MASTER OF COMPUTER APPLICATIONS (Regular)
(For students admitted from 2018-19 & 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 (Regular)
Course Scheme and Scheme of Examinations
(For students admitted from 2018-19 & onwards)

Part	Category	Course Code	Title of the Course	Contact Hrs/week	Exam Duration hrs.	CIA	ESE	Total marks	Credits
						Max. Marks			
I –SEMESTER									
III	Core: I	18CAP01	Introduction to Information Technology	4	3	25	75	100	3
III	Core :II	18CAP02	Computer Organization and Architecture	4	3	25	75	100	3
III	Core : III	18CAP03	Problem Solving in C	4	3	25	75	100	4
III	Core : IV	18CAP04	Accounting and Financial Management	4	3	25	75	100	3
III	Core : V	18CAP05	Web Designing	4	3	25	75	100	4
III	Core : VI	18CAP06	Problem Solving using C –Practical	5	3	40	60	100	4
III	Core : VII	18CAP07	Web Designing- Practical	5	3	40	60	100	4
			TOTAL	30				700	25
II –SEMESTER									
III	Core: VIII	18CAP08	Data Structures	4	3	25	75	100	3
III	Core : IX	18CAP09	Relational Database Management Systems	4	3	25	75	100	4
III	Core : X	18CAP10	Operating Systems	4	3	25	75	100	3
III	Core : XI	18CAP11	Object Oriented Analysis and Design & C++	4	3	25	75	100	4
III	Core : XII	18CAP12	Mathematical Foundations of Computer Science	4	3	25	75	100	3
III	Core : XIII	18CAP13	Data Structures Using C++ -Practical	5	3	40	60	100	4
III	Core : XIV	18CAP14	RDBMS - Practical	5	3	40	60	100	4
			TOTAL	30				700	25

			III –SEMESTER						
III	Core : XV	18CAP15	Python Programming	4	3	25	75	100	4
III	Core : XVI	18CAP16	Advanced Java	4	3	25	75	100	4
III	Core : XVII	18CAP17	Research Methodology	4	3	25	75	100	4
III	Core : XVIII	18CAP18	Data Communication and Networking	4	3	25	75	100	3
III	Core : XIX	18CAP19	Operations Research	4	3	25	75	100	3
III	Core : XX	18CAP20	Python Programming - Practical	5	3	40	60	100	4
III	Core : XXI	18CAP21	Advanced Java - Practical	5	3	40	60	100	4
III	Core : XXII	18CAP22	Comprehension in Computer Science – I (Self Study/ Online Exam)	-	1 1/2	-	100	100	1
			TOTAL	30				800	27
			IV –SEMESTER						
III	Core: XXIII	18CAP23	.NET Programming	5	3	25	75	100	5
III	Core: XXIV	18CAP24	Computer Graphics and Multimedia	5	3	25	75	100	5
III	Core: XXV	18CAP25	Software Project Management	4	3	25	75	100	4
III	Elective: I	18CAP26A/ 18CAP26B/ 18CAP26C/ 18CAP26D	Client Server Technology / Digital Image Processing / Open Source System / Internet of Things	4	3	25	75	100	3
III	Elective: II	18CAP27A/ 18CAP27B/ 18CAP27C/ 18CAP27D	Mobile Computing / Distributed Computing / Cloud Computing / Remote sensing and Geomatics for Agriculture and Forestry	4	3	25	75	100	3
III	Core: XXVI	18CAP28	.NET Programming- Practical	3	3	40	60	100	4
III	Core:XXVII	18CAP29	Computer Graphics and Multimedia - Practical	3	3	40	60	100	4
III	Core : XXVIII	18CAP30	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	31

V –SEMESTER

III	Core :XXIX	18CAP31	Data Mining and Warehousing	5	3	25	75	100	5
III	Elective - III	18CAP32A/ 18CAP32B/ 18CAP32C/ 18CAP32D	Natural Language Processing/ Soft Computing/ Component Based Systems/GIS for Land Resource Management	5	3	25	75	100	3
III	Elective – IV	18CAP33A/ 18CAP33B/ 18CAP33C/ 18CAP33D	C# Programming/ Robotics/ Learning Big Data & Hadoop/ Information Retrieval Techniques	5	3	25	75	100	3
III	Core: XXX	18CAP34	Data Mining using R Practical	6	3	40	60	100	4
III	Core:XXXI	18CAP35	Mini Project and Viva voce	6	-	40	60	100	5
III	Core :XXXII	18CAP36	Comprehension in Computer Science – III (Self Study/ Online Exam)	-	1 1/2	-	100	100	1
III	Core: XXXIII	18CAP37	Institutional Training	-	-	40	60	100	2
IV	Core :XXXIV	**	Core Optional	3	3	-	-	100	3
V	Proficiency Enhancement	18PEPCA1	Multimedia Systems (Self Study)	-	3	-	-	100	2
			Total	30				900	28

VI –SEMESTER

III	Core: XXXV	18CAP38	Major Project and Viva-voce	-	-	200	100	300	10
V	Proficiency Enhancement		Online Course / Learning Object Repository	III– VI SEMESTER					2
			Certificate Course	III – VI SEMESTER					2
			Total	-	-	-	-	4300	150

P. H. ely

Head, Department of Computer Science
P.K.R. Arts College for Women (Autonomous)
Gobichettipalayam - 638476.

** - 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

III SEMESTER

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core	18CAP15	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 XV - 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	18CAP16	**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 of Java Programming	K1,K2
CO2	Enrich knowledge about Remote Method Invocation	K2
CO3	To develop programs using JDBC and database access	K3
CO4	To apply the knowledge of Java Server Pages	K3, K6
CO5	Gain experience in JAR file and Swing Programming	K4, K5,K6

CORE: XVI - ADVANCED JAVA

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

Overview of Java

Java Basics Review: Components and event handling – Threading concepts – Networking features – Media techniques

(8 hours)

Unit II

Distributed Java

Remote Method Invocation-Distributed Application Architecture- Creating stubs and skeletons-Defining Remote objects- Remote Object Activation-Object Serialisation-Java Spaces

(10 hours)

Unit III

Database Connectivity and Web Applications

Java in Databases- JDBC principles – database access- Interacting- database search – Creating multimedia databases – Database support in web applications

(10 hours)

Unit IV

Java Server Page

JAVA SERVER PAGES-JSP Overview-Installation-JSP tags-Components of a JSP page-Expressions-Scriptlets-Directives-Declarations-A complete example   **(10 hours)**

Unit V

Advanced Java Techniques

JAR file format creation – Internationalization – Swing Programming – Advanced java Techniques.

(10 hours)

REFERENCE BOOKS:

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

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

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

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core	18CAP17	**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

CORE XVII: 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

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", 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	18CAP18	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 XVIII – 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	18CAP19	**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 XIX-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 Lab	**18CAP20**	**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 of 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 Lab	18CAP21	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. Display a welcome message using Servlet.
2. Design a Purchase Order form using Html form and Servlet.
3. Develop a program for calculating the percentage of marks of a student using JSP.
4. Design a Purchase Order form using Html form and JSP.
5. Prepare a Employee pay slip using JSP.
6. Write a program using JDBC for creating a table, Inserting, Deleting records and list out the records.
7. Write a program using Java servlet to handle form data.
8. Write a simple Servlet program to create a table of all the headers it receives along with their associated values.
9. Write a program in JSP by using session object
10. Write a program to build a simple Client Server application using RMI.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
core	18CAP22	**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 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.

IV SEMESTER

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core	18CAP23	.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 XXIII - .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	18CAP24	**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 XXIV – 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	18CAP25	**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 XXV- 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 metrics 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
Elective	18CAP26A	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
Elective	18CAP26B	**DIGITAL IMAGE PROCESSING**	48	-	3

Preamble

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

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 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
Elective	18CAP26C	OPEN SOURCE SYSTEM	48	-	3

Preamble

To learn the basics 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
Elective	18CAP26D	**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 IOT Networking Core	K1,K2
CO2	Acquire depth knowledge in Network Fundamentals, Router, Switches.	K2,K3
CO3	Explore On IOT Architecture and Security aspects in IOT	K3,K4,K5
CO4	Deals With the Concepts of IOT Application Development, Application Protocols	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 1

The IOT Networking Core

Technologies involved in IoT Development: Internet/Web and Networking Basics OSI Model, Data transfer referred with OSI Model, IP Addressing, Point to Point Data transfer, Point to Multi Point Data transfer & Network Topologies, Sub-netting, Network Topologies referred with Web, Introduction to Web Servers, Introduction to Cloud Computing IoT Platform overview .Overview of IoT supported Hardware platforms such as: Raspberry pi,ARM Cortex Processors, Arduino and Intel Galileoboards

(10 hours)

UNIT II

Network Fundamentals

Overview and working principle of Wired Networking equipment's –Router, Switches, Overview and working principle of Wireless Networking equipment's –Access Points, Hubs etc. Linux Network configuration Concepts: Networking configurations in Linux Accessing Hardware & Device Files interactions

(10 hours)

UNIT III

IOT Architecture

History of IoT, M2M –Machine to Machine, Web of Things, IoT protocolsApplications:Remote Monitoring & Sensing,Remote Controlling,Performance Analysis TheArchitecture The Layering concepts , IoT Communication Pattern, IoT protocol Architecture, The 6LoWPAN Security aspects in IoT

(10 hours)

UNIT IV

IOT Application Development

Application Protocols MQTT, REST/HTTP,CoAP, MySQL Back end Application Designing Apache for handling HTTP Requests, PHP & MySQL for data processing, MongoDB Object type Database, HTML, CSS & jQuery for UI Designing, JSON lib for data processing, Security & Privacy during development, Application Development for mobile Platforms: Overview of Android / IOS App Development tools

(10 hours)

UNIT V

Case study & Advanced IOT Applications

IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipments. Use of Big Data and Visualization in IoT, Industry 4.0 concepts. Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / Intel Galileo/ARM Cortex/ Arduino)

(8 hours)

REFERENCE BOOKS:

1. 6LoWPAN: The Wireless Embedded Internet, Zach Shelby, Carsten Bormann, A John Wiley and Sons, Ltd, Publication,2009.
2. Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, Dr. Ovidiu Vermesan, Dr. Peter Friess, River Publishers,ISBN: 978-87-92982-73-5.
3. Interconnecting Smart Objects with IP: The Next Internet,Jean-Philippe Vasseur, Adam Dunkels, Morgan Kaufmann Publishers is an Imprint of Elsevier, Copyright © 2010 Elsevier Inc., ISBN : 978-0-12-375165-2
4. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning, Auerbach Publications, ISBN 978-1-4200-5281-7

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Elective	18CAP27A	**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
Elective	18CAP27B	**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
Elective	18CAP27C	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
Elective	18CAP27D	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 Crops Acre Age And Yield Estimation	K1,K2
CO2	Acquire depth knowledge in Soil Mapping	K2,K3
CO3	Explore On Damage Assessment and Agriculture damage prediction	K3,K4,K5
CO4	Deals With the Concepts of Forest taxonomy	K5
CO5	Gain knowledge in Climatic Impact Of Agriculture And Forestry	K4,K5,K6

ELECTIVE II: REMOTE SENSING AND GEOMATICS FOR AGRICULTURE AND FORESTRY

UNIT I

Crops Acre Age and Yield Estimation

Spectral properties of crops in optical & TIR region, Microwave backscattering behavior of crop canopy – crops identification and crop inventory – crop acreage estimation – vegetation indices and biophysical model – Yield modeling – crop condition assessment – command area monitoring and management – Microwave RS for crop inventory – Case studies

(10 hours)

UNIT II

Soil Mapping

Soil classifications – Soil survey, Types and methods – Hydrological Soil grouping - Factors influencing soil reflectance properties – Characteristics of saline & alkaline Soils –principle component analysis and orthogonal rotation transformation - Soil mapping - watershed management - Problem soil identification – land evaluation – Case studies. **(10 hours)**

UNIT III

Damage Assessment

Detection of pest & diseases – Flood mapping and Assessments of crop loss – drought assessment – Land degradation – Soil erosion & sedimentation – Soil loss assessment – Soil conservation – Agriculture damage prediction modeling.

(10 hours)

UNIT IV

Forestry

Forest taxonomy – inventory of forest land – forest types and density mapping – Forest stock mapping – factors influencing degradation of forest – Delineation of degraded forest - Forest change detection and monitoring – Forest fire mapping & damage assessment — biomass estimation - carbon storage – ALTM for Forest studies – urban forestry issues 28

(10 hours)

UNITV

Climatic Impact of Agriculture And Forestry

Concepts of Integrated surveys– global effects and climatic changes: land degradation and desertification, extreme events, - effect on forest produces health, forest hazards, sustainable forest Management and practice - biodiversity issues – invasive biotics – mitigation and adaptation – RS & GIS for drawing out action plans – watershed approach – landuse planning for sustainable development – precision farming – Case studies.

REFERENCE BOOKS :

1. John G. Lyon, Jack MCcarthy, Wetland & Environmental application of GIS,1995.

2. Margareb Kalacska, G. Arturosanchez, Hyper spectral RS of tropical and sub tropical forest, 2005.

3. Shunlin liang, Advances in land RS: System, modeling invention and applications, 2001.

4. Joe Boris dexon, Soil mineralogy with environmental application, Library of congress catalog, 2004.

5. James B, Introduction of Remote sensing, Third edition Campbell, 3rd edition Guilford Press, 2002.

6. David H. White, S. Mark Howden, Climate Change: Significance for Agriculture and Forestry,

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core Lab	**18CAP28**	**.NET PROGRAMMING - PRACTICAL**	**-**	**36**	**4**

Subject Description

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 Lab	18CAP29	**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	18CAP30	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
Skill Enhancement Course: I	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 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

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Core	18CAP31	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 XXIX: 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
Elective	18CAP32A	**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
Elective	18CAP32B	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
Elective	18CAP32C	**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
Elective	18CAP32C	**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

Geological and Geo-technical studies

Mineral resources exploration, mineral mapping and mineral resources information system, mapping mining area, encroachment mapping, GIS in mine remediation and mine reclamation, oil and gas exploration, site suitability for dams, atomic power plants.

(10 Hours)

UNIT II

Applications in soil

Soil and Land Use Surveys, Soil classification, soil irrigability, soil erosion mapping, soil salinity, soil alkalinity, surface soil moisture estimation, runoff and sediment yield estimation, desertification mapping, soil fertility mapping, agro-land suitability assessment, soil capability and loss assessment, locational and climatic advantages, settlements and demographic pressure estimation.   **(15 Hours)**

UNIT III

Forest and Ecology

RS and GIS for forest cover mapping and monitoring, estimation of biomass, carbon sequestration, Wildlife ecology: wildlife tracking, protected areas, wildlife habitat selection, rangeland applications, forest fire surveillance and forecasting, forest burnt area mapping, fire spread modeling, revegetation.

(12 Hours)

UNIT IV

Deforestation

Biodiversity characterization: Deforestation/ afforestation/encroachment mapping and monitoring, impact assessment of mining in forest.

(10 Hours)

UNIT V

Application in agriculture

Agro-climatic zonation, site suitability for agricultural and horticulture crops, crop acreage estimation, RS based yield model, crop norm violation, RS basis for crop insurance claim, damage assessment due to cyclone, drought, flood and forewarning, crop stress detection, precision agriculture.

(13 Hours)

Reference Books

1. Introduction to Environmental Remote Sensing – Barrett E. C.

2. Remote Sensing Principles and Interpretations – Sabins F. F.

3. Remote Sensing and Image Interpretation – Thomas M. Lillesand

4. Modeling in Resource Management and Environment - Sharma H.S. and Binda P.R.

5. Genesis, Termination and succession in the life cycle of organizations - Paul Brown M.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Elective	18CAP33A	**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
Elective	18CAP33B	**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 classifications.	K1,K2
CO2	To gain knowledge in End Effectors And Robot Controls	K2
CO3	To analyze Robot Transformations And Sensors	K3,K4
CO4	Deals with Robot Cell Design And Application	K3,K4
CO5	Depth knowledge of Micro/Nano Robotics System and their principles	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 anatomy-Definition, law of robotics, History and Terminology of Robotics-Accuracy and repeatability of Robotics-Simple problems-Specifications of Robot-Speed of Robot-Robot jointsand links-Robot classifications-Architecture of robotic systems-Robot Drive systems-Hydraulic, Pneumatic and Electric system.

(10 hours)

UNIT II

Effectors and Robot Controls

Mechanical grippers-Slider crank mechanism, Screw type, Rotary actuators, cam type-Magnetic grippers-Vacuum grippers-Air operated grippers-Gripper force analysis-Gripper design-Simple problems-Robot-Point to point control, Continuous path control, Intelligent robot-Control system for robot joint-Control actions-Feedback devices-Encoder, Resolver, LVDT-Motion Interpolations-Adaptive control.

(13 hours)

UNIT III

Robot Transformations and Sensors

Robot kinematics-Types- 2D, 3D Transformation-Scaling, Rotation, Translation-Homogeneous coordinates, multiple transformation-Simple problems. Sensors in robot – Touch sensors-Tactile sensor – Proximity and range sensors – Robotic vision sensor-Force sensor-Light sensors, Pressure sensors.

(15 hours)

UNIT IV

Robot Cell Design and Application

Robot work cell design and control-Sequence control, Operator interface, Safety monitoring devices in Robot-Mobile robot working principle, actuation using MATLAB, NXT Software Introductions-Robot applications- Material handling, Machine loading and unloading, a ssembly, Inspection, Welding, Spray painting and undersea robot.

(12 hours)

UNIT V

Micro/Nano Robotics System

Micro/Nanorobotics system overview-Scaling effect-Top down and bottom up approach- Actuators of Micro/Nano robotics system-Nanorobot communication techniques-Fabrication of micro/nano grippers-Wall climbing micro robot working principles-Biomimetic robot-Swarm robot-Nanorobot in targeted drug delivery system.

(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.

4. Francis N. Nagy, Andras Siegler, Engineering foundation of Robotics, Prentice Hall Inc., 1987.

5. P.A. Janaki Raman, Robotics and Image Processing an Introduction, Tata McGraw Hill,1995.

CATEGORY	COURSE CODE	Title of the Course	C	P	CREDIT
Elective	18CAP33C	**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
Elective	18CAP33D	**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 Lab	18CAP34	**DATA MINING USING R - PRACTICAL**	-	72	4

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

Goal : Candidates 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. Fit a decision tree to the training set with response Sex and the crab measurements as predictors, use tree() and Division of Statistics, IDA
    a. Analyze the output produced by print() and summary()
    b. Plot the tree, use plot() and text()
6. Linear Regression.
7. Create dummy variables for Sex in the training set by using such type of code:
    train$M=as.numeric(train$sex=="Male");
    train$F=as.numeric(train$sex=="Female");
8. Split data into training-validation-test sets (40%,30%,30%) by using sample() function. How many

    observations did you get in each set?
9. Run logistic regression with Species as response and BD as predictor, use glm().
    a. Analyze the summary of the regression output with summary().
    b. Look at the summary plots, use plot() .
    c. Plot the predicted data in the coordinates (P(Species), BD) by using plot(). Does this look like logistic regression function?
10. Update the data frame by standardizing the crab measurements. This can be done by applying scale() function to each column containing a crab measurement. From now on, the standardized data should be used.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
core	**18CAP35**	**Mini Project**	-	-	**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	18CAP36	**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	18CAP37	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.

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	18PEPCA1	**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 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 (Self Study)

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, 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.

CATEGORY	Course Code	Title of the Course	C	P	CREDIT
Core	18CAP38	**Major Project**	-	-	**10**

MAJOR PROJECT (GUIDELINES FOR MAJOR PROJECT):

    d. 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.

    e. 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.

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	**18CSPC01**	**ANIMATION PRACTICAL**	-	36	3

Core:XX ANIMATION PRACTICAL

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.