MASTER OF COMPUTER APPLICATIONS
(For students admitted from 2020-21 & onwards)

The curriculum of all programme courses are highlighted with Employability – Pink Color, Entrepreneurship – Yellow Color and Skill-Development – Red Color

P.K.R ARTS COLLEGE FOR WOMEN
(Accredited with 'A' Grade by NAAC)
An Autonomous Institution – Affiliated to Bharathiar University
Gobichettipalayam – 638 476.

MASTER OF COMPUTER APPLICATIONS
Course Scheme and Scheme of Examinations
(For students admitted from 2020-21 & onwards)

Part	Category	Course Code	Title of the Course	Contact Hrs/ week	Exam Duration hrs.	Max. Marks			Credits
						CIA	ESE	Total marks	
			I –SEMESTER						
III	Core: I	20CAP01	Python Programming	4	3	25	75	100	4
III	Core :II	20CAP02	Advanced Java	4	3	25	75	100	4
III	Core : III	20CAP03	Research Methodology	4	3	25	75	100	4
III	Core : IV	20CAP04	Data Communication and Networking	4	3	25	75	100	3
III	Core : V	20CAP05	Operations Research	4	3	25	75	100	3
III	Core : VI	20CAP06	Python Programming – Practical	5	3	40	60	100	4
III	Core : VII	20CAP07	Advanced Java - Practical	5	3	40	60	100	4
III	Core : VIII	20CAP08	Comprehension in Computer Science – I (Self Study/ Online Exam)	-	1 1/2	-	10 0	100	1
			TOTAL	30				800	27
			II –SEMESTER						
III	Core: XI	20CAP09	NET Programming	5	3	25	75	100	5
III	Core: X	20CAP10	Computer Graphics and Multimedia	5	3	25	75	100	5
III	Core: XI	20CAP11	Software Project Management	4	3	25	75	100	4
III	Core X11: Elective I	20CAP12A/ 20CAP12B/ 20CAP12C/ 20CAP12D	Client Server Technology / Digital Image Processing / Open Source System / Internet of Things/	4	3	25	75	100	3
III	Core X111: Elective: II (CBCS)	20CAP13A/ 20CAP13B/ 20CAP13C/ 20CAP13D	Mobile Computing / Distributed Computing / Cloud Computing / Remote sensing and Geomatics for Agriculture and Forestry	4	3	25	75	100	3

Part	Course	Code	Title						
III	Core: XIV	20CAP14	.NET Programming- Practical	3	3	40	60	100	4
III	Core:XV	20CAP15	Computer Graphics and Multimedia - Practical	3	3	40	60	100	4
III	Core: XVI	20CAP16	Comprehension in Computer Science – II (Self Study/ Online Exam)	-	1 1/2	-	100	100	1
IV	Ability Enhancement Course:1	20AEP01	Cyber Security	2	-	100	-	100	2
			TOTAL	30				900	31

III –SEMESTER

Part	Course	Code	Title						
III	Core :XVII	20CAP17	Data Mining and Warehousing	5	3	25	75	100	5
III	Core XVIII: Elective – III (CBCS)	20CAP18A/ 20CAP18B/ 20CAP18C/ 20CAP18D	Natural Language Processing/ Soft Computing/ Component Based Systems/GIS for Land Resource Management	5	3	25	75	100	3
III	Core XIX: Elective – IV (CBCS)	20CAP19A/ 20CAP19B/ 20CAP19C/ 20CAP19D	C# Programming/ Robotics/ Learning Big Data & Hadoop/ Information Retrieval Techniques	5	3	25	75	100	3
III	Core: XX	20CAP20	Data Mining using R Practical	6	3	40	60	100	4
III	Core:XXI	20CAP21	Mini Project and Viva voce	6	-	40	60	100	5
III	Core :XXII	20CAP22	Comprehension in Computer Science – III (Self Study/ Online Exam)	-	1 1/2	-	100	100	1
III	Core: XXIII	20CAP23	Institutional Training	-	-	100	-	-	2
III	-	**	Open Elective	3	3	40	60	100	3
V	Proficiency Enhancement	20PECAP24	Multimedia Systems (Self Study)	-	3	-	-	100	2
			Total	30				900	28

IV –SEMESTER

Part	Course	Code	Title						
III	Core: XXV	20CAP25	Major Project and Viva-voce	-	-	200	100	300	10
V	Competency Enhancement		Online Course / Learning Object Repository	I-IV SEMESTER					2
			Certificate Course	I-IV SEMESTER					2
			Total	-	-	-	-	2900	102

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CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: I	20CAP01	PYTHON PROGRAMMING	48	-	4

Preamble

To gain knowledge on basics of Python and to enrich the *programming* skills needed for

software development

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To get introduced to Python Programming	K1
CO2	To acquire knowledge about Expressions, Operator Precedence, errors	K3
CO3	To develop programs using conditional statements and expressions	K3,K5
CO4	To understand iteration concepts using looping statements	K2, K4
CO5	To learn how to work with Lists, Objects and Handling exceptions.	K3, K6

CORE I - PYTHON PROGRAMMING

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

UNIT I

Introduction to Python programming

 Learning Programming with Python- Writing a Python Program-The Python Interactive Shell-
  A Longer Python program- Values and Variables   **(8 hours)**

UNIT II

Expressions and Arithmetic

Expressions -Mixed Type Expressions-Operator Precedence and Associativity-Formatting
Expressions-Comments- Errors -More Arithmetic Operators- working with examples.

(10 hours)

UNIT III

Conditional Execution

Boolean Expressions- The Simple if Statement- The if/else Statement- compound boolean expressions- The pass Statement- Floating-point Equality Nested Conditionals- Multi-way Decision Statements- Multi-way Versus Sequential Conditionals -Conditional Expressions

(10 hours)

UNIT IV

Iteration

The while Statement - Definite Loops vs. Indefinite Loops- The for Statement- Nested Loops-Abnormal Loop Termination-Infinite Loops- Iteration Examples-Using Functions-Writing Functions- More on Functions.

(10 hours)

UNIT V

Working with list

List- Tuples, Dictionaries, and Sets - Lists Processing: Sorting - Flexible Sorting – Search - Objects-Custom types-Handling Exceptions

(10 hours)

REFERENCE BOOKS:
1. Learning to Program With Python- Richard L. Halterman , Copyright © 2011(ebook)
2. Fundamentals of Programming Python, Richard L. Halterman, Southern Adventist University, November 30, 2017.
3. Introduction to Computing and Problem Solving Using Python, E.Balagurusamy, McGraw Hill Education,3rd Edition.
4. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus ,Charles Dierbach, ISBN: 978-0-470-55515-6. Dec 2012.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: II	20CAP02	ADVANCED JAVA	48	-	4

Preamble

Presents the basic concepts of object oriented programming, methods data types, class and objects, packages; overview of JDBC, Overview of Servlet technology.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basics concepts of Java Programming	K1,K2
CO2	Enrich knowledge about Threads and IO Streams	K2
CO3	To develop programs using Networking and JDBC database access	K3
CO4	To apply the knowledge of Java Servlets	K3, K6
CO5	Gain experience in Java server pages and RMI	K4, K5,K6

CORE: II - ADVANCED JAVA

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

Unit I

Overview of Java

Object-Oriented programming- fundamentals - Object- Oriented Programming and Java basics -Event-Driven programming- Generic programming.

(8 Hours)

Unit II

Java Library

Concurrent Programming: Thread- Multithreading and Multitasking- The Thread model in Java- Life cycle of a thread- Creating Own Threads-Identifying thread Priorities-Thread Methods. **Java Library:** Java IO Streams- string handling- Java Language class – Java Utility class- Java collections framework.

(10 Hours)

Unit III

Database Connectivity

Network programming in Java: Networking basics - URLs and URL Connections- TCP/IP and Client Server- User Datagram protocol- Transmission Control Protocol- Network programming and Threads - Hyper Text Transfer Protocol. **Multi-tier application development:** Server-side programming- JDBC.

(10 Hours)

Unit IV

Servlets

Servlets: Servlets Architecture- Environment setup- Life cycle- First program- Form data- Client HTTP request- Server HTTP response- HTTP status code- Writing filters- Exception handling- Cookies handling- session tracking- Database access- File uploading- Handling date- Servlets- page redirection- sample programs- Servlets-packaging- Debugging- Internationalization.

(10 Hours)

Unit V

Java Server Pages

An overview- advantages of JSP –Architecture – JSP Processing- JSP life cycle – JSP Comments- JSP-Syntax- Implicit objects- control-flow statements- client-server JSP- Database access- XML data-custom tags- Expression language- Exception Handling- Debugging- Security- Internationalization- JSP standard tag library-Applet to applet communication-applet to servlet communication- servlet to applet communication- java media framework. **Applications in distributed environment:** Need- overview-architecture – advanced concepts in RMI.

(10 Hours)

REFERENCE BOOKS:

1. B.Prasanalakshmi, ”Advance Java Programming” CBS publishers and Distributers Pvt ltd.

ISBN: 978-93-881-0813-3.

2.Jamie Jaworski, "Java Unleashed" , SAMS Techmedia Publications 1999

3.Campione, Walrath and Huml, "The Java Tutorial", Addison Wesley 1999

4. Jim Keogh," The Complete Reference J2EE", Tata McGrawHill Publishing Company Ltd,2002

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: III	20CAP03	**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

COREIII: 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 Survey & Problem Identification
Literature Survey 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

(10 hours)

Unit-III:

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", Third edition,New Age International publishers.
2. Santosh Gupta ,"Research Methodology Methods and Statistical Techniques" ,Deep & Deep Publishers
3. Kumar," Research Methodology: A Step by Step Guide for Beginners", 3rd. ed. Indian: PE, 2010

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: IV	20CAP04	DATA COMMUNICATION AND NETWORKING	48	-	3

Preamble

To enable the students to learn the computer networks concepts and layer description. Understood the use of computer network and the functions of Digital Transmission.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To acquire knowledge about the use of computer networks, Network hardware and software. Usage of Reference models and examples of networks.	K1
CO2	To get introduced to Analog and Digital transmission using various Channels.	K2,K3
CO3	To acquire knowledge about Wired and wireless networks and its way of transmitting data through different layers.	K2
CO4	To understand concepts about Addressing on different protocols and process. Acquiring knowledge about congestion control and quality of data.	K2,K5
CO5	To enrich information about managing the data, security for the data using cryptography, file transfer and E-mail.	K2, K6

CORE IV – DATA COMMUNICATION AND NETWORKING

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

UNIT I

Network Layers

Introduction: Data communications – Networks – The internet - Protocols and standards – Network models: OSI Model-Layers-TCP/IP protocol Suite-Addressing– Digital Transmission.

(10 Hours)

UNIT II

Data Transmission

Analog transmission – Switching: Circuit switched Networks-Datagram Networks-Virtual circuit networks – Error detection and correction - Protocols – Noiseless channels – Noisy channels – Point to Point control. **(8 Hours)**

UNIT III

Wired And Wireless Networks

Multiple access – Wired LANs: Ethernet – wireless LANs: IEEE 802.11-Bluetooth – Connecting devices:-Backbone networks-Virtual LANs – SONET /SDH: Architecture – SONET Layers-SONET Networks.

(10 Hours)

UNIT IV

Network Addressing

Logical Addressing: IPv4 Addresses –IPv6 Address– Internet Protocol – Process-To-Process Delivery: UDP, TCP and SCTP –Congestion Control and Quality of service : Data Traffic-Congestion-Congestion Control.

(10 Hours)

UNIT V

Network Management And Security

Remote logging, Electronic mail and File transfer- Network management: SNMP multimedia – Network security: Security Service- Message Confidentiality-Message Integrity-Digital Signature-Entity Authentication.

(**10 Hours)**

REFERENCE BOOKS :

1. Behrouz A Forouzan, "DATA COMMUNICATION AND NETWORKING ",TaTa McGraw Hill 4th Edition.
2. William Stallings,"Data and Computer Communications", Prentice Hall of India Pvt.Ltd, 4thContents

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: V	20CAP05	**OPERATIONS RESEARCH**	48	-	3

Preamble

To enable the students to understand the linear programming problems, the Inventory control concepts , the concept of replacement and CPM , PERT.

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	To define and understand general linear Programming problem, transportation problem, costs involved in inventory, Characteristics of queuing system,network scheduling.	K_1, K_2
CO2	To apply simplex method, Modi's algorithm, Hungarian algorithm, replacement models and models in queueing system	K_3
CO3	To analyze and evaluate planning and scheduling problems	K_4 & k_5

CORE V-OPERATIONS RESEARCH

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

UNIT I :

Linear Programming

Formulation of LPP – Graphical solutions to LPP –Simplex Method - Big M method – Two – Phase Simplex Method - Duality in Linear Programming: Primal & Dual Problems – Dual Simplex Method. **(10 Hours)**

UNIT II :

The Transportation Problem

Introduction – Mathematical Formulation- Finding Initial Basic Feasible Solutions – Moving towards Optimality – Unbalanced Transportation Problems – Degeneracy. The Assignment Problem: Introduction – Mathematical formulation - Hungarian Assignment Method – Maximization in Assignment Problem – Unbalanced Assignment Problem – Impossible Assignment.

(10 Hours)

UNIT III :

Inventory Control

Introduction – Costs involved in inventory - Deterministic models : EOQ models without and with shortage - Buffer stock and Reorder Level – Price Break models – ABC Analysis.

(10 Hours)

UNIT IV:

Replacement Model

Introduction – Replacement of items that deteriorates gradually : value of money does not change with time – value of money changes with time – Replacement of items that fails suddenly : Individual Replacement –Group Replacement. PERT/CPM: Introduction – Construction of Network - CPM calculations –PERT Calculations.

(10 Hours)

UNIT V:

Queuing Theory

Introduction - Characteristics of queuing system - Problems of single server with finite / infinite population model – Problems of multi server with finite /infinite population model.(No derivation) **(08 Hours)**

REFERENCE BOOKS :

1. Kanti Swarup, P.K. Gupta, Man Mohan, "Operations Research", Sultan Chand & Sons.
2. P.K. Gupta, D.S Hira, "Problems in Operations Research", S.Chand & Company Ltd.
3. Hamdy A. Taha, "Operations Research – An Introduction", PHI/Pearson Education, Seventh Edition.
4. Frederick S. Hillier, Gerald J. Lieberman, "Introduction to Operations Research", Tata McGraw Hill Pub Company Ltd., Seventh Edition.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: VI	20CAP06	PYTHON PROGRAMMING - PRACTICAL	-	60	4

Subject description: This course provide complete knowledge in Python
Goal: To enable the students to develop applications using Python
Objectives: To learn how to design and program Python applications.

1. Program to display all the prime numbers within an interval
2. Program to check Armstrong numbers in certain interval
3. Program make a simple calculator that can add, subtract, multiply and divide using functions
4. program to display the Fibonacci sequence up to n-th term using recursive functions
5. Program to sort alphabetically the words form a string provided by the user
6. Program to print the resolution 6f the jpeg image file passed into it

7. Program to perform the following
   a) different set operations
   b) display calendar of given month of the year
8. Program to Merge Mails
9. Program to multiply two matrices using nested loops

10. Program to generate
    a) Password
    b) Random Number
11. Program to perform Binary search in a given list of ordered numbers
12. Program to play Tic Tac Toe game

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: VII	**20CAP07**	**ADVANCED JAVA - PRACTICAL**	**-**	**60**	**4**

Subject Description:

This course presents the basic concepts of object oriented programming, methods data types, class and objects, packages; overview of JDBC, Overview of Servlet technology.

Goal:

To enable the students to learn the basic functions, principles and concepts of java programming.

Objectives:

To enable the students to understand the core principles of the Java language as well as J2EE Specifications to produce well designed, effective web applications using JSP and supportive technologies.

Practical List

1. Write an Event driven programming in java to move the snowman in different position.
2. Write a program for generating 2 threads, one for printing even numbers and the other for printing odd numbers.
3. Display a welcome message using Servlet.
4. Design a Purchase Order form using Html and Servlet.
5. Write a simple Servlet program to create a table of all the headers it receives along with their associated values.
6. Develop a program for calculating the percentage of marks of a student using JSP.
7. Design a registration form using JSP with validation.
8. Write a program using JDBC for creating a table, Inserting, Deleting records and list out the records.
9. Write a program to display your mark sheet using JDBC.
10. Prepare an Employee pay slip using JSP.
11. Write a program in JSP by using session object
12. Write a program to build a simple Client Server application using RMI.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core: VIII	20CAP08	Comprehension in Computer Science – I (Self study/ Online Exam)	-	-	1

PART III - COMPREHENSION IN COMPUTER SCIENCE – III, IV & V

(For those admitted in June 2017-18)

The Comprehension in Computer Science examination will be conducted at the end of each semester III, IV & V for a mimum 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 III, IV & V 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: XI	20CAP09	.NET PROGRAMMING	60	-	5

Preamble

To gain an understanding of the Microsoft .NET architecture and 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	To get introduced to VB.NET and work with forms, controls and setting properties.	K1,K2
CO2	To acquire knowledge about creating menus and using Dialog boxes and Accessing data with ADO.NET.	K3
CO3	To develop a web application program using Asp.net	K3,K4
CO4	To understand the navigation controls and standard controls	K2,K5
CO5	To develop programs using various Database Controls	K3,K6

CORE IX - .NET PROGRAMMING

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

UNIT I:

Introduction

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

(10 Hours)

UNIT II

Arrays

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

(10 Hours)

UNIT III

Development of Web Application

Developing a Web Application-Application Structure and State-Web Forms: Standard Controls. **(10 Hours)**

UNIT IV

Navigation Controls

Navigation Controls: TreeView, Menu, and SiteMapPath-Validation Controls.

(15 Hours)

UNIT V

Database Controls

Working with Database Controls: The GridView Control-The DataList Control-The DetailsView Control-The FormView Control-The ListView Control-The Repeater Control.

(15 Hours)

REFERENCE BOOKS:

1. P.Radhaganesan,"VB.NET" ,Scitech Publications(IndiA) Pvt Ltd,2004

2. Sams Teach youself ASP.NET in 24 hours

3. Matt J.Couch, ASP.NET and VB.NET Web Programming", Pearson Education, 2002.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: X	20CAP10	**COMPUTER GRAPHICS AND MULTIMEDIA**	60	-	5

Preamble

To provide an in-depth knowledge of display systems, image synthesis, shape modeling of 2D and 3D applications and to understand basic multimedia concepts like animation and compression.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To get introduced to graphic devices and basic graphics algorithms	K1
CO2	To acquire knowledge about 2D transformation , viewing and Clippping	K3,K2
CO3	To understand the concepts of 3-D Transformation and Visible surface detection	K4
CO4	To gain knowledge on multimedia devices and concepts like animation	K2,K5
CO5	To understand the data compression techniques and algorithms	K3,K6

CORE X– COMPUTER GRAPHICS AND MULTIMEDIA

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

UNIT I

Computer Graphics and output primitives

Concepts and applications- Random and Raster scan devices- Refresh Cathode ray tubes- LCD monitors- Laser- Printers- Keyboards- Mouse- Scanners- Graphics Software output primitives- Line drawing algorithm: DDA along with Bresenhan's- Circle generating algorithm- Midpoint algorithms: Ellipse and other curves- Attributes of output primitive- Antialising- Area filling- Filled area primitive: Scan-line Polygon fill Algorithm- Boundary fill algorithm- Flood fill algorithm.

(15 Hours)

UNIT II

2-D-Transformation, Viewing, Clipping

Two-dimensional Transformations: Translation- Scaling- Rotation- Reflection- Shear- Matrix representation of all homogeneous coordinates- Composite transformation- 2D-projections– Parallel and Perspective projection- Two dimensional viewing: Viewing pipeline- Window-to-viewport transformation- Clipping operations- Line Clipping: Cohen Sutherland- Polygon Clipping. **(12 Hours)**

UNIT III

3-D Transformation and Visible surface detection

Three dimensional object representations: Polygon Surface- Tables- Plane Equation- 3D Transformation- Visible Surface detection Algorithm: Object based and image based methods- Depth comparison- A-Buffer- Back face removal- Scan-line method- Depth Sorting Method- Area subdivision method. **(13 Hours)**

UNIT IV

Overview of Multimedia

Overview of Multimedia- Classification- Basic concept of sound/audio MIDI: Devices-Messages- Software- Speech, Video and Animation: Basic concept- Computer-based animation- Methods of controlling animation- Display of animation and transmission of animation**. (10 Hours)**

UNIT V

Data Compression

Storage space- Coding requirements- Source- Entropy and Hybrid coding- Some basic compression technique: Runlength code- Huffman code- JPEG: Image preparation, Lossy sequential DCT – Based mode- Expanded Lossy DCT based mode- Lossless mode, Hierarchical mode- MPEG- Huffman Encoding- LZW compression. **(10 Hours)**

REFERENCE BOOKS :

1. Anirban Mukhopadhyay & Arup Chattopadhyay, " Introduction to Computer Graphics", Second Edition, 2008.

2. Donald Hearn & M. Pauline Baker, "Computer Graphics", PHI, Second Edition, 2007.

3. Rogers, "Computer Graphics", TMH, First Edition, 2006.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XI	20CAP11	**SOFTWARE PROJECT MANAGEMENT**	48	-	4

Preamble

To understand the fundamental principles of software project management and different methods and techniques used for project management

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To get introduced to Product Life Cycle models and metrices	K1
CO2	To acquire knowledge about Software configuration management and Software quality assurance	K2,K5
CO3	To understand the concepts of Software Requirements gathering and Estimation	K2,K3
CO4	To gain in indepth knowledge on Design and development phases and Challenges faced during design and development phases and testing process	K3,K4
CO5	To understand about Project management in the maintenance phase and Globalization issues in project management	K3,K6

CORE XI- SOFTWARE PROJECT MANAGEMENT

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

Total hours in the semester: 48

UNIT I   Product Life Cycle

Product Life Cycle: Introduction – Idea Generation- Prototype Development Phase- Alpha phase –Beta phase- Protection phase- Maintenance and obsolescence phase. Project Life Cycle Models: What is project life cycle model-A frame work for studying different life cycle models-The waterfall model- The prototype model- The Rapid Application Development Model- The spiral model and its variants. Metrices: Introduction- The metrices roadmap- A typical metrices strategy – What should you measure – Set Targets and Track them- Understanding and Trying to minimize variability- Act on data-People and Organisational Issues in metrices programmes- Common Pitfalls to watch out for in metrices programmes- Metrices implementation checklists and tools.

(10 Hours)

UNIT II

Software configuration management

Introduction-Basic definitions and terminology-The Process and Activities of software Configuration Audit –Software configuration management in geographically distributed teams-Metrices in software configuration management –Software configuration management tools and automation. Software quality assurance: How do you define quality- Why is quality important in software- Quality Control and quality assurance –Cost and benefits of quality – Software quality analyst's functions- Some popular misconceptions about the SQA's role – Software quality assurance tools –Organizational structures –Profile of a successful SQA-measures of SQA success –Pitfalls to watch out for in the SQA's role. Risk management: Introduction-What is Risk management and why is it important- Risk management cycle- Risk identification: Common tools and techniques- Risk quantification –Risk monitoring-Risk mitigation- Risks and mitigation in the context of global project- Teams –Some practical techniques in risk management –Metrices in risk management.

(10 Hours)

UNIT III

Software requirements gathering

Inputs and start criteria for requirements gathering- Dimensions of requirements gathering Steps to be followed during requirements gathering outputs and quality records from the requirements phase- Skills sets required during the requirements phase- Differences for a Shrink-wrapped software- Challenges during the requirements management phase- Metrices for the requirement phase. Estimation: what is estimation-when & why is estimation done The Three phases of estimation-Estimation methodology- Formal models for size estimation – Translation effort estimated into schedule estimates –Common challenges during estimation Metrices for the estimation processes.

(10 Hours)

UNIT IV

Design and development phases

Some difference in our chosen approach-Salient features of design- Evolving an architecture /Blueprint –Design for reusability- Technology choices /constraints –Design to standards – Design for portability- User interface issues- Design for testability-Design for diagnosability-Design for maintainability- Design for Installability-Inter –Operability design-Challenges during design and development phases-Skill sets for design and development metrices for design and development phases. Project management in the testing phase: Introduction- What is testing- What are the activities that make up testing- Test scheduling and types of tests-

People issues in testing management structures for testing in global teams –Metrics for testing phase. **(10 Hours)**

UNIT V

Project management in the maintenance phase

Introduction- Activities during the maintenance phase-management issues during the maintenance phase- Configuration management during the maintenance phase –Skill sets for people in the maintenance phase estimating size, effort and people resources for the maintenance phase- Advantages of using geographically distributed teams for the maintenance phase-Metrics for the maintenance phase. Globalization issues in project management: Evolution of globalization- Challenges in building global teams-Models for the execution of some effective management techniques for managing global teams. Impact of the internet on project management: Introduction – The effect of internet on project management –Managing projects for the internet- Effect on project management activities. **(08 Hours)**

REFERENCE BOOKS :

1. Gobalswamy Ramesh, "Managing Global Software Projects", Tata McGraw Hill Publishing Company, 2003.
2. S.A. Kelkar, "Software Project Management –A concise study", PHI, 2003
3. Mike Cotterel, Bob Hughes, "Software Project Management", Inclination / Thomas computer press, 1955.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XII Elective I	20CAP12A	CLIENT SERVER TECHNOLOGY	48	-	3

Preamble

To understand the client/server computing techniques and client/server application development and production environments

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To get introduced to Client/Server Computing and applications	K1
CO2	To acquire knowledge about Client Hardware and Software and Database access tools	K2,K3
CO3	To understand the concepts of Data Management Software and Networking	K2,K5
CO4	To gain knowledge on applications development environments and integrating multivendor environments	K3,K4
CO5	To understand about Production Requirements and Hardware and Software Trends.	K3,K6

ELECTIVE I- CLIENT SERVER TECHNOLOGY

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

UNIT I

Overview of Client/Server computing:

What is Client/Server Computing-Benefits of Client/Server Computing-Evolution of Client/server Computing: Hardware and Software Trends-Overview of Client /Server Applications: Components of Client/Server Application- Classes of client/server application-Categories of Client/Server Applications-Understanding Client /Server Computing: Obstacles-Open systems and standards-Factor for success

(10 Hours)

UNIT II

The Client Hardware and Software

Client Components-Client operating systems-GUI-X Windows versus Windowing–Database access-Application logical-Client Software Products: GUI Environment-Database access tools Client Requirements-The Server- Categories –Features of Server Machines-Classes of Server Machines-Server Environment.

(10 Hours)

UNIT III

Server Requirements

Server Requirements-Server Data Management and Access Tools-Data Manager Features-Data Management Software-Database Gateways-Overview of Networking-LAN Hardware and Software: LAN Hardware-Network Operating Systems   **(10 Hours)**

UNIT IV

Applications Development Environments

Applications Development Environments-Managing the Production Environment-Distributed Transaction Management-Integrating Multivendor Environments   **(10 Hours)**

UNIT V

Production Requirements

System Management-Network Management-Runtime Specifications- Distributing Software Updates-Hardware and Software Trends   **(08 Hours)**

REFERENCE BOOKS:

1. Dawna Travis Dewire, " Client Server Computing", Tata Mc GRAW-Hill Edition, 2003
2. Robert Orfali, Dan Harkey and Jerri Edwards, "Essential Client/Server Survival Guide", John Wiley & Sons Inc., 1996.
3. Smith P. Guengerich, "Client/Server Computing", Second Edition, 2002.
4. Larry I.Vaughn, "Client/Server System Design and Implementation", First Edition, 1994.
5. Neil Jenkins et al., "Client/Server Unleashed", Tec Media Publications, First Edition,1998.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XII Elective I	20CAP12B	DIGITAL IMAGE PROCESSING	48	-	3

Preamble

To understand the fundamentals of Digital Image Processing, image compression and segmentation

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To get introduced to Digital Image Fundamentals and Components of an image processing system.	K1
CO2	To acquire knowledge about Image Enhancement methods in the spatial domain	K2,K4
CO3	To understand the concepts of Image Restoration and Geometric Transformations.	K2
CO4	To gain knowledge on Image compression models and standards	K3,K5
CO5	To understand about Image Segmentation and use of motion in Image Segmentation	K2,K6

ELECTIVE I - DIGITAL IMAGE PROCESSING

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

UNIT I

Introduction

What is Digital image processing – The origin of DIP – Examples of fields that use DIP – Fundamentals steps in DIP – Components of an image processing system. Digital Image Fundamentals: Elements of Visual perception – Light and the electromagnetic spectrum – Image sensing and acquisition – Image sampling and   Quantization – Some Basic relationship between Pixels – Linear & Nonlinear operations.

(10 Hours)

UNIT II

Image Enhancement

Image Enhancement in the spatial domain: Background – Some basic Gray level Transformations – Histogram Processing – Enhancement using Arithmetic / Logic operations – Basics of spatial filtering – Smoothing spatial filters – Sharpening spatial filters – Combining spatial enhancement methods.

(10 Hours)

UNIT III

Image Restoration

Image Restoration: A model of the Image Degradation / Restoration Process – Noise models – Restoration is the process of noise only – Spatial Filtering – Periodic Noise reduction by frequency domain filtering – Linear, Portion – Invariant Degradations – Estimating the degradation function – Inverse filtering – Minimum mean square Error Filtering – Constrained least squares filtering – Geometric mean filter – Geometric Transformations**.**

(10 Hours)

UNIT IV

Image Compression

Image Compression: Fundamentals – Image compression models – Elements of Information Theory – Error Free compression – Lossy compression – Image compression standards.

(10 Hours)

UNIT V

Image Segmentation

Image Segmentation: Detection and Discontinuities – Edge Linking and Boundary deduction – Thresholding – Region-Based segmentation – Segmentation by Morphological watersheds – The use of motion in segmentation. **(08 Hours)**

REFERENCE BOOKS :

1. Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing",PHI/Pearson Education, Second Edition.
2. B. Chanda, D. Dutta Majumder, "Digital Image Processing and Analysis", PHI, Second Edition, 2013.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XII Elective I	20CAP12C	OPEN SOURCE SYSTEM	48	-	3

Preamble

To learn the bass of network programming using PERL and PHP.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To get introduced to Linux and the X windows system files and Directories	K1
CO2	To acquire knowledge about viewing, editing text, analyzing and formatting text.	K2
CO3	To understand the concepts of TCP/IP and Elementary sockets	K2
CO4	To gain knowledge on PHP Programming Basics	K3
CO5	To understand about Perl Programming, File Management and Databases	K3

ELECTIVE - I OPEN SOURCE SYSTEM

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

UNIT I
Introduction to Linux
Introduction to Linux – What every Linux users knows- The shell-The X windows system – Files and Directories.   **(10 Hours)**

UNIT II
Editing Text
Viewing Text – Editing Text – Grammar and Reference – Analyzing text – Formatting Text.

(08 Hours)

UNIT III
Shell Programming

Shell Programming-Shell Variables-The Export Command-The Profile File a Script Run During Starting-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement-The

Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The here Document(<<)-The Sleep Command-Debugging Scripts-The Script Command-The Eval Command-The Exec Command.

(10 Hours)

UNIT IV

PHP Programming

PHP Programming Basics PHP - Introduction, PHP Basics: - Syntax- Variables- Controls and functions- passing information between pages -Strings. Arrays: - Using Arrays, Manipulating Arrays, Associative Arrays. **(10 Hours)**

UNIT – V

Perl Programming

Perl Programming Perl - Introduction, Perl Basics: - Syntax, Variables, Strings, Numbers, Operators, Arrays: - Using Arrays, Manipulating Arrays, Associative Arrays, Chop, Length, and Sub string. Hashes, Arguments, Logic, Looping, Files, Pattern Matching, Environment Variables, Using cgi- lib for Forms. File Management PERL: - File Handling, Reading From Files, Appending Files, Writing to Files, File Checking, Reading Directories.Databases PERL: - DBI Module, DBI Connect, DBI Query, MySQL Module, MySQL Connect, MySQL SelectDB, MySQL Query.

(10 Hours)

REFERENCE BOOKS :

1. Michael Stutz, "Linux CookBook", SPD Pvt.ltd, 2nd Edition, 2004.
2. Ellen sivever, Aarom weber,Stephen Figgins, Robers Love and Arnold Robbins, "Linux In a Nutshell – A desktop Quick Reference", – O"Reilly, 5th Edition.
3. W.Richard stevens, Bill Fenner,, Andrew M Rudoff ,"Unix Network programming –The Sockets networking API", volume I –Third Edition.
4.Wiley ,"PHP 5 and MySQL Bible", Dream tech India Pvt.ltd, 2006 Edition.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XII Elective I	20CAP12D	INTERNET OF THINGS	48	-	3

Preamble

To enable the students to learn the Data and Knowledge Management and use of Devices in IOT Technology.

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 connected devices and web connectivity	K1,K2
CO2	Acquire depth knowledge in Data processing over Internet	K2,K3
CO3	Explore on IOT Architecture in Networking	K3,K4,K5
CO4	Deals With the Concepts of IOT Application on Security and Business models	K5
CO5	Gain knowledge by case study and Advanced IOT Applications	K4,K5,K6

ELECTIVE I: INTERNET OF THINGS

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

Unit I
Introduction
An overview- Design principles for connected devices-design principles for web connectivity.

(10 Hours)

Unit II
Data Processing
Internet connectivity principles- Data Acquiring, Organizing, Processing and Analytics-Data collection, storage and Computing using a cloud platform.

(10 Hours)

Unit III
IoT and Networking
Sensor Participatory Sensing, RFID'S and wireless sensor networks-Prototyping and embedded devices for IOT and M2M- Prototyping and designing the software for IoT Applications.

(10 Hours)

UNIT IV

<h2 align="center">Security and Business</h2>

IoT Privacy, Security and Vulnerabilities solutions-Business models and Processes using IoT.

(10 Hours)

Unit V

<h2 align="center">Case Studies</h2>

Introduction-Design Layers, Design Complexity and Designing using Pass- IoT/IIoT Applications in the premises, supply-chain and customer monitoring-Connected car and its application services-IoT applications for smart homes, cities, Environment monitoring Agriculture.

(8 Hours)

Reference Book:

1. "Internet of Things Architecture and Design Principles" Raj Kamal , McGrawHill Education(India) Pvt Ldt., 2017.
2. E-Book ISBN-13:978-93-5260-523-1
   https://books.google.co.in/books?id=uS1HDwAAQBAJ&lpg=PA1&dq=INTERNET%20of%20things%20rajkamal%20pdf&pg=PT5#v=onepage&q=INTERNET%20of%20things%20rajkamal%20pdf&f=false

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XIII Elective II	20CAP13A	MOBILE COMPUTING	48	-	3

Preamble

To understand mobile computing applications, techniques and environment

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To get introduced to mobile communication , its need and requirements	K1
CO2	To acquire knowledge Cellular Mobile Communication and Mobile Communication Standards	K2,K3
CO3	To understand the concepts of Classification of Mobile data networks Satellites in Mobile Communication	K2,K5
CO4	To gain knowledge on Working of Mobile IP , Wireless Network Security and Wireless application Protocol.	K2,K4
CO5	To understand about WCDMA Technology and Fibre Optic Microcellular Mobile Communication	K2,K6

ELECTIVE II- MOBILE COMPUTING

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

Total hours in the semester: 48

UNIT I

Introduction

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

(10 Hours)

UNIT II

Mobile Communication

Introduction to Cellular Mobile Communication – Mobile Communication Standards – Mobility Management – Cordless Mobile Communication Systems.

(10 Hours)

UNIT III

Mobile Computing

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.

(10 Hours)

UNIT IV

Mobile Internet

Mobile Internet: Working of Mobile IP – Wireless Network Security – Wireless Application Protocol.

(10 Hours)

UNIT V

WCDMA Technology

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

(08 Hours)

REFERENCE BOOKS:

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

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XIII Elective II	20CAP13B	**DISTRIBUTED COMPUTING**	48	-	3

Preamble

To Understand the Distributed Processing Systems Design, Client/Server Network Model and Distributed databases.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To get introduced to Distributed Processing Systems , Networks and Interconnection Structures and Designing	K1
CO2	To acquire knowledge on Distributed Databases– and the Challenges of Distributed Data	K2,K3
CO3	To understand the concepts of Design Considerations and Synchronization of Network Databases	K2,K5
CO4	To gain knowledge on an **Client/Server Network Model:** , printer Server an e- mail Server	K2,K4
CO5	To understand about Levels of Transparency and Problems of Heterogeneous Distributed Databases	K2,K6

ELECTIVE II - DISTRIBUTED COMPUTING

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

Total hours in the semester: 48

UNIT I

Distributed Systems

Fully Distributed Processing Systems – Networks and Interconnection Structures – Designing a Distributed Processing System. **(10 Hours)**

UNIT II

Distributed Systems Techniques

Pros and Cons of Distributed Processing – Distributed Databases– The Challenge of Distributed Data – Loading Factors – Managing the Distributed Resources – Division of Responsibilities.

(10 Hours)

UNIT III

Design Considerations

Communication Line Loading – Line Loading Calculations – Partitioning and Allocation – Data Flow Systems – Dimension Analysis – Network Database Design Considerations – Ration Analysis – Database Decision Trees – Synchronization of Network Databases.

(10 Hours)

UNIT IV

Client/Server Network Model

Concept – File Server – Printer Server – an e- mail Server.

(08 Hours)

UNIT V

Distributed Databases

An overview – Distributed Databases – Principles of Distributed Databases – Levels of Transparency – Distributed Database Design – The R* Project Technique Problems of Heterogeneous Distributed Databases. **(10 Hours)**

REFERENCE BOOKS :

1. John A. Sharp, "An Introduction to Distributed and Parallel Processing", Blackwell Scientific Publications, 1987. (Unit I and Unit III)

2. Uyless D. Black, "Data Communications & Distributed Networks",Third Edition , 2009. (Unit II)

3. Joel M. Crichllow, "Introduction to Distributed & Parallel Computing", Second Edition, 2001. (Unit IV)

4. Stefans Ceri, Ginseppe Pelagatti, "Distributed Databases Principles and systems", McGraw

   Hill Book Co., New York, 1984. (Unit V)

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XIII Elective II	20CAP13C	CLOUD COMPUTING	48	-	3

Preamble

To understand 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	To get introduced to Cloud Computing ,Working, Benefits and Discovering cloud services.	K1
CO2	To acquire knowledge on Centralizing email communications, Mapping schedules and managing projects	K2,K3
CO3	To understand the concepts of Schedules and task management, Collaborating on event management and Collaborating on project management	K3,K4
CO4	To gain knowledge on Evaluating web mail services, web conference tools and Creating groups on social networksand Collaborating via blogs and wikis.	K5
CO5	To understand cloud storage , Evaluating on line file storage, Exploring photo sharing communities and Controlling it with web based desktops.	K3,K6

ELECTIVE – II : CLOUD COMPUTING

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

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. **(10 Hours)**

UNIT II

Cloud Computing

Centralizing email communications- Cloud computing for community- Collaborating on

schedules- Collaborating on group projects and events- Cloud computing for corporation-

Mapping schedules managing projects- Presenting on road. **(10 Hours)**

UNIT III

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. **(10 Hours)**

UNIT IV

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. **(10 Hours)**

UNIT V

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.

(08 Hours)

REFERENCE BOOKS:
1. Michael Miller, "Cloud Computing", Pearson Education, New Delhi, First Edition, 2013
2. Anthony T. Velte, "Cloud Computing- A Practical Approach", Tata McGraw Hill Education Private Limited, 1st Edition (2013).

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XIII Elective II	20CAP13D	REMOTE SENSING AND GEOMATICS FOR AGRICULTURE AND FORESTRY	48	-	3

Preamble

This course enables the students to understand the application potentialities of remote sensing data separately and in combination with GIS techniques for Agriculture and Forestry.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To get introduced to Earth observation and holistic information	K1,K2
CO2	Acquire depth knowledge in Soil Mapping	K2,K3
CO3	Explore on Applications of RS and GIS in water management	K3,K4,K5
CO4	Gain knowledge on crop and vegetation	K5
CO5	Deals With the Concepts of Forest taxonomy	K4,K5,K6

ELECTIVE II: REMOTE SENSING AND GEOMATICS FOR AGRICULTURE AND FORESTRY

UNIT I

Sensors, Platforms and Applications

General features of agricultural applications-Trends in technological development - Information needs for agricultural applications-need for all weather systems-Applications at various scales-Earth observation and Holistic information-future systems. components of a vegetation canopies.

(10 Hours)

UNIT II

Soil Mapping

Remote sensing and soil mapping-Photo / image type for interpretive studies- Digital analysis of images for discriminating soils - Remote sensing for recording the interactions of crop growth with soils and weather-Remote sensing of soil moisture-Remote sensing and soil degradation-Rainfall estimates from cold cloud statistics.

(10 Hours)

UNIT III

Water Management

Applications of RS and GIS in water management: Two methods to determine actual crop transpiration-Integration of remotely sensed imagery and SWATRE simulations in a geographical information system-transpiration mapping in agricultural water management.

(10 Hours)

UNIT IV

Crop and vegetation

Classification for crop mapping-GIS support image classification in crop inventories-HSR indices for Crop Stress: vegetation Indices-Effects of stress in vegetation -need of high spectral resolution-Crop disease -crop husbandry and stress.

(10 Hours)

UNITV

Forestry

Geographic and forest Information Systems- Multi resource forest Inventory.

(8 Hours)

REFERENCE BOOKS :
1. Applications of Remote sensing in Agriculture, M.D.Steven, J.A.Clark,Butterworths.
2. Sampling Methods, Remote Sensing and GIS Multiresource Forest Inventory (Tropical Forestry) , Michael Köhl, Steen S. Magnussen, October 19, 2006
3. Shunlin liang, Advances in land RS: System, modeling invention and applications, 2001.
4. James B, Introduction of Remote sensing, Third edition Campbell, 3rd edition Guilford Press,
   2002.
5. David H. White, S. Mark Howden, Climate Change: Significance for Agriculture and Forestry,

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XIV	20CAP14	.NET PROGRAMMING - PRACTICAL	-	36	4

This Course presents the Introduction to .NET programming.

Goals

To enable the students to learn what is .NET fundamentals, Components & techniques

Objective

To understood how to build the applications using .NET Programming.

VB.NET

1. Develop a menu based VB.Net application to implement a notepad application
2. Develop a form in VB.NET for arithmetic calculator
3. Develop an application for billing in fruits shop
4. Develop a VB.Net application to perform timer based quiz of 10 questions
5. Develop a database application using ADO.NET to display, insert, modify, update and delete operations

ASP.NET

1. Create a web site in ASP.NET using master page
2. Create a web page in ASP.NET for alumnae registration with validation controls
3. Create a web site in ASP.NET for online shopping using database
4. Create a web service in ASP.NET
5. Create ASP.NET program for state management

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XV	20CAP15	COMPUTER GRAPHICS AND MULTIMEDIA -PRACTICAL	-	36	4

Subject Description:

This course presents the Object Model, classes and objects, overloading, files, exception handling, OO analysis and 2D and 3D animation techniques with graphic techniques.

Goal:

To enable the students to learn the basic functions, principles and concepts of Object oriented programming, 2D animation techniques and Photoshop tools

Objectives:

To understood the Object model and relationship among objects and to gain knowledge in C++ programming, Flash and Photoshop

C++

1. Implementation of DDA algorithm
2. Implementation of Bresenham's algorithms.
   i) Line   ii) Circle   iii) Ellipse
3. 2D Transformations:
   i) Translation ii) Rotation iii) Scaling iv) Reflection v) Shearing of Objects
4. Implementation of Cohen-Sutherland line clipping algorithm.
5. 3D Transformations:
   i) Translation ii) Rotation iii) Scaling
6. Implementation of polygon filling algorithm

PHOTOSHOP, FLASH

1. Basic operations using Photoshop (Various menus) (Decide individually)
2. Design a Banner with various characteristics
3. Animate Plane Flying the Clouds using Photoshop.
4. Create Rollover Buttons using Photoshop.
5. Design a Animated application using FLASH
6. Develop a content (teaching aid) for school children using FLASH

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core: XVI	20CAP16	Comprehension in Computer Science – II (Self study/ Online Exam)	-	-	1

PART III - COMPREHENSION IN COMPUTER SCIENCE – III, IV & V

(For those admitted in June 2017-18)

The Comprehension in Computer Science examination will be conducted at the end of each semester III, IV & V 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 III, IV & V 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
Ability Enhancement Course: I	20AEP01	**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 Credits: 2**
Total hours in the semester: 24

Unit I:

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.   (**5 Hours**)

Unit II: **Introduction to Cyber Security**

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

                                                        (5 Hours)

Unit III:

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.

                                                        (**5 Hours**)

Unit IV:

Social media

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

(5 Hours)

Unit V:

Case study

Impact of social media: Education -Business- Banking-Mobile –Human Life- Present generation-Indian scenario.   **(4 Hours)**

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

III SEMESTER

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XVII	20CAP17	**DATA MINING AND WAREHOUSING**	60	-	5

Preamble

This course presents the basic data mining tasks, techniques, classification, clustering and data warehousing which could be used in real life mining.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Introduce basic Data Mining tasks and techniques.	K1
CO2	Explore on Data Mining classifications and algorithms.	K2,K3
CO3	Understand Clustering concepts and association rules.	K3
CO4	Deals with Data Warehousing concepts , OLTP & OLAP systems.	K4,K5
CO5	Acquire adequate knowledge in developing a Data Warehouse and to understand its applications.	K2,K6

CORE XVIII: DATA MINING AND WAREHOUSING

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

UNIT I

Data mining techniques

Basic data mining tasks – data mining versus knowledge discovery in databases – data mining issues – data mining metrices – social implications of data mining – data mining from a database perspective. Data mining techniques: Introduction – a statistical perspective on data mining – similarity measures – decision trees – neural networks – genetic algorithms.

(10 hours)

UNIT II

Classification

Introduction – Statistical – based algorithms - distance – based algorithms – decision tree - based algorithms - neural network – based algorithms –rule - based algorithms – combining techniques.

(10 hours)

UNIT III

Clustering and Association rules

Clustering: Introduction – Similarity and Distance Measures – Outliers –

Hierarchical Algorithms - Partitional Algorithms.Association rules: Introduction - large item sets - basic algorithms – parallel & distributed algorithms – comparing approaches-incremental rules – advanced association rules techniques – measuring the quality of rules.

(12 hours)

UNIT IV

Data warehousing

Introduction - characteristics of a data warehouse – data marts – other aspects of data mart. Online analytical processing: introduction - OLTP & OLAP systems data modeling – star schema for multidimensional view –data modeling – multifact star schema or snow flake schema – OLAP TOOLS – State of the market – OLAP TOOLS and the internet.

(13 hours)

UNIT V

Applications

Developing a data warehouse: why and how to build a data warehouse –data warehouse architectural strategies and organization issues - design consideration – data content - metadata distribution of data – tools for data warehousing – performance considerations – crucial decisions in designing a data warehouse. Applications of data warehousing and data mining in government: Introduction - national data warehouses – other areas for data warehousing and data mining.

(15 hours)

REFERENCE BOOKS :

1. Margaret H. Dunham, "Data mining introductory and advanced topics", Pearson education, 2003.
2. C.S.R. Prabhu, "Data warehousing concepts, techniques, products and applications", PHI, Second Edition.
3. Arun K.Pujari, " Techniques", Universities Press (India) Pvt. Ltd., 2003.
4. Alex Berson, Stephen J. Smith, "Data warehousing, Data mining, & OLAP, TMCH, 2001.
5. Jiawei Han & Micheline Kamber, " Data mining Concepts & Techniques", 2001, Academic press.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XVIII Elective III	20CAP18A	NATURAL LANGUAGE PROCESSING	60	-	3

Preamble

To attain fundamental knowledge in natural language processing and to recognize the necessity and an ability to engage in life-long learning

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To acquire knowledge about speech and language processing, History of NLP	K1,K2
CO2	To get introduced to Regular expressions , speech tagging and other entropy models	K2
CO3	Understand and apply Phonetics ,Automatic speech recognition	K3,K4
CO4	To enrich information about Formal grammars of English	K4,K5
CO5	Provide guidelines for Question answering and Summarization	K5

ELECTIVE III : NATURAL LANGUAGE PROCESSING

Total hours per week: 5 No. of
Credits: 3
Total hours in the semester: 60

Unit I :

Introduction

Knowledge in speech and language processing – Ambiguity – Models and algorithms– language, Thought and understanding – History of NLP

(10 hours)

Unit II :

Words

Regular expressions and automata – Words and transducers – N- grams – Part-of-speech tagging – Hidden markov and maximum entropy models

(10 hours)

Unit III:

Speech

Phonetics – Speech synthesis – Automatic speech recognition – Advanced topics on speech recognition –Computational phonology

(10 hours)

Unit IV:

Syntax, Semantics and Pragmatics

Formal grammars of English – Syntactic parsing – Statistical parsing – Features and unification – Language andcomplexity – Representation of meaning – Computational semantics – Lexical semantics

(8 hours)

Unit V:

Applications

Information extraction – Question answering - Summarization – Dialog agents – Conversational agents – Machine translation

(10 hours)

REFERENCE BOOKS:

1. Daniel Jurafsky and James H. martin, *Speech and Language Processing* , Pearson Education, 2008.

2. David A. Grossman and Ophir Fedier, *Information Retrieval: Algorithms and Heuristics (The Information Retrieval Series)*, Springer, 2004.

3. Michael W Berry, *Survey of Text mining I: Clustering, Classification and Retrieval*, Copyrighted material, 2004.

4. Daniel Bikel and Imed Zitouni, *Multilingual Natural Language Processing Applications: From Theory to Practice*, IBM Press, 2012.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XVIII Elective III	20CAP18B	SOFT COMPUTING	60	-	3

Preamble

To enable the students to become familiar with various Soft Computing Techniques and to gain knowledge on applying soft computing techniques to solve optimization problems

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To get introduced to Soft Computing and Neural Networks	K1,K2
CO2	To acquire knowledge about Genetic Algorithms and its applications.	K2,K3
CO3	Enrich knowledge about Neural Networks and Kohonen self organising networks	K3
CO4	To apply the knowledge of Fuzzy Logic in several models.	K3,K4
CO5	Gain experience in Neuro-Fuzzy Modeling and Data clustering algorithms	K5,K6

ELECTIVE –III: SOFT COMPUTING

Total hours per week:5   **No. of Credits: 3**
Total hours in the semester: 60

Unit I

Introduction to Soft Computing and Neural Networks

Introduction - Soft computing constituents – From conventional AI to computational intelligence – Evolutionary computation – Neuro-Fuzzy and soft computing characteristics

(10 hours)

Unit II

Genetic Algorithms

Introduction to Genetic Algorithm (GA) – Goals of optimization – Simple GA – Simulation – Important similarities- Applications of GA – Rise of GA - GA application of historical interest – Improvements in basic technique - DeJong and function optimization

(13 hours)

Unit III

Neural Networks

Adaptive networks – Back propagation for feed forward networks – Batch learning – Pattern by pattern learning -Supervised learning neural networks – Radial basis function networks – Unsupervised learning neural networks –Competitive learning network – Kohonen self organising networks- Hebbian learning

(15 hours)

Unit IV

Fuzzy Logic

Fuzzy sets – Set theoretic operations – Fuzzy rules and fuzzy reasoning – Extension principle and fuzzy relation –Fuzzy If-then rules - Fuzzy inference systems – Mamdani fuzzy models – Sugeno fuzzy models – Tsukamoto fuzzy models

(12 hours)

Unit V

Neuro-Fuzzy Modeling

Adaptive neuro-fuzzy Inference systems – Classification and regression trees – Decision trees – CART algorithm fortree induction - Data clustering algorithms

(10 hours)

REFERENCE BOOKS :

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun and Eiji Mizutani, Neuro-Fuzzy and Soft Computing: A

   Computational Approach to Learning and Machine Intelligence, New Delhi: Prentice-Hall of India, 2003.

2. David E. Goldberg, Genetic Algorithms in Search, Optimization and Machine Learning, Singapore: Addison Wesley, 2001.

3. James A. Freeman and David M. Skapura, Neural Networks Algorithms, Applications, and Programming Techniques. New Delhi: Pearson Education, 2003.

4. Mitchell Melanie, An Introduction to Genetic Algorithm. New Delhi: Prentice Hall, 1998.

5. George J. Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic-Theory and Applications. New Delhi: PHI 1995.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XVIII Elective III	20CAP18C	COMPONENT BASED SYSTEMS	60	-	3

Preamble

To enable the students to become familiar with java components with distributed systems and to gain knowledge on applying COM objects and Active X Controls.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To get introduced to Software Components, Java Beans, CORBA Distributed objects	K1,K2
CO2	Obtain thorough knowledge about Garbage collection on the Client and Server , Event driven programming	K1,K3
CO3	Enrich knowledge about CORBA , ORB runtime system and their applications.	K3,K4
CO4	Familiar with Distributed Object Database management, DOM architectures	K3,K4,K5
CO5	Depth knowledge of Applying COM objects and ActiveX Controls	K3,K5

ELECTIVE-III : COMPONENT BASED SYSTEMS

Total hours per week:5   **No. of Credits: 3**
Total hours in the semester: 60

UNIT I

Software Components

Concepts: Software Components – COM/DCOM- Java Beans – CORBA Distributed objects, request and response – remote reference – IDL interface – proxy –Marshalling

(10 hours)

UNIT II

Client and Server Objects

Factory – Broker – Garbage collection on the Client and Server, Handling remote references – Transactions – Concurrency in Server Objects – Event driven programming

(13 hours)

UNIT III

CORBA

CORBA : Java programming with CORBA – Overview of Java ORBs – First Java ORBOMG IDL to Java mapping – ORB runtime system – Discovering Services(Naming and Building applications- advanced features(DSI, DII, Interface depository)CORBA Events-applications

(12 hours)

UNIT IV

Distributed Object Database management

Object model features – fundamental object management and DOM architectures – object caching – object clustering – object migration – Query processing in Object DBMS – Transaction management in distributed object DBMS

(15 hours)

UNIT V

COM and ActiveX Controls

COM – Distributed COM- Facilities and services – Applying COM objects – Class – Factory components –servers –clients – object orientation infrastructure – transparency – concurrency – security – building components with ATL –ActiveX Controls

(15 hours)

REFERENCE BOOKS:

1. Andreas Vogel, Keith Duddy "Java Programming with CORBA" John Wiley & Sons

2. George Shepher Brad King "Inside ATL", WP Publishers and Distributors

3. Ozsu and Valduries "Principles of Distributed Database Systems ", Prentice Hall

4. "InsideCOM" Microsoft Press.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XVIII Elective III	20CAP18D	**GIS FOR LAND RESOURCE MANAGEMENT**	60	-	3

Preamble

To develop the skills in utilization of technologies of remote sensing, GIS, GPS, etc. in Land Resource Analysis and planning for sustainable development, soil, forest, ecology and agricultural resources management and studies.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To acquire knowledge about Geological and Geo-technical studies	K1,K2
CO2	To get introduced to Applications in soil	K2
CO3	Understand about Forest and Ecology	K3,K4
CO4	To enrich information about Deforestation and Afforestation	K3,K4,K5
CO5	Deals with Application in agriculture	K5,K6

GIS FOR LAND RESOURCE MANAGEMENT

UNIT I

Mapping of Primary Soil Properties

Introduction-Spectral Signatures of Soil-Estimation of Soil Properties from their spectral signatures-Direct uses of Estimation models-Use of the Vis –NIS remote sensing products for direct soil mapping.

(10 Hours)

UNIT II

Estimation of Bio Physical Variables

Introduction-Definition of the Canopy biophysical variables accessible from remote sensing observations-Land covering mapping from optical images:Introduction-The Input Data-Land Cover Map production approaches.

(15 Hours)

UNIT III
Crop and Water Monitoring
Introduction: Indicators for Crop monitoring-Indication of agricultural practices at the territory level-Estimating water status and the water needs of crops using models-Agricultural production quantification.

(15 Hours)

UNIT IV
Crop Monitoring
Introduction-Crop mapping-Yield prediction-Harvest monitoring.Monitoring of Agricultural landscapes using remote sensing data:Introduction-Identifying winter land cover within the framework of intensive agriculture.

(10 Hours)

UNIT V
Characteristics of Forest
Introduction-The LiDAR Technology- LiDAR Technology in forestry:platforms and applications-Future of LiDAR Technology in forestry.

(10 Hours)

Reference Books:
1. Nicolas Baghdadi and Mehrez Zribi, "Land Surface remote sensing in Agriculture and forest" Elsevier publications.
2. Introduction to Environmental Remote Sensing – Barrett E. C.
3.Modeling in Resource Management and Environment - Sharma H.S. and Binda P.R.
4.Genesis, Termination and succession in the life cycle of organizations - Paul Brown M.

https://books.google.co.in/books?id=_Xa0CwAAQBAJ&lpg=PA219&dq=remote%20sensing%20and%20geomatics%20in%20agriculture&pg=PR11#v=onepage&q=remote%20sensing%20and%20geomatics%20in%20agriculture&f=false

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XIX Elective IV	20CAP19A	**C# PROGRAMMING**	60	-	3

Preamble

To understand the basics of developing programs using C# on .NET and to Debug, compile, and run a simple application.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To get introduced to C# programming and understanding .net	K1
CO2	To gain knowledge in Object Oriented Aspects Of C#	K1,K2
CO3	To get exposed to Application Development On .Net	K3,K4
CO4	To analyze Web Based Application Development On .Net	K3
CO5	Depth knowledge of CLR AND .NET Framework	K4,K5

ELECTIVE-IV: C# PROGRAMMING

Total hours per week: **5**   **No. of Credits: 3**
Total hours in the semester: 60

UNIT I

Introduction to C#

Introducing C#, Understanding .NET, overview of C#, Literals, Variables, Data Types, Operators, checked and unchecked operators, Expressions, Branching, Looping, Methods, implicit and explicit casting, Constant, Arrays, Array Class, Array List, String, String Builder, Structure, Enumerations, boxing and unboxing.

(10 hours)

UNIT II

Object Oriented Aspects of C#

Class, Objects, Constructors and its types, inheritance, properties, indexers, index overloading, polymorphism, sealed class and methods, interface, abstract class, abstract and interface, operator overloading, delegates, events, errors and exception, Threading.

(12 hours)

UNIT III

Application Development On .Net

Building windows application, Creating our own window forms with events and controls, menu creation, inheriting window forms, SDI and MDI application, Dialog Box(Modal and Modeless), accessing data with ADO.NET, DataSet, typed dataset, Data Adapter, updating database using stored procedures, SQL Server with ADO.NET, handling exceptions, validating controls, windows application configuration.

(15 hours)

UNIT IV

Web Based Application Development On .Net

Programming web application with web forms, ASP.NET introduction, working with XML and .NET, Creating Virtual Directory and Web Application, session management techniques, web. Config , web services, passing datasets, returning datasets from web services, handling transaction, handling exceptions, returning exceptions from SQL Server.

(13 hours)

UNIT V

CLR and .Net Framework

Assemblies, Versoning, Attributes, reflection, viewing meta data, type discovery, reflection on type, marshalling, remoting, security in .NET

(10 hours)

REFERENCE BOOKS:

1. E. Balagurusamy, "Programming in C#", Tata McGraw-Hill, 20041. Andrew Troelsen , "Pro C# 2010 and the .NET 4 Platform, Fifth edition, A Press, 2010.

2. Herbert Schildt, "The Complete Reference: C# 4.0", Tata Mc Graw Hill, 2012.

3. Christian Nagel et al. "Professional C# 2012 with .NET 4.5", Wiley India, 2012.

4. Ian Griffiths, Matthew Adams, Jesse Liberty, "Programming C# 4.0", Sixth Edition, O'Reilly, 2010.

5. J. Liberty, "Programming C#", 2nd ed., O'Reilly, 2002.

6. S. Thamarai Selvi, R. Murugesan, "A Textbook on C#", Pearson Education, 2003.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XIX Elective IV	20CAP19B	ROBOTICS	60	-	3

Preamble

To learn about fundamental concepts in robotics and to provide an introductory understanding of robotics to the students.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	To get introduced to anatomy, law of Robotics and its mechanisms.	K1,K2
CO2	To gain knowledge in End Effectors And Robot Controls	K2
CO3	To analyze Robot automations and Mechatronic Applications	K3,K4
CO4	Deals with Robot quantitative techniques and installations	K3,K4
CO5	To know the various applications of robots that used today and future	K4,K5

ELECTIVE-IV ROBOTICS

Total hours per week: **5**   **No. of Credits: 3**

Total hours in the semester: 60

UNIT I

Introduction to Robotics

Robot: History-Definition, law of robotics, Anatomy-Specifications of Robot-Machine Intelligence, Computer and robotics-Flexible automation vs Robotics Technology-Robot Kinematics and dynamics, Electrical drives, Actuators, Drive mechanisms.

(10 Hours)

UNIT II

Effectors and Robot Controls

Classification of End-effectors- Mechanical grippers-Magnetic grippers-Vacuum grippers-Adhesive grippers-Gripper force analysis-Gripper design-Active and passive grippers-AI and Robotics-Need for sensing system-sensory devices-types of sensors-Robot vision systems-Design and Control of Sensor.

(13 Hours)

UNIT III

Automation and Mechatronic Application

Robot Languages-Classifications-Robot Software-VAL System and language. Mechatronics and Computer Interfacing: Changing Environment-Leading Edge Technology-Automation

and Mechatronic application- Electronic Components-Digital Circuits-PCL-Computer and Microprocessors-MEMS.

(15 Hours)

UNIT IV
Flexible automation and Quantitative Techniques
Introduction to flexible automation-Flexible automation-A new tool-Feasibility of Robotization plan-Data Acquisition -Investment and Evaluation Strategies-Planning for Robot Installation.

(12 Hours)

UNIT V
Applications of Robots
Introduction-Capabilities of Robots-Robotic Applications-Obstacle Avoidance-Other uses of robots-Robotics applications under CIM Environment-Robotics in India-Future of Robotics.

(10 Hours)

References

1. S.R. Deb, Robotics Technology and flexible automation, Tata McGraw-Hill Education., 2009.
2. Mikell P Groover & Nicholas G Odrey, Mitchel Weiss,Roger N Nagel, Ashish Dutta, Industrial Robotics, Technology programming and Applications, McGraw Hill, 2012.
3. Richard D. Klafter, Thomas .A, Chri Elewski, Michael Negin, Robotics Engineering an Integrated Approach, Phi Learning., 2009.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XIX Elective IV	20CAP19C	**LEARNING BIG DATA & HADOOP**	60	-	3

Preamble

To introduce the concepts and challenges of big data and focuses on big data handling concepts, R Programming, Map Reduce and Hadoop based analytics.

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 Big Data and Pioneers of Big Data	K1
CO2	Acquire depth knowledge to performing data modeling in R	K2,K3
CO3	Explore on Installing Hadoop and understanding different Hadoop modes	K3,K5
CO4	Gain knowledge in HDFS, MapReduce architecture	K3 , K4
CO5	Depth knowledge in the components of HDFS and MapReduce	K4,K6

ELECTIVE-IV LEARNING BIG DATA AND HADOOP

Total hours per week: 5   **No. of Credits: 3**
Total hours in the semester: 60

UNIT I

An Introduction

Importance of Big Data: A Flood of Mythic "Start-Up" Proportions- A convergence of Key Trends- A Wider Variety of Data – The Expanding Universe of Unstructured Data. Industry Examples of Data: Digital Marketing and the Non - line World – Database Marketers, Pioneers of Big Data – Big Data and the New School of Marketing.

(10 hours)

UNIT II

R Language

Installing R - Installing RStudio - Understanding the features of R language - Using R packages - Performing data operations - Increasing community support - Performing data modeling in R

(12 hours)

UNIT III

Hadoop

Installing Hadoop - Understanding different Hadoop modes - Understanding Hadoop installation steps - Installing Hadoop on Linux, Ubuntu flavor (single node cluster) - Installing Hadoop on Linux, Ubuntu flavor (multinode cluster) - Installing Cloudera Hadoop on Ubuntu

(13 hours)

UNIT IV

Hadoop Architecture

Understanding Hadoop features - Understanding HDFS - Understanding the characteristics of HDFS - Understanding MapReduce -Learning the HDFS and MapReduce architecture

(10 hours)

UNIT V

MapReduce Components

Understanding the HDFS architecture - Understanding HDFS components - Understanding the MapReduce architecture - Understanding MapReduce components - Understanding the HDFS and MapReduce architecture by plot - Understanding Hadoop subprojects

(15 hours)

Reference Books:

1. Michael Minelli , Michele Chambers , Ambiga Dhiraj " BIG DATA BIG ANALYTICS ", Wiley Publications, Indian Reprint 2014.
2. Vignesh Prajapathi, Big Data Analytics with R and Hadoop, PACKT Publishing, 2013.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core: XIX Elective IV	20CAP19D	**INFORMATON RETRIEVAL TECHNIQUES**	60	-	3

Preamble

To introduce the concepts and challenges of information retrieval on data storage and various multimedia operations used on information retrieval 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 information storage and retrieval techniques	K1
CO2	Performing structural query and other query operations	K2,K3
CO3	Explore information retrieval process in multimedia techniques	K3,K5
CO4	Gain knowledge in text operations with user interface	K3 , K4
CO5	Create knowledge in Online IR systems and other public access catalogs	K4,K6

ELECTIVE-IV INFORMATON RETRIEVAL TECHNIQUES

Total hours per week: 5   **No. of Credits: 3**
Total hours in the semester: 60

Unit I   Introduction on Information retrieval
Basic Concepts –Retrieval Process –Modeling –Classic Information Retrieval –Set Theoretic, Algebraic and Probabilistic Models –Structured Text Retrieval Models –Retrieval Evaluation –Word Sense Disambiguation   **(10 Hours)**

Unit II   Querying

Languages –Key Word based Querying –Pattern Matching –Structural Queries –Query Operations –User Relevance Feedback –Local and Global Analysis –Text and Multimedia languages

(10 Hours)

Unit III

Text Operations and User Interface

Document Preprocessing –Clustering –Text Compression -Indexing and Searching –Inverted files –Boolean Queries –Sequential searching –Pattern matching –User Interface and Visualization –Human Computer Interaction –Access Process –Starting Points –Query Specification -Context –User relevance Judgment –Interface for Search

(15 Hours)

Unit IV **Multimedia Information Retrieval**

Data Models –Query Languages –Spatial Access Models –Generic Approach –One Dimensional Time Series –Two Dimensional Color Images –Feature Extraction

(10 Hours)

Unit V **Applications**

Searching the Web –Challenges –Characterizing the Web –Search Engines –Browsing – Meta-searchers –Online IR systems –Online Public Access Catalogs –Digital Libraries – Architectural Issues –Document Models, Representations and Access–Prototypes and Standards

15 Hours)

REFERENCE BOOKS:

1.Ricardo Baeza-Yate, Berthier Ribeiro-Neto, "Modern Information Retrieval", Pearson Education Asia, 2005.

2.G.G. Chowdhury, "Introduction to Modern Information Retrieval", Neal-

Schuman Publishers; 2nd edition, 2003.

3.Daniel Jurafsky and James H. Martin, "Speech and Language Processing", Pearson Education, 2000

4.David A. Grossman, Ophir Frieder, " Information Retrieval: Algorithms, and Heuristics", Academic Press, 2000

5.Charles T. Meadow, Bert R. Boyce, Donald H. Kraft, "Text Information Retrieval Systems", Academic Press, 2000

CATEGORY	COURSE CODE	Title of the Course	L	P	CREDIT
Core: XX	20CAP20	DATA MINING USING R - PRACTICAL	-	72	4

Subject Description: This course provides hand on experience to Data Mining Using R

Goal : Candiates pursuing this course will be aligned with the current market job requirements. **Objectives :** This course is designed to imbibe the best practice programming skills in Data Mining with R with real world Machine Learning case studies

Practical List

1. Implement Apriori algorithm to extract association rule of data mining.
2. Implement k-means clustering technique.
3. Implement any one Hierarchal Clustering.
4. Implement Classification algorithm.
5. Implement a decision tree.
6. Linear Regression.
7. Implement any one statistical based algorithm.
8. Implement outliers.
9. Implement logistic regression.
10. Implement time series analysis.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core: XXI	20CAP21	**Mini Project and Viva Voce**	-	-	**5**

MINI PROJECT (GUIDELINES FOR MINI PROJECT):

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

    b. 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.

    c. 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: XXII	20CAP22	**Comprehension in Computer Science –III (Self study/ Online Exam)**	-	-	1

PART III - COMPREHENSION IN COMPUTER SCIENCE – III, IV & V

(For those admitted in June 2017-18)

The Comprehension in Computer Science examination will be conducted at the end of each semester III, IV & V 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 III, IV & V 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: XXIII	20CAP23	**INSTITUTIONAL TRAINING**	-	-	**2**

Institutional / Industrial Training:

A student shall visit an institution / organisation and learn its operations according to the nature of her discipline of study after approval from the Department for a period of 15 days during her summer vacation between IV and V semesters. Work carried out during this period will have to be recorded in a work diary provided by the department. An institutional training report should be submitted by the student at the end of the fifth semester (ESE) to complete the programme.

Institutional Training reports are evaluated at the end of semester- V by the **Internal Examiners** only as appointed By COE. Following weightages shall be used to evaluate the institutional training report:

COMPONENTS*	MARKS	TOTAL MARKS
Understanding and articulation of concepts	30	
Clarity and comprehensiveness of presentation in the report	30	**100**
Structure and neatness of the report	40	

a. Different metrics may be evaluated depending on the nature of the work carried out during the training period and is left to the discretion of the department.

OPEN ELECTIVE

A student shall take up one **OPEN 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 2019 – 2020 ONWARDS

S.No.	Course Code	Department	Course
1.	19TAPC01	Tamil	Naval Ilakiyam – Kalikattu Ithigasam
2.	19ENPC01	English	Business Communication
3.	19MAPC01	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

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	20PECAP24	MULTIMEDIA 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 authoring tools	K1
CO2	To enrich knowledge multimedia text, image, graphics, video and animation.	K2,K3

CO3	To learn various multimedia file system, operating systems and networking.	K2,K5
CO4	To understand knowledge about multimedia database.	K3,K4
CO5	To acquire knowledge how multimedia is used in day to day life in various application models using internet.	K2,K6

Proficiency Enhancement – MULTIMEDIA SYSTEMS (Self Study)

UNIT I
Fundamentals of Multimedia
What is multimedia - Introduction to multimedia-multimedia skills - Mulitimedia Macintosh and windows production platforms-Basic software-Multimedia authoring tools.

UNIT II
Significance of Multimedia
Text-Sound/Audio-Images and graphics-Video and Animation

UNIT III
Multimedia Operating System
Resource management- Process Management- File system- Networking Systems. Multimedia Subsystems: Application Subsystem, Transport subsystem, QOS, Synchronization, Presentation, Multimedia Synchronization- single user – multimedia on networks.

UNIT IV
Multimedia Database
Database systems- MDBMS- Characteristics- Data analysis- Data Structure-Operations on Data-Integrations and database model- Documents-Hypertext and Hypermedia-Document Architecture SGML, ODA- MHEG.

UNIT V
Multimedia and Internet
The internet and how it works- Tools for WWW- Designing for WWW.

REFERENCE BOOKS:

1. Steinmetz and Klara Nahrstedt, "Multimedia Computing, communication and application", *Pearson*
   Education Asia, 1995
2. Tay Vaughnan, "Multimedia: Making it work" 5th Edition, *Tata McGraw-Hill 2001*
3. Jeffcoat, "Multimedia in Practice- Technology and applications", *PHI 1995* Edition.

IV SEMESTER

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core: XXV	20CAP25	Major Project and Viva-voce	-	-	10

MAJOR PROJECT (GUIDELINES FOR MAJOR PROJECT):

      a. 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.

      b. 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.