PRACTICAL	-	60	4

Core:VI NETWORKING PRACTICAL

Subject Description: This course provides hand on experience on using TCP Sockets.

Goal : To enable the students to learn about the usage of TCP Sockets

Objectives : On successful completion of the course the students must have

- understood the concepts of TCP Sockets.
- Skill to use Socket Programming.

PROGRAM USING TCP SOCKETS

1. Date And Time Server
2. Client-Server Application For Chat
3. Implementation of TCP/IP Echo
4. Program Using Simple UDP
5. Domain Name System
6. Program Using UDP Socket
7. Programs Using Raw Sockets (Like Packet Capturing And Filtering)
8. Programs Using RPC / RMI
9. Simulation of Sliding Window Protocol
10. Address Resolution Protocol

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
core	18CSP07	**Comprehension in Computer Science – I (Self study/ Online Exam)**	-	-	1

PART III - COMPREHENSION IN COMPUTER SCIENCE – I , II & III

(For those admitted in June 2018-19)

The Comprehension in Computer Science examination will be conducted at the end of each semester II & III for a maximum of 100 marks which consists of

Comprehension (Multiple Choice Questions) (50x2=100)   100 marks

The students are examine on Core, Core Allied, Core Elective papers studied in I, II & III Semester. In the comprehension component, the students are tested on their grasping ability of the subjects of study.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core	18CSP08	ADVANCED OPERATING SYSTEMS	60	-	4

Preamble

To understood the inter process communication problems and file caching schemes and to gain knowledge in Distributed OS and Unix OS

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of operating system and its process models	K1
CO2	Acquire the basic knowledge on Inter process communication	K2
CO3	Obtaining the knowledge thoroughly on Distributed operating system concepts and design	K3
CO4	Obtaining the knowledge on UNIX operating system	K4
CO5	Gain detailed knowledge on process scheduling in UNIX	K5,K6

Core:VIII ADVANCED OPERATING SYSTEMS

Total hours per week: 5   **No. of Credits: 4**

Total hours in the semester: 60

UNIT I: **12 Hours**

Introduction to Operating System

Evolution of Operating systems – Serial, Simple Batch, Mutiprogrammed Batch, Timesharing, Distributed and Real time operating systems – Computer Hardware review – Interrupts - Operating System Concepts – Processes – Model – Creation - Termination – Process Hierarchy – Process States – Implementation of Processes – Threads – Thread Usage – Implementation of Threads in User Space and Kernel space – Multi threading.

UNIT II: **12 Hours**

Inter Process Communication

Race condition – Critical Region – Mutual Exclusion – Sleep and wakeup – Semaphores – Mutexes – Message Passing. Classical IPC Problems : The Dining Philosophers Problem – The Readers and Writers Problem – The Sleeping Barber Problem – Producer Consumer problem.

UNIT III: **12 Hours**

Distributed Operating System Concepts & Design

Fundamentals -Remote Procedure Calls - The RPC Model - Transparency of RPC - Implementing RPC mechanism - Stub Generation - RPC Messages - Server Management - Parameter-Passing Semantics - Call Semantics - Communication Protocol for RPCs. Distributed File System: Introduction - Desirable Features - File Models - File - Accessing Models - File Sharing Semantics - File Caching Schemes - File Replication.

UNIT IV: **12 Hours**

UNIX

Architecture of Unix Operating System – Introduction to system concepts – Kernel data structures – Internal representation of Files – Inodes – Algorithms for allocation and Releasing Inode - Structure of a Regular file – Directories – Super block – Algorithm for assigning new Inode and freeing Inode - Allocation of Disk blocks - Process states and transition – Layout of system memory - The context of a Process

UNIT V: **12 Hours**

Process Control in Unix

Algorithm for Fork system call – Algorithm for Exit – Algorithm for Wait – Algorithm for Exec – Uses of Exec – Algorithm for Booting the Unix system – Algorithm for Init process - Process scheduling algorithm – Example of Process scheduling in Unix. Example C programs by using fork, exec, wait, exit system calls.

REFERENCE BOOKS

1. Andrew S.Tanenbaum,"Modern Operating Systems", PHI/Pearson Education Asia, First Edition, 2001.
2. Pradeep K. Sinha, "Distributed operating systems concepts and design" ,Prentice - Hall of India, Edition 2002.
3. Maurice J. Bach, "The Design of the Unix Operating System", Pearson Education, India, Edition 2013.
4. William Stallings, "Operating Systems", Prentice Hall of India, Second Edition, 2000.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core	18CSP09	PHP & MySQL PROGRAMMING	60	-	4

Preamble

Gain the PHP programming skills needed to successfully build interactive, data-driven sites.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Obtaining the basic concepts of PHP	K1
CO2	Gain the basic knowledge on Decision making and Looping	K1,K2
CO3	Understand the concept in string manipulation and arrays	K1,K3
CO4	Gain detailed knowledge on MySQL Commands	K4
CO5	Obtain knowledge about database manipulation using MySQL	K5,K6

CORE:IX PHP & MySQL PROGRAMMING

Total hours per week: 5   **No. of Credits: 4**
Total hours in the semester: 60

Unit I: **10 Hours**
Introduction to PHP
Introduction to PHP- Evaluation of Php - Basic Syntax - Defining variable and constant-Php Data type- Operator and Expression- Handling Html Form With Php - Capturing Form Data- Dealing with Multi-value filed-Generating File uploaded form -Redirecting a form after-submission

Unit II: **13 Hours**
Decision making and Looping
Decisions and loop - Making Decisions - Doing Repetitive task with looping - Mixing Decisions and looping with Html- Function - What is a function - Define a function - Call by value and Call by reference - Recursive function.

Unit III: **12 Hours**
String Manipulation
String- Creating and accessing String - Searching & Replacing String - Formatting String - String Related Library function- Array - Anatomy of an Array - Creating index based and Associative array - Accessing array Element - Looping with Index based array - Looping with associative array using each() and foreach() - Some useful Library function

UNIT – IV :   **12 Hours**

MySQL an Overview

Introduction –connecting to and disconnecting from the server –Entering queries –creating and using a database –creating a table –loading data into a table – retrieving information from a table –selecting all data –selecting particular rows –selecting particular columns –sorting rows – date calculations –working with NULL values –pattern matching – counting rows – using more than one table.

UNIT – V   **13 Hours**

MySQL Databases in PHP

Introduction –connecting to a MYSQL database –querying the database –retrieving and displaying the results –modifying data –deleting data. Designing simple applications

REFERENCE BOOKS:

1. Steven Holzner, PHP: The Complete Reference, Tata McGraw-Hill Publications, Edition 2017.
2. VIKRAM VASWANI, "PHP and MySQL", Tata McGraw-Hill Publications, Edition 2005.
3. Lee Babin, Nathan A. Good, Frank M. Kromann, Jon Stephens, "PHP 5 RECIPIES, A PROBLEM SOLUTION APPROACH" (Unit IV, V), Apress Publications,Edition 2005

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core	18CSP10	CLOUD COMPUTING	48	-	3

Preamble

To understood the Cloud computing architectures, applications and challenges

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of Cloud Computing Services	K1
CO2	Acquire the basic knowledge on Cloud Computing Schedules	K2
CO3	Acquire detailed knowledge on using Cloud Services in Real Time systems.	K3,K4
CO4	Evaluating the Web Mail Services and collaborating via blogs and Wikis	K5
CO5	Understanding and Evaluating and Exploring Cloud storage with web based desktops	K5,K6

CORE X : CLOUD COMPUTING

Total hours per week: 4   **No. of Credits: 3**
Total hours in the semester: 48

UNIT – I: **10 Hours**
Introduction
Cloud Computing Introduction, From, Collaboration to cloud, Working of cloud computing, pros and cons, benefits, developing cloud computing services, Cloud service development, discovering cloud services.

UNIT – II: **10 Hours**
Cloud Computing For Everyone
Centralizing email communications, cloud computing for community, collaborating on schedules, collaborating on group projects and events, cloud computing for corporation, mapping schedulism managing projects, presenting on road.

UNIT – III: **10 Hours**

Using Cloud Services

Collaborating on calendars, Schedules and task management, exploring on line scheduling and planning, collaborating on event management, collaborating on contact management, collaborating on project management, collaborating on word processing, spreadsheets, and databases.

UNIT – IV: **10 Hours**

Outside the Cloud

Evaluating web mail services, Evaluating instant messaging, Evaluating web conference tools, creating groups on social networks, Evaluating on line groupware, collaborating via blogs and wikis

UNIT – V :   **08 Hours**

Storing and Sharing

Understanding cloud storage, evaluating on line file storage, exploring on line book marking services, exploring on line photo editing applications, exploring photo sharing communities, controlling it with web based desktops.

REFERENCE BOOKS :

1. Michael Miller, "Cloud Computing", Pearson Education, New Delhi,Edition 2009.

2. Anthony T. Velte,Cloud Computing A Practical Approach 1st Edition, Tata Mcgraw Hill Education Private Limited, Edition 2009.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core	18CSP11	DOT NET PROGRAMMING	48	-	4

Preamble

To learn how to implement web applications in ASP.Net using web forms, including programs that interact with databases

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of .NET programming issues	K1
CO2	Understand the basic concepts of .NET statements	K2
CO3	Acquire detailed knowledge on implementing web applications	K3,K5
CO4	Acquire the detailed knowledge Navigation controls	K4
CO5	Apply and work with Database controls	K6

Core : XI DOT NET PROGRAMMING

Total hours per week: 4   **No. of Credits: 4**

Total hours in the semester: 48

UNIT I :   **10 Hours**

Introduction to .NET

Introducing .NET-Our first VB.NET program-Data Types and Operators-Control Statements.

UNIT II: **10 Hours**

.NET Statements

Arrays-Procedures and Structures-Creating menus and using Dialog boxes-Data Access with ADO.NET.

UNIT III: **08 Hours**

Developing a Web Application

Application Structure and State-Web Forms- Standard Controls.

UNIT IV: **10 Hours**

Navigation Controls

Tree View, Menu, and SiteMapPath-Validation Controls.

UNIT V: **10 Hours**

Working with Database Controls

The GridView Control-The DataList Control-The DetailsView Control-The FormView Control-The ListView Control-The Repeater Control.

REFERNCE BOOKS

1. P.Radhaganesan,"VB.NET", Scitech Publications(India) Pvt Ltd,1st Edition 2014.

2. ASP.NET 4.5 Black Book, Dreamtech Press, Kindle Edition, 2013.

3. Martin A and Tomson B, "Teach youself ASP.NET in 24 hours", Sams Publications, Edition 2002.

4. Matt J.Couch, ASP.NET and VB.NET Web Programming", Pearson Education Publicaitons, Edition 2004.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Elective	18CSP12A	INTERNET OF THINGS	48	-	3

Preamble

- Explain in a concise manner how the general Internet as well as Internet of Things work.
- Understand constraints and opportunities of wireless and mobile networks for Internet of Things

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Obtaining the basic concepts of Inter of Things	K1,k2
CO2	Acquire the basic knowledge on Transport services	K1,K2
CO3	Understand the concept of IP-Addressing in network layer	K3
CO4	Gain detailed knowledge on real time networking	K4
CO5	Obtain knowledge about sensor body-area-network and control of a smart home through case study	K5,K6

Elective:I INTERNET OF THINGS

Total hours per week: 4   **No. of Credits: 3**
Total hours in the semester: 48

Unit I: **8 Hours**
Introduction to IoT
Internet in general and Internet of Things: layers, protocols, packets, services, performance parameters of a packet network as well as applications such as web, Peer-to-peer, sensor networks, and multimedia.

Unit II: **10 Hours**
Transport services
Transport services: TCP, UDP, socket programming.

Unit III: **10 Hours**

Network Layer

Network layer: forwarding & routing algorithms (Link, DV), IP-addresses, DNS, NAT, and routers. Local Area Networks, MAC level, link protocols such as: point-to-point protocols, Ethernet, WiFi 802.11, cellular Internet access, and Machine-to-machine.

Unit IV: **10 Hours**

Mobile Networking and Real-time Networking

Mobile Networking: roaming and handoffs, mobile IP, and ad hoc and infrastructure less networks. Real-time networking: soft and real time, quality of service/information, resource reservation and scheduling, and performance measurements.

Unit V: **10 Hours**

Case Study

 IoT definitions: overview, applications, potential & challenges, and architecture. IoT examples: Case studies- sensor body-area-network and control of a smart home.

REFERENCE BOOKS:

1. Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach", Orient Blackswan Private Limited - New Delhi, First edition (2015).
2. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice, John Wiley & Sons, Ltd Publications, Edition 2010.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Elective	18CSP12B	MOBILE COMPUTING	48	-	3

Preamble

To understand the mobile computing applications, techniques and its environment

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of mobile communication and its history	K1
CO2	Acquire the basic knowledge on cellular Mobile Communication	K2
CO3	Acquire detailed knowledge on Mobile Computing	K3
CO4	Gain the detailed knowledge on Parameters of mobile Communication System and Wireless Loop Architecture	K4
CO5	Apply and work with WCDMA in real time Systems	K5,K6

ELECTIVE I : MOBILE COMPUTING

Total hours per week: 4   **No. of Credits: 3**
Total hours in the semester: 48
UNIT – I: **10 Hours**

Introduction

Advantages of Digital Information - Introduction to Telephone Systems –Mobile communication: Need for Mobile Communication – Requirements of Mobile Communication – History of Mobile Communication.

UNIT – II: **10 Hours**

Introduction to Cellular Mobile Communication

Mobile Communication Standards –Mobility Management – Frequency Management – Cordless Mobile Communication Systems.

UNIT – III: **10 Hours**

Mobile Computing

History of data networks – Classification of Mobile data networks - CDPD System – Satellites in Mobile Communication: Satellite classification – Global Satellite Communication – Changeover from one satellite to other – Global Mobile Communication – Interferences in Cellular Mobile Communication.

UNIT – IV: **10 Hours**

Parameters of Mobile Communication System

Important Parameters of Mobile Communication System – Mobile Internet: Working of Mobile IP – Wireless Network Security – Wireless Local Loop Architecture: Components in WLL – Problems in WLL – Modern Wireless Local Loop – Local Multipoint Distribution Service – Wireless Application Protocol.

UNIT –V: **08 Hours**

WCDMA Technology

WCDMA Technology and Fibre Optic Microcellular Mobile Communication – Ad hoc Network and Bluetooth technology – Intelligent Mobile Communication system – Fourth Generation Mobile Communication systems.

REFERENCES

1. T.G. Palanivelu, R. Nakkeeran, Wireless and Mobile Communication, PHI Limited, Edition 2009.
2. Jochen Schiller, Mobile Communications, Second Edition, Pearson Education.2007 Asoke K Talukder,Hasan Ahmed,Roopa Yavagal, Mobile Computing , TMH Publications, Edition 2007.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Elective	18CSP12C	ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS	48	-	3

Preamble

To enriched knowledge regarding heuristic search and to emphasis knowledge representation in Expert systems

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of AI techniques and its issues	K1
CO2	Gain knowledge on using Predicate logic and logic programmimg	K2
CO3	Acquire detailed knowledge on statistical reasoning and knowledge representation	K3,K4
CO4	Acquire the detailed knowledge on Learning	K4
CO5	Gain detailed knowledge on common sense reasoning	K5,K6

ELECTIVE I : ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS

Total hours per week: 4   **No. of Credits: 3**

Total hours in the semester: 48

UNIT I: **10 Hours**

Introduction

AI Problems – AI techniques – Criteria for success. Problems, Problem Spaces, Search: State space search – Production Systems – Problem Characteristics – Issues in design of Search.

UNIT II: **10 Hours**

Using Predicate logic

Representing simple facts in logic - Representing Instance and Isa relationships - Computable functions and predicates - Resolution - Natural deduction. Representing knowledge using rules: Procedural Vs Declarative knowledge - Logic programming - Forward Vs Backward reasoning - Matching - Control knowledge.

UNIT III: **10 Hours**

Statistical reasoning

Probability and Bayes' Theorem- Certainty Factors and Rule Based Systems – Bayesian Network –Demster Shafer Theory- Fuzzy Logic – Knowledge representation – Planning

UNIT IV: **10 Hours**

Learning

What is Learning? – Rote Learning – Learning by taking advice-Learning in Problem Solving –Learning from Examples- Explanation based Learning – Discovery – Analogy – Formal Learning Theory – Understanding : What is Understanding? – What makes understanding Hard?- Understanding as Constraint Satisfaction.

UNIT V: **08 Hours**

Common sense

Qualitative Physics – Common sense ontologies –Memory Organisation –Case-based reasoning– Perception and Action – Expert System.

REFERENCE BOOKS

1. Elaine Rich and Kelvin Knight, "Artificial Intelligence", Tata McGrawhill Publication, 2nd Edition, 1995. (Chapters 1- 6).

2. Stuart Russell & Peter Norvig, "Artificial Intelligence a modern Approach", Pearson Education Publication, 2nd Edition.

3. George F Luger, "Artificial Intelligence - Pearsons Education Publications, 4th Edition 2002.

4. V. S. Janaki Raman, K Sarukesi, P Gopalakrishnan, "Foundations of Artificial Intelligent and Expert Systems"-MacMillan India limited Publications,3rd Edition.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core Lab	**18CSP13**	**DOT NET PROGRAMMING PRACTICAL**	-	36	3

Core:XII DOT NET PROGRAMMING PRACTICAL

Subject Description: This course provides hand on experience on .NET Programming

Goal : To enable the students to learn about .NET Programming

Objectives : On successful completion of the course the students must have

- Skill to create VB.NET and ASP.NET Programs

VB.NET PROGRAMS

1. Font Application
2. Notepad Application
3. Arithmetic Calculator
4. Employee Details
5. Students Information
6. Adding data into a text file

ASP.NET PROGRAMS

1. College Website
2. Online Recruitment system
3. Online Examination System
4. Online Mobile phone shop
5. Online Tax Information system
6. Online voting system

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core Lab	18CSP14	PHP & MySQL PROGRAMMING - PRACTICALS	-	36	3

Core: XIII PHP & MySQL PROGRAMMING - PRACTICALS

Subject Description: This course provides knowledge necessary to design and develop dynamic, database-driven Web pages.

Goal : The goal of the language is to allow web developers to write dynamically generated pages quickly.

Objectives : On successful completion of the course the students must have

- understood the concepts of PHP
- Skill to develop a web page

1. To print out the multiplication table upto 6*6.

2. To generate calculator.

3. To find majority element in an array.

4. To generate Optional Parameters.

5. To sort a list of elements using Cocktail sort.

6. To display JSON decode errors.

7. To Convert Timestamp to Human Readable Format.

8. Write a PHP program to reverse a string/ find the length of the string.

9. Create table structures using MySQL data types

10. Alter the table and insert the data in the database using MySQL

11. Write MySQL DML commands

12. Sort the data and apply SQL aggregate functions

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
core	18CSP15	**Comprehension in Computer Science – II (Self study/ Online Exam)**	-	-	1

PART III - COMPREHENSION IN COMPUTER SCIENCE – I, II & III

(For those admitted in June 2018-19)

The Comprehension in Computer Science examination will be conducted at the end of each semester II & III for a maximum of 100 marks which consists of

Comprehension (Multiple Choice Questions) (50x2=100)   100 marks

The students are examine on Core, Core Allied, Core Elective papers studied in I, II & III Semester. In the comprehension component, the students are tested on their grasping ability of the subjects of study.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Skill Enhancement	18SEP01	CYBER SECURITY	24	-	2

Preamble

To understand the basics of cyber security and the security threats in day-to-day activities.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of information security and its types	K1
CO2	Obtaining the knowledge thoroughly on cyber security and its principles	K1
CO3	Deals with risk management and threats	K1,K2
CO4	Gain detailed knowledge on security issues in social media	K3,K4
CO5	Apply and work with cyber security applications in real world	K5,K6

SKILL ENHANCEMENT COURSE: I CYBER SECURITY

Total hours per week: 2   **No. of Credit: 2**

Total hours in the semester: 24

Unit I: **5 Hours**

Information Security

History of Information Security - Need for Security-**Types of Security:** Physical Security – Network Security –Personal Security –Operation Security –Communication Security - Information Security Threats.

Unit II: **5 Hours**

Introduction to Cyber Security

Cyber Security: Objectives- Roles- Differences between Information Security and Cyber Security. **Cyber Security Principles:** Confidentiality- Integrity – Availability.

Unit III: **5 Hours**

Risks & Vulnerabilities

Risk Meaning: Risk Management –Problems of Measuring Risk -Risk Levels-Risk Analyzes-Risk Assessment –Response to Risk Terminology- **Threats:** Components of Threats-Types of Threats- **Vulnerabilities:** Computing System Vulnerabilities –Hardware Vulnerabilities-Software Vulnerabilities-Data Vulnerabilities-Human Vulnerabilities.

Unit IV: **5 Hours**

Social media

Introduction to social media: What, Why –Pros and cons- **Security issues in social media:** Mail-Facebook-Whatsapp-Twitter-Preventive and control measures.

Unit V: **4 Hours**

Case study

Impact of social media: Education -Business- Banking-Mobile –Human Life- Present generation-Indian scenario.

WEB REFERENCES

1. https://m.youtube.com/watch?v=o6pgd8gLFHg
2. https://m.youtube.com/watch?v=3rl4ZjZpcHU
3. https://blog.barkly.com/10-fundamental-cybersecurity-lessons-for-beginners
4. https://5social media security risk and how to avoid them.html
5. https://10 cyber security twitter profiles to watch.html
6. https://cyber security in banking 4 trends to watch in 2017.html
7. https://gmail hacking security tips-indian cyber security solutions.html
8. https://why social media sites are the new cyber weapons of.html
9. EBook:A complete guide to Staying Ahead in the Cyber Security Game

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core	18CSP16	J2EE PROGRAMMING	48	-	4

Preamble

To understand the basics of J2EE architecture and concepts for developing server-side programming

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the underlying concepts of J2EE platform	K1,K2
CO2	Obtain thorough knowledge on JSP and its advanced features	K1,K2,K5
CO3	Understand the concepts of servlet and its application in server-side programming	K2,K3,K5
CO4	Familiar with database drivers, database connection in J2EE environment	K3,K6
CO5	Gain depth knowledge of entity beans and implementing business methods	K4,K6

Core:XV - J2EE PROGRAMMING

Total hours per week: 4   **No. of Credits: 4**
Total hours in the semester: 48

UNIT I: **10 Hours**
J2EE Introduction

Introduction to Enterprise Java Programming – Multi-Tier Architecture of J2EE –Client Tier Implementation - Classification of clients - Web tier implementation –EJB tier implementation - Enterprise Applications Strategy – clients - Session Management.

UNIT II: **10 Hours**
Java Server Pages

Introduction to JSP- Writing JSP Pages-Translation and Compilation-Errors and Exceptions-Including and Forwarding from JSP Pages - Advanced JSP Topics - Expression Language-Custom Actions and Tag Libraries- Java Server Pages Standard Tag Library (JSTL).

UNIT III: **10 Hours**
Servlets

HTTP and Server Programs -The Servlet Model and HttpServlets –Handling Exceptions-Session Management – Filters -The MVC Architecture.

UNIT IV: 10 Hours

Working with Databases

Connecting to Databases -Statements–Result sets-Prepared Statements-Callable Statements-Data Sources and Connection Pools-Transactions-Locking and Isolation

UNIT V: 08 Hours

EJB Fundamentals

Understanding EJBs -Session Beans- EJB Entity Beans - Developing CMP Entity Beans-Developing BMP Entity Beans

REFERENCE BOOKS:

1. Beginning J2EE 1.4, Kevin Mukhar, James L. Weaver, James P. Crume and Ron Phillips, Wrox Press, Edition 2003.
2. The Complete Reference J2EE, , Jim Keogh, TataMcGraw Hill Publications, Ist Edition.
3. J2EE 1.4 Bible, Mcgovern, et all,Wiley Publication (P) Ltd., Edition 2010.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core	18CSP17	IMAGE PROCESSING AND PATTERN RECOGNITION	48	-	4

Preamble

To cover the basic theory and algorithms that are widely used in digital image processing

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of digital image processing	K1,K2
CO2	Acquire depth knowledge in image enhancement techniques	K2,K3
CO3	Explore on image degradation and restoration methods	K3,K4,K5
CO4	Deals with concepts and methods of image compression and segmentation	K5,K6
CO5	Gain knowledge in patterns and pattern classification	K4,K5

Core: XVI IMAGE PROCESSING AND PATTERN RECOGNITION

Total hours per week: 4   **No. of Credits: 4**

Total hours in the semester: 48

Unit-I: **10 Hours**

Digital Image Processing Fundamentals

Introduction - The origins of Digital Image Processing- Fundamental Steps in Image Processing,-Components of Digital Image Processing System-Image Sensing and Acquisition- Image Sampling and Quantization-Basic relationships between pixels-Linear and Non Linear Operations.

Unit-II: **10 Hours**

Spatial Filtering

Gray Level Transformations- Histogram Processing: Histogram equalization, Histogram specification-Histogram Processing - Basics of Spatial Filters- Smoothening and Sharpening Spatial Filters – Basics of Frequency Filters - Smoothing and Sharpening Frequency Domain Filters.

Unit-III: **10 Hours**

Image Restoration

A model of The Image Degradation / Restoration Process- Noise Models- Restoration in the presence of Noise - Periodic Noise Reduction by Frequency Domain Filtering - Linear Position -Invariant Degradations-Estimation of Degradation Function- Inverse filtering- Wiener filtering- Constrained Least Square Filtering- Geometric Mean Filter-Geometric Transformations.

Unit-IV: **10 Hours**

Image Compression and Image Segmentation

Image Compression - Introduction, Compression Models, Image Compression Standards-Basic Image Compression methods: Huffman coding, Run length coding, LZW coding. Image Segmentation - Point, Line and Edge Detection, Edge Linking and Boundary Detection, Region Based Segmentation.

Unit-V: **08 Hours**

Pattern Recognition

Object Recognition - Patterns and Pattern Classes - recognition based Decision Theoretic Methods - Structural Methods.

REFERENCE BOOKS:

1. Rafael G. Gonzalez ,   Richard E. Woods, Digital Image Processing, Pearson Education.
     3rd Edition.
2. A.K. Jain, Fundamental of Digital Image Processing, PHI Publications, 4th Edition 2011.
3. Chanda&Majumdar,Digital Image Processingand analysis, PHI Publications, 2nd Edition 2007.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core	18CSP18	**CORPORATE CULTURE & COMMUNICATION**	48	-	4

Preamble

To learn about the corporate culture and the business communication concepts

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Know basic purpose of communication	K1,K2
CO2	Learn basics of oral and written communication	K1,K2
CO3	Understand the verbal and nonverbal communication	K2,K5
CO4	Familiarize in concepts of report writing	K3,K4
CO5	Analyze in writing business letters and resume	K4,K5

CORE XVII : CORPORATE CULTURE AND COMMUNICATION

Total hours per week: 4   **No. of Credits: 4**
Total hours in the semester: 48

UNIT-I: **8 Hours**

Nature And Scope Of Communication

Nature And Scope Of Communication - Definition, Classification – Process - Objectives - Purpose - Scope - Functions-Evaluation of Effective Communication - Organizational Communication.

UNIT-II: **10 Hours**

Oral And Written Communication

Oral And Written Communication – Introduction - Verbal Communication Oral – Verbal Communication Written.

UNIT-III: 10 Hours

Non-Verbal Communication

Non-Verbal Communication – Introduction - Characteristics of Non-Verbal Communication – Relationship of Non-Verbal Messages With Verbal Message – Classification of Non-Verbal Communication

UNIT-IV: 10 Hours

Report Writing

Report Writing – Significance, Type of Reports, Routine Reports, Five W's And One H, Report Planning - Report Writing Process- Outline of A Report – Guidelines – Technicalities – Visual Aids – Effectiveness of A Report – Illustrations.

UNIT-V: 10 Hours

Business Letter

Business Letter – Introduction – Different Types of Business Letter – Knowing What Qualifies As A Bad Letter – Essentials of A Business Letters – Layout Of Business Letter – Resume Writing – Introduction – Job Application or Covering Letter – Resume / CV Writing.

REFERENCE BOOK:

1. M K Sehgal Vandana Khetarpal – Business Communication, Excel Books Publications, Ist Edition.
2. sBusiness Communication: Process and Product (with meguffey.com Printed Access Card), 7th Edition.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Elective	18CSP19A	GIS FOR AGRICULTURE AND NATURAL RESOURCE MANAGEMENT	48	-	4

Preamble

Maximize the efficiency of decision making and planning. Provide efficient means for data distribution and handling. Complex analysis/queries is involving geographical reference data to generate new information.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts Geographic Information System(GIS) and working with Arcmap	K1
CO2	Acquire the basic knowledge on the coordinate system and map projection	K2
CO3	Obtaining the knowledge about tables, queries and spatial joins	K3
CO4	Gain detailed knowledge on geocoding	K4
CO5	Obtain knowledge about geodatabase and Raster & Vector analysis	K5,K6

Elective:II GIS FOR AGRICULTURE AND NATURAL RESOURCE MANAGEMENT

Total hours per week: 4   **No. of Credits: 4**

Total hours in the semester: 48

Unit- I: **10 Hours**
Introduction

Introduction: What is GIS?- A history of GIS- What can a GIS do?- GIS project management-Project case study: A thorny issue- Types of GIS projects- Planning a GIS project. Introducing ArcGIS- Mastering the Concepts- ArcGIS overview- Intro to raster and vector data models- Data files in ArcGIS- Properties of spatial data files- Introduction to metadata -Object properties-About ArcCatalog- About ArcToolbox. Working with ArcMap: Mastering the Concepts Concepts Map documents ArcMap windows and menus The Help System Data Frames Data layer. Properties Working with symbols and styles Map scale concepts Labeling concepts.

Unit-II: 10 Hours

Coordinate Systems and Map Projections

Coordinate Systems and Map Projections: Concepts About map projections and GIS-Geographic coordinate systems- Spheroids and datums- Map projections- A note on terminology- Common projection systems- Map projections in ArcMap- Managing coordinate systems- Projecting data- Using ArcToolbox. Drawing and Symbolizing Features: Types of maps- Classifying numeric data- Using map layer files- Editing symbols and using styles- Displaying rasters.

Unit-III: 10 Hours

Tables, Queries & Spatial Joins

Working with Tables: Overview of tables in ArcGIS-Table formats- Field types- Queries on tables- Joining and relating tables- Getting statistics on tables. Queries: What are queries? Interactive selection- Selecting by attributes- Selecting by location- Choosing the selection method- Selection states- Definition queries- Using queries in GIS Analysis. Spatial Joins: What is a spatial join?- Types of spatial joins- Setting up a spatial join. Map Overlay- Examples of Map Overlay-other spatial analysis functions- coordinate systems and map units-Tips for making maps-Tha Layout Toolbar- Working with map scales.

Unit-IV: 8 Hours

Geocoding

Geocoding: What is geocoding? How does geocoding work? Available geocoding styles- The geocoding process- Setting up an address locator- The reference data- Adding x-y coordinates. Basic Editing in ArcMap: Editing overview- The Editor Toolbar- General information about editing- Snapping features- Creating adjacent polygons- Editing features- Editing attributes Saving work. More Editing Techniques: Using different sketch tools- Changing existing features- Combining features- Buffering features- Topology and shared features.

Unit-V: **10 Hours**

Geodatabase and Analysis

Geodatabase: About geodatabases- Creating geodatabases- Creating features datasets- Using default values- Setting up domains- Split and merge policies- About subtypes. Analyzing Networks: About networks- Types of networks- Network analysis- The Utility Network Analyst toolbar- Generic trace solvers- Utility trace solvers- Building networks. Raster Analysis: Raster versus vector models- About rasters- Coordinate systems and rasters- Raster analysis- Boolean map overlay- Controlling analysis options- Spatial Analyst and ArcToolbox.

REFERENCE BOOK:

1. Mastering ArcGIS, Maribeth Price, McGraw Hill Publications, Co. ISBN: 978-0-007-729332-1, 4th Edition.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Elective	18CSP19B	**PARALLEL PROCESSING**	48	-	4

Preamble

To understand the concepts and principles of parallel processing, Multiprocessor architecture

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of parallel processing	K1
CO2	Gain knowledge in memory and input/output system	K1,K2
CO3	Get exposed to pipeline processors and various memory organization	K2,K3
CO4	Analyze various array processors and SIMD interconnection networks	K3,K4
CO5	Deals with Multiprocessor architecture and Inter processor communication mechanism	K5

Elective: II PARALLEL PROCESSING

Total hours per week: 4   **No. of Credits: 4**

Total hours in the semester: 48

Unit – I :   **8 Hours**

Parallel Processing

Introduction to parallel processing – definition and functions of parallel processing – uni-processor and parallel processing systems – parallel computers – pipeline computers – array processor – multiprocessor systems – performance of parallel computers – application of parallel processor.

Unit – II :   **10 Hours**

Memory and Input/Output system

Memory and input/output system – memory system for parallel processor computers – hierarchical memory structures – virtual memory system – paged system – segmented system with paged segments – memory management policies – fixed partitioning and variable partitioning – cache memories and management – characteristics of cache memories – cache memory organization – input/output subsystem – characteristics of I/O subsystem – Interrupt Mechanism and special hardware – I/O processor and channel architecture.

Unit – III :   **10 Hours**

Pipeline Computers

Pipeline computers – principles of linear pipelining – pipelined structures of a typical central processing unit – classification of pipeline processors – interleaved memory organization – S access memory organization – C access memory organization – C & S access memory organization – Static & dynamic pipelining – principles of designing static pipeline processors – Instruction prefetch and branch handling – data buffering and busing structures – Internal forwarding and register tagging – vector processing – requirements and characteristics of pipelined vector processing methods.

Unit - IV :   **10 Hours**

Array Processors

Array Processors – Single Instruction stream – Multiple data stream – SIMD processors – Types of SIMD computer organization – Array processor organization and associative processors – Array processor computer organization – SIMD interconnection networks – Static and Dynamic networks – Linear array, mesh, ring, star, tree, systolic, completely connected, chordal ring and cube networks – Parallel algorithms for array processors – SIMD matrix multiplication – Parallel sorting on array processors.

Unit - V: **10 Hours**

Multiprocessor Architecture

Multiprocessor architecture – Functional structures of a multiprocessor system - loosely and tightly coupled multiprocessor – Processor characteristics of multiprocessing – Inter processor communication mechanism – Instruction set – Interconnection networks – Time shared or common bus – cross bar switch and multi port memories and multistage networks for multiprocessor – Parallel memory organization – Interleaved memory configurations – classification of multiprocessor operating system.

REFERENCE BOOKS:

1. Kai Hwang, Faye A.Briggs, "Computer Architecture and Parallel Processing , Prentice Hall of India Publications, Edition 1985.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Elective	18CSP19C	**RESEARCH METHODOLOGY**	48	-	4

Preamble

      To expose the students with the principles, procedures and techniques of research methodology and assist in planning, carrying and implementing a research project.

Course Outcomes

      On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Define research and describe the research process and research methods	K1,K2
CO2	Establish a theoretical framework for the research topic, define key terms, definitions and terminology, identify studies, models and case studies supporting the topic.	K2,K3
CO3	Understand and apply basic research methods including research design, data analysis and interpretation	K3,K4
CO4	Deals with basic statistics required for research	K3,K4,K5
CO5	Provide guidelines for oral and written presentation of research findings.	K5,K6

Elective II: RESEARCH METHODOLOGY

Total hours per week: 4   **No. of Credits: 4**
Total hours in the semester: 48
Unit-I: **10 Hours**

Research Methodology

Introduction to Research - Meaning, Objectives and Types – Research approaches – Research methods Vs methodology - Research Process – Criteria of Good Research – Limitations of Research.

Unit-II: **10 Hours**

Literature Review & Problem Identification

Literature Review - Purpose of Review of Literature – Literature Search Procedure – Sources of Literature – Importance of Review of Literature. Selecting a Research Problem – Problem Definition - Necessity, Techniques and Illustration.

Unit-III: 10 Hours

Research Design and Data

Essentials of Research Design - Need , Features of a good design and important concepts - Classifications of Research Design – Basic Principles Of Experimental Design - Measurement and Scaling: Quantitative, Qualitative, Classification of Measure scales, Data Collection, Data Preparation.

Unit-IV: 10 Hours

Mathematical Modeling

Descriptive Statistics - Measures of Central Tendency, Measures of Dispersion, Measure of Skewness, Kurtosis, Measure of Relationship - Regression Analysis - Dependent and Independent variables, Simple Linear Regression model - Hypothesis – Fundamentals of Hypothesis testing –Testing the Hypothesis.

Unit-V: 8 Hours

Report Writing

Report Writing - Significance Of Report Writing – Different Steps In Writing Report – Layout Of Research Paper – Types Of Report – Oral Presentation – Mechanics Of Writing Research Report - Precautions Of Writing Research Report -Case study - Preparing a research paper for a scientific journal.

REFERENCE BOOKS:

1. C R Kothari, Gaurav Garg "Research methodology Methods and Techniques", New Age International publishers, 3rd Edition.
2. Santosh Gupta , "Research Methodology Methods and Statistical Techniques", Deep & Deep Publishers, Edition 2000.
3. Kumar, "Research Methodology: A Step by Step Guide for Beginners", Pearson Education, 3rd Edition 2010.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core Lab	18CSP20	IMAGE PROCESSING USING MATLAB PRACTICAL	-	48	4

Core:XVIII IMAGE PROCESSING USING MATLAB PRACTICAL

Subject Description: This course provides hand on experience of using MATLAB in image processing

Goal : To enable the students to design and implement their own imaging solutions using MATLAB to solve practical problems in image processing

Objectives :

The objective of this course is to study the fundamentals of digital image processing including image enhancement, filtering, segmentation and compression.

1. Perform shrinking, zooming and cropping of an image

2. Perform the experiment for histogram equalization

3. Implement Smoothing and Sharpening using filters

4. Implement the image enhancement Technique

5. Implement a function for Image Restoration

6. Implement Image Filtering techniques

7. Implement a) Edge Detection b) Line Detection

8. Implement a function for image segmentation

9. Boundary extraction using morphology

10. Implement image compression

11. Perform blurring and de-blurring on an image / Implement a function for image morphology that analyze the form and shape detail of image structures.

12. Perform Removal of salt and pepper noise / Implement models for representing the color and methods of processing the color plane

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core Lab	18CSP21	J2EE PRACTICAL	-	48	4

Core:XIX J2EE PRACTICAL

Subject Description: This course provides hand on experience of implementing J2EE technologies.

Goal : To enable the students to work with JDBC, Servlets, JSP and EJB

Objectives :

The objective of this course is to study J2EE which applies to all aspects of building and developing large scale applications

1. Write a JAVA Program to insert data into Student DATA BASE and retrieve information based on particular queries
2. Write a JAVA Program to insert data into Employee DATA BASE and retrieve information based on particular queries
3. Write a Servlet Program to implement a dynamic HTML using Servlet (user name and password should be accepted using HTML and displayed using a Servlet).
4. Write a Servlet Program to implement and demonstrate get() and Post() methods (Using HTTP Servlet Class).
5. Write a Servlet Program to implement sessions (Using HTTP Session Interface).
6. Write a Servlet Program to download a file and display it on the screen (A link has to be provided in HTML, when the link is clicked corresponding file has to be displayed on Screen)
7. Write a JSP Program to implement verification of a particular user login and display a welcome page.
8. Write a JSP Program to get student information through a HTML and display the same information through another JSP.
9. Write a JSP Program to get train ticket reservation through a HTML and display the output as printable ticket format.
10. Write an EJB application that demonstrates Session Bean.
11. Write an EJB application that demonstrates Entity Bean / Write an EJB application that demonstrates Message Driven Bean.
12. Write a JAVA Servlet Program to implement sendRedirct() method(using HTTP ServletClass) / Write a JAVA Servlet Program to implement sessions (Using HTTP Session Interface).

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
core	**18CSP22**	**Mini Project**	**3**	**-**	**4**

MINI PROJECT (GUIDELINES FOR MINI PROJECT):

- The aim of the Mini Project is to lay a foundation for the Main Project.

- Each student should carry out individually one Mini Project Work and it may be a case study using the software packages that they have learned or may be an implementation of a concept in a paper prescribed on a journal.

- It should be compulsorily done in the college only under the supervision of the staff concerned.

Departments encouraging project work may adopt the following structure for evaluation of reports else, they shall define their own rubrics as per need. **The project reports** are evaluated at the end of semester by the **Internal & External Examiners** as appointed By COE. Following weightages shall be used to evaluate the Project report:

SPLIT - UP	COMPONENTS		TOTAL MARKS (100)
CIA	Review I and Presentation	20	40
	Review II and Presentation	20	
ESE*	Problem Identification	10	60
	Nature of Work / Logic behind the study	20	
	Learning Outcome	10	
	Viva – Voce	20	

*ESE Viva-Voce for projects will be jointly conducted by internal and external examiners.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
core	18CSP23	**Comprehension in Computer Science – III (Self study/ Online Exam)**	-	-	1

PART III - COMPREHENSION IN COMPUTER SCIENCE – I, II & III

(For those admitted in June 2018-19)

The Comprehension in Computer Science examination will be conducted at the end of each semester II & III for a maximum of 100 marks which consists of

Comprehension (Multiple Choice Questions) (50x2=100)   100 marks

The students are examine on Core, Core Allied, Core Elective papers studied in I, II & III Semester. In the comprehension component, the students are tested on their grasping ability of the subjects of study.

Proficiency Enhancement - Self Study:

No lecture hours are provided for self study courses and the students are expected to prepare the courses on the prescribed syllabi by their own. Students have to appear for the ESE that would be conducted as per the curriculum specification of each department and scoring a passing minimum is mandatory for completion of the programme. The score obtained in these courses will also be accounted for CGPA calculation.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Proficiency Enhancement (Self Study)	18PEPCS1	**MU LTIMEDIA SYSTEMS**	-	-	2

Preamble

To expose students to understand the various concepts of compression methods, hardware and software used in multimedia and to get familiar with the various file formats used in multimedia.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To get introduced on Architecture and other multimedia evolving technologies	K1
CO2	To enrich knowledge multimedia hardware and software elements	K2,K3
CO3	To learn various multimedia input and output tools and technologies	K2,K5
CO4	To understand about various multimedia subsystems	K3,K4
CO5	To acquire knowledge how multimedia is used in day to day life in various application models.	K2,K6

PROFICIENCY ENHANCEMENT: MULTIMEDIA SYSTEMS

No. of Credits: 2

UNIT I :

Fundamentals of Multimedia

Elements of Multimedia systems – Needs – Benefits – Converging of Multimedia application development, multimedia building blocks - Text – Sound – images – video – animation.

UNIT II:

Significance of Multimedia

PC Platform – SCSI , MCI(Media control interface), Storage for Multimedia – DVD &CD, Input devices and Output Hardware, communication devices, multimedia workstation

UNIT III:

Multimedia Tools

Hypertext – hypermedia – document architecture – MPEG, Basic tools – image forming, painting and drawing tools – sound editing programs, Video formats –quick time, Linking multimedia objects – OLE , DDE. Office suites – presentation tools-User interface design

UNIT IV:

Multimedia Subsystems

Application Subsystem , Transport subsystem , QOS, Synchronization, Presentation, Multimedia Synchronization- single user – multimedia on networks

UNIT V:

Real Time Applications

Multimedia OS – Process Management – File handling , Multimedia DBMS – Data structures for storage – Indexing techniques – Information retrieval, Search Engine – Case study.

REFERENCE BOOKS:

1. Steinmetz and Klara Nahrstedt, "Multimedia Computing, communication and application",

Pearson Education Asia Publications, Edition 1995.

2. Tay Vaughnan, "Multimedia: Making it work", Tata McGraw-Hill Publications, 5th Edition 2001.

3. Jeffcoat, "Multimedia in Practice- Technology and applications", PHI Publications, Edition 1995.

SEMESTER - IV

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core	18CSP24	**Major Project**	-	-	10

MAJOR PROJECT (GUIDELINES FOR MAJOR PROJECT):

- Each student should carry out individually one Major Project Work using the software packages that they have learned or may be an implementation of a concept in a paper prescribed on a journal.

- It should be compulsorily done in the IT Industry or some other company only under the supervision of the staff concerned.

Departments encouraging project work may adopt the following structure for evaluation of reports. **The project reports** are evaluated at the end of semester by the **Internal & External Examiners** as appointed By COE. Following weightages shall be used to evaluate the Project report:

SPLIT - UP	COMPONENTS		TOTAL MARKS (300)
CIA	Regularity	20	200
	Review I and Presentation	60	
	Review II and Presentation	60	
	Review III and Presentation	60	
ESE*	Problem Identification	20	100
	Nature of Work / Logic behind the study	20	
	Learning Outcome	10	
	Viva – Voce	50	

*ESE Viva-Voce for projects will be jointly conducted by internal and external examiners.

** - CORE: XXI – CORE OPTIONAL

A student shall take up one **CORE OPTIONAL** course offered by other departments under Part: III to complete the programme. The score obtained in this course will be accounted for CGPA calculation. The enrollment is based on first come first served basis depending upon the available strength. The following is the list of optional papers offered by each department.

PG PROGRAMME 2018 – 2019 ONWARDS

S.No.	Course Code	Department	Course
1.	18TAPC01	Tamil	Naval Ilakiyam – Kalikattu Ithigasam
2.	18ENPC01	English	Business Communication
3.	18MAPC01	Mathematics	Statistical Methods
4.	18PHPC01	Physics	Concepts of Electrical Appliances
5.	18CSPC01	Computer Science	Animation Practicals
6.	18CGPC01	Commerce	Elements of Taxation
7.	18BAPC01	Management	Agri – Entrepreneurship

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core Optional	18COP05	ANIMATION PRACTICAL	-	36	3

Core:XX ANIMATION PRACTICALS

Subject Description: This course provides hand on experience of implementing animation techniques

Goal : To enable the students to work with Adobe Photoshop and Flash

Objectives :

The objective of this course is to study Photoshop and Flash which applies to all aspects of building and developing animation techniques.

1. Design a text using blended option using photoshop.
2. Design a text using fire effect using photoshop.
3. Change black and white image into color image using photoshop.
4. Design a text using bold floral text effect in photoshop.
5. Create an image using water color effects in photoshop.
6. Create an image using crack effect in human face using photoshop.
7. Create an animation effect to bounce a ball using flash.
8. Create an animation effect for man walking using flash.
9. Create an animation for eye blinking using flash.
10. Create an animation using tweening effect using flash.
11. Create an animation for tree falling effect using flash.
12. Create an animation for simple character head turn.