J.J.COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

M.Sc. Information Technology – SYLLABUS
(from 2022 – 2023 onwards)

J.J College of Arts and Science (Autonomous), Pudukkottai – 622 422
M.Sc. – Information Technology (Course Structure under CBCS)
Proposed Course Structure based on UGC-LOCF and TANSCHE
(For the Candidates admitted from academic year 2022 – 2023)

Semester		Paper Code	Course	Title	Instruct Hours/ Week	credit	Exam Hours	Marks		Total
								Internal	External	
I		P1R2ITCC1	CC - 1	Advanced JAVA Programming	5	5	3	25	75	100
		P1R2ITCC2	CC - 2	Cryptography and Network Security	5	5	3	25	75	100
		P1R2ITCC3	CC - 3	Design and Analysis of Algorithm	5	5	3	25	75	100
		P1R2ITCC4P	CC - 4	Advanced JAVA Practical	5	5	3	40	60	100
		P1R2ITCC5P	CC - 5	Algorithm Practical	5	5	3	40	60	100
		P1R2ITDSE1:1/ P1R2ITDSE1:2	DSE – 1	**Discipline Specific Elective Course 1** (Taken from list of Electives)	5	3	3	25	75	100
					30	**28**				**600**
II		P2R2ITCC6	CC - 6	Advanced Web Technology	5	5	3	25	75	100
		P2R2ITCC7	CC - 7	Distributed Operating System	5	5	3	25	75	100
		P2R2ITCC8	CC - 8	Machine Learning	5	5	3	25	75	100
		P2R2ITCC9	CC - 9	Advanced Database Management Systems	5	5	3	25	75	100
		P2R2ITCC10P	CC - 10	Advanced Web Technology Practical	5	5	3	40	60	100
		P2R2ITDSE2:1/ P2R2ITDSE2:2/	DSE - 2	**Discipline Specific Elective Course 2** (Taken from list of Electives)	5	3	3	25	75	100
					30	**28**				**600**

III		P3R2ITCC11	CC - 11	Digital Image Processing	6	5	3	25	75	100
		P3R2ITCC12	CC - 12	Compiler Design	6	5	3	25	75	100
		P3R2ITCC13	CC - 13	Internet of Things	6	5	3	25	75	100
		P3R2ITCC14P	CC – 14	Image Processing Practical	6	5	3	40	60	100
		P3R2ITSEC1:1/ P3R2ITSEC1:2/	SEC - 1	**Skill Enhancement Course 1** (Taken from list of Electives)	6	3	3	25	75	100
					30	**23**				**500**
		P4R2**GEC1	GEC - 1	**Generic Elective Course 1** (Taken from other department list)	6	3	3	25	75	100
IV		P4R2ITCC15PW	CC - 15	Project Work		8				100
						11				**200**
TOTAL CREDITS/MARKS						**90**				**1900**

Discipline Specific Elective Course 1:

P1R2ITDSE1:1 - Cloud Computing
P1R2ITDSE1:2 - Advanced Computer Networks

Discipline Specific Elective Course 2:

P2R2ITDSE2:1 - Data Mining
P2R2ITDSE2:2 - Data Science and Big Data Analytics

Skill Enhancement Elective Course

P3R2ITSEC1:1 - Dot Net Programming
P3R2ITSEC1:2 - Soft Computing

Generic Elective Course

P4R2ITGEC1 - Web Services

CORE COURSE – 1 ADVANCED JAVAPROGRAMMING (P1R2ITCC1)

Hours/Week: 5 **Max. Marks: 100 (CIA:25+Ext.:75)**

Total Hours: 65 **Credit:5**

Nature of the Course: Skill Development

Objectives:

1. To develop programming skill and to solve scientific problems using java Programming.
2. To enable the students to understand the core and advanced principles of the Java Language and use visual tools to produce well designed, effective applications and applets.
3. To Develop distributed applications using RMI .
4. To Develop server side programs in the form of servlets
5. To create the JDBC database connection

UNIT- I: Design Patterns **(13hrs)**

Introduction to Design patterns - Catalogue for Design Pattern - Factory Method Pattern, Prototype Pattern, Singleton Pattern- Adapter Pattern- Proxy Pattern- Decorator Pattern- Command Pattern- Template Pattern- Mediator Pattern- Collection Framework – Array List class – Linked List class**(ICT CLASS)** – Array List vs. Linked List - List iterator interface - Hash Set class- Linked Hash Set class-Tree Set class Priority Queue class - Map interface-Hash Map class- Linked Hash Map class –Tree Map class - Comparable interface -Comparator interface- Comparable vs. Comparator **(Assignment)**

UNIT-II: Applet Fundamentals **(13hrs)**

Applet Class - Applet lifecycle- Steps for Developing Applet Programs- Passing Values through Parameters- Graphics in Applets(ICT CLASS)- GUI Application**(Seminar)** - Dialog Boxes - Creating Windows - Layout Managers – AWT Component classes – Swing component classes- Borders – Event handling with AWT components - AWT Graphics classes - File Choosers - Color Choosers – Tree – Table–Tabbed panels–Progressive bar - Sliders.

UNIT-III: JDBC **(13hrs)**

Introduction - JDBC Architecture - JDBC Classes and Interfaces – Database Access with MySQL -Steps in Developing JDBC application - Creating a New Database and Table with JDBC - Working with Database Metadata; Java Networking Basics of Networking - Networking in Java**(ICT CLASS)**- Socket Program using TCP/IP - Socket Program using UDP**(Assignment)**- URL and Inet address classes.

UNIT–IV: Servlet **(13hrs)**

Advantages over Applets - Servlet Alternatives - Servlet Strengths - Servlet Architecture - Servlet Life Cycle – Generic Servlet, Http Servlet - First Servlet - Invoking Servle**(ICT CLASS)** - Passing Parameters to Servlets - Retrieving Parameters - Server-Side Include – Cookies- JSP Engines - Working with JSP - JSP and Servlet - Anatomy of a JSP Page- Database Connectivity using Servlets and JSP**(Seminar)**.

UNIT-V: Lambda Expressions

Lambda Expressions- Method Reference- Functional Interface- Streams API, Filters- Optional Class- Nashorn- Base 64 Encode Decode**(ICT CLASS)**- JShell(RPEL)- Collection Factory Methods- Private Interface Methods- Inner Class Diamond Operator- Multiresolution Image API.

Textbooks

1. Bert Bates, Karthy Sierra , Eric Freeman, Elisabeth Robson, "Head First Design Patterns", O'REILLY Media Publishers.(1st- Unit). Herbert Schildt, "Java: A Beginner Guide", Oracle Pres-SeventhEdition. (2nd and 3rd Unit).

2. Murach's, "Java Servlets and JSP", 2nd Edition, Mike Murach & Associates Publishers; 3rd Edition. (4th Unit).

3. Warburton Richard, "Java 8 Lambdas", Shroff Publishers & Distributors Pvt Ltd. (5th Unit).

References

1. Paul Deitel and Harvey Deitel, "Java: How to Program", PrenticeHall Publishers; 9th Edition.

2. Jan Graba, "An Introduction to Network Programming with Java- Java 7 Compatible", 3rd Edition, Springer.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understood the OOPs Concepts	K2
CO 2	Improve the knowledge in JDBC	K1
CO 3	Create the knowledge in Servlet	K5
CO 4	Understand the knowledge in EJB	K2
CO 5	Create the knowledge in RMI	K5

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO – 1	2	3	2	2	3	2	2	3	2	2
CO – 2	2	2	2	3	2	2	3	2	3	3
CsO – 3	3	2	3	2	2	2	3	2	3	2
CO – 4	3	2	2	2	2	2	2	2	2	2
CO – 5	2	2	2	3	2	3	2	3	2	3

Mean Overall Relationship is 2.32 which is HIGH

CORE COURSE2-CRYPTOGRAPHY AND NETWORK SECURITY (P1R2ITCC2)

Hours/Week: 5 **Max. Marks: 100 (CIA:25+Ext.:75)**
Total Hours: 65 **Credit : 5**
Nature of the Course: Skill Development

Objectives

1. To understand Cryptography Theories, Algorithms and Systems.
2. To understand necessary Approaches
3. To Techniques to buildprotection mechanisms in order to secure Computer networks.
4. To know about the concept of Authentication Applications.
5. To gain the knowledge about virus and intruders.

Unit I (13Hours)

Introduction - Security trends – Legal, Ethical and Professional Aspects of Security, Need for Security at Multiple levels, Security Policies – Model of network security – Security attacks, services and mechanisms – OSI security architecture**(ICT CLASS)** – Classical encryption techniques: substitution techniques, transposition techniques, steganography-Foundations of modern cryptography: perfect security(**Assignment)**– information theory – product cryptosystem – cryptanalysis.

Unit II (13Hours)

Symmetric Encryption and Message Confidentiality - Symmetric Encryption Principles, Symmetric Block Encryption Algorithms, Stream Ciphers and RC4 , Chipher Block Modes of Operation, Location of Encryption Devices, Key Distribution. Public-key Cryptography and Message Authentication: Approaches to Message Authentication, Secure Hash Functions and HMAC, Public-Key Cryptography Principles, Public-Key Cryptography Algorithms, Digital Signatures, Key Management**(ICT CLASS)**.

Unit III (13Hours)

Authentication Applications - Kerberos, x.509 Authentication Service, Public-Key Infrastructure. Electronic Mail Security: Pretty Good Privacy (PGP), S/MIME**(ICT CLASS)**.

Unit IV (13Hours)

IP Security - IP Security Over view, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations. Web Security: Web Security Considerations**(ICT CLASS)**, Secure Socket Layer(SSL) and Transport Layer Security(TLS), Secure Electronic Transaction(SET).Network Management Security: Basic Concepts of SNMP, SNMPv1 Community Facility, SNMPv3.

Unit V (13Hours)

Intruders - Intruders, Intrusion Detection, Password Management. **Malicious Software:** Virus and Related Threats**(ICT CLASS)**, Virus Countermeasures, Distributed Denial of Service Attacks**.(Seminar) Firewalls:** Firewall Design Principles, Trusted Systems, Common Criteria for Information Technology Security Evaluation.

Text books

1. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill, 2007, Reprint 2015.
2. Stallings William,"Cryptography and Network Security- Principles and Practice 2017.
3. William Stallings, "Network Security Essentials Applications and Standards "Third Edition, Pearson Education, 2008.

References

1. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms And Protocols", Wiley Publications, 2003.
2. Charles Pfleeger, "Security In Computing", 4th Edition, Prentice Hall Of India, 2006.
3. Ulysess Black, "Internet Security Protocols", Pearson Education Asia, 2000.
4. Charlie Kaufman And Radia Perlman, Mike Speciner, "Network Security, Second Edition, Private Communication In Public World", PHI 2002.
5. Bruce Schneier And Neils Ferguson, "Practical Cryptography", First Edition, Wiley Dreamtech India Pvt Ltd, 2003.
6. Douglas R Simson "Cryptography – Theory And Practice", First Edition, CRC Press, 1995.Http://Nptel.Ac.In/.

Course Outcomes:

Upon the completion ion of the course students would be able to		Knowledge Level
CO 1	Understand the concepts Network Security.	K2
CO 2	Create knowledge in RSA Algorithm	K5
CO 3	Improve the knowledge in Virus	K6
CO 4	Create knowledge in Email Security	K5
CO 5	Improve the knowledge in DES	K6

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO – 1	2	2	2	3	3	2	2	2	2	2
CO – 2	3	2	3	2	3	2	3	2	3	2
CO – 3	2	2	3	2	2	3	2	2	2	3
CO – 4	2	2	2	3	2	3	2	2	2	2
CO – 5	2	2	2	3	2	3	2	3	2	2

Mean Overall Relationship is 2.30 which is HIGH

CORE COURSE – 3

DESIGN AND ANALYSIS OF ALGORITHMS (P1R2ITCC3)

Hours/Week: 5 **Max.Marks: 100 (CIA:25+Ext.:75)**

Total Hours: 65 **Credi : 5**

Nature of the Course: Skill Development

Objective:

1. To learn effective problem solving in Computing applications.
2. To analyze the algorithmic procedure
3. To determine the computational complexity of algorithms.
4. To gives stepwise procedure to solve problems
5. To Efficient approach of solving problems by a model of Computations

Unit I (13Hours)

Introduction: Algorithm Definition – Algorithm Specification – Performance Analysis-Asymptotic Notations. Elementary Data Structures: Stacks and Queues**(ICT CLASS)** – Trees – Dictionaries – Priority Queues – Sets and Disjoint Set Union – Graphs**(Assignment)**

Unit II (13Hours)

Divide and Conquer: The General Method – Defective Chessboard – Binary Search – Finding The Maximum And Minimum**(ICT CLASS)** – Merge Sort – Quick Sort – Selection - Strassen's Matrix Multiplication.

Unit III (13Hours)

The Greedy Method: General Method - Container Loading - Knapsack Problem - Tree Vertex Splitting – Job Sequencing With Deadlines - Minimum Cost Spanning Trees - Optimal Storage On Tapes**(ICT CLASS)** – Optimal Merge Patterns - Single Source Shortest Paths.

Unit IV (13Hours)

Dynamic Programming: The General Method – Multistage Graphs – All-Pairs Shortest Paths – Single-Source Shortest Paths - Optimal Binary Search Trees - String Editing - 0/1 Knapsack - Reliability Design - The Traveling Salesperson Problem - Flow Shop Scheduling. Basic Traversal and Search Techniques: Techniques for Binary Trees – Techniques for Graphs **(ICT CLASS)**– Connected Components and Spanning Trees(**seminar)–** Biconnected Components and DFS.

Unit V (13Hours)

Backtracking: The General Method – The 8-Queens Problem**(Seminar)** – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem Branch and Bound: Least Cost searchhod - 0/1 Knapsack Problem**(ICT CLASS)**.

Text Book

1. Ellis Horowitz, Satraj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Universities Press, Second Edition, Reprint 2009.

References

1. Data Structures Using C - Langsam, Augenstien, Tenenbaum,PHI

2. Data structures and Algorithms, V.Aho, Hopcropft, Ullman , LPE
3. Introduction to design and Analysis of Algorithms - S.E.Goodman, ST. Hedetniem- TMH.
4. Carlos A.Coello Coello, Gary B.Lamont, David A.Van Veldhuizen, "Evolutionary Algorithms for Solving Multi-Objective Problems",Springer 2nd Edition, 2007.

Course Outcomes:

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the concept of data structure.	K2
CO 2	Create knowledge in divide and conquer.	K5
CO 3	Improve the knowledge in the greedy method.	K6
CO 4	Create knowledge in dynamic programming.	K5
CO 5	Improve the knowledge in backtracking	K6

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO – 1	3	2	2	2	3	2	2	3	2	2
CO – 2	2	2	2	2	2	2	2	2	3	2
CO – 3	2	3	2	3	2	3	2	2	3	2
CO – 4	3	2	2	3	2	2	3	2	3	2
CO – 5	2	2	3	3	2	2	2	3	3	2

Mean Overall Relationship is 2.32 which is HIGH

CORE COURSE – 4

ADVANCED JAVA-PRACTICAL (P1R2ITCC4P)

Hours/Week: 5 **Max. Marks: 100 (CIA:40+Ext.:60)**
Total Hours: 65 **Credit : 5**
Nature of the Course: Employability

Objectives

1. To learn effective problem solving in java applications.
2. To know the concept of Japplet.
3. To gain the knowledge of JDBC concept.
4. To gain the knowledge of servlet.
5. To know the concept of java swing and RMI.

1. Write Java program to sort the given Array.

2. Write a Java program to find the area of rectangle using Constructor.

3. Create a JApplet using swing control, which will create the Biodata.

4. Write a JDBC program to create a table, insert, delete and update records.

5. Write a program in Java to retrieve the records from the database using JDBC
.
6. Write a program in Java to implement a client/server application using RMI.

7. Write a servlet program to count the number of visitors to a web page.

8. Write a servelet program to create mark statement.

9. Write a Swing program to place the images.

10. Write a Swing program to find out the biggest number of given three numbers.

Course Outcomes:

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the concept of Java applications.	K2
CO 2	Create knowledge of Japplet.	K5
CO 3	Improve the knowledge of JDBC.	K6
CO 4	Improve the knowledge of servlet.	K5
CO 5	Improve the knowledge of java swing and RMI concept.	K6

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO – 1	3	2	2	3	3	3	3	3	2	2
CO – 2	2	3	2	3	3	2	3	2	2	2
CO – 3	3	2	3	3	3	3	2	2	2	2
CO – 4	2	2	2	3	2	2	3	3	2	2
CO – 5	2	2	2	3	2	2	2	2	2	2

Mean Overall Relationship is 2.38 which is HIGH

CORE COURSE – 5: ALGORITHM PRACTICAL (P1R2ITCC5P)

Hours/Week: 5 **Max. Marks: 100 (CIA:40+Ext.:60)**

Total Hours: 65 **Credit: 5**

Nature of the Course: Skill Developement

Objective:

1. To learn the concept of stack and queue operation.
2. To know the concept of searching techniques.
3. To know the concept of sorting techniques.
4. To understand the concept of linked list.
5. To gain the knowledge of polynomial addition.

1. Write a C++ program to perform stack operation.
2. Write a C++ program to perform polynomial addition.
3. Write a C++ program to perform single linked list.
4. Write a C++ program for queue operation.
5. Write a C++ program to perform linear search.
6. Write a C++ program to to perform binary search tree.
7. Write a C++ program to perform binary tree traversal.
8. Write a C++ program to sort numbers using insertion sort.
9. Write a C++ program to numbers using Bubble sort.
10. Write a C++ program to numbers using quick sort.

Course Outcomes:

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the concept of sorting techniques..	K2
CO 2	Improve the knowledge in searching techniques.	K5
CO 3	Improve the knowledge in complexity of algorithms.	K6
CO 4	Improve the knowledge to solve polynomial addition.	K5
CO 5	Improve the knowledge of stack and queue concept..	K6

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO – 1	3	2	2	3	3	3	3	3	2	2
CO – 2	2	3	2	3	3	2	3	2	3	2
CO – 3	3	2	3	3	3	3	2	2	2	2
CO – 4	2	2	2	3	2	2	3	3	2	2
CO – 5	2	2	3	3	2	3	2	2	3	2

Mean Overall Relationship is 2.38 which is HIGH

DISCIPLINE SPECIFIC ELECTIVE COURSE-1: CLOUD COMPUTING (P1R2ITDSE1:1)

Hours/Week: 5 **Max. Marks: 100 (CIA:25+Ext.:75)**
TotalHours: 65 **Credit : 3**
Nature of the Course: Skill Development

Objective

1. T o objective of this course is to provide students with the comprehensive
2. To in-depth knowledge of Cloud Computing concepts, technologies, architecture
3. T o applications by introducing and researching state-of-the-art in Cloud Computing fundamntal issues, technologies, applications and implementations.
4. To Another objective is to expose the students to frontier areas of Cloud Computing and information systems,
5. To providing sufficient foundations to enable further study and research.

UNIT - I COMPUTING BASICS (13Hours)

Cloud computing definition- Characteristics- Benefit-Challenges- Distributed Systems- Virtualization-Service-oriented computing- Utility-oriented computing- Building Cloud Computing environments- computing platforms & technologies - Cloud Models**(ICT CLASS)** – Cloud Service Examples - Cloud Based Services & Applications(**Assignment)** - Cloud concepts and Technologies.

UNIT – II (13Hours)

VIRTUALIZATION, CLOUD SERVICES AND PLATFORM: Virtualization:Virtualization- Characteristics- taxonomy-types- Pros and Cons- Examples Architecture: Reference model- types of clouds- Compute Service - Storage Services**(ICT CLASS)** - Cloud Database Services - Application Services - Content Delivery Services - Analytics Services - Deployment And Management Service - Identity And Access Management Services - Open Source Private Cloud Software.

UNIT – III (13Hours)

CLOUD APPLICATION DESIGN AND DEVELOPMENT Design consideration- Reference Architecture for Cloud Application - Cloud Application Design Methodologies - Data Storage Approaches**(ICT CLASS)**- Development in Python: Design Approaches – Application: Image Processing - Document Storage - Map Reduce - Social Media Analytics.

UNIT – IV (13Hours)

PYTHON FOR CLOUD

Introduction- Installing Python- Data types & Data Structures**(seminar)**- Control Flow- Functions- Modules- Packages- File Handling- Date/Time

Operations **(ICT CLASS)**– Classes- Python for Cloud: Amazon Web Services –Google Cloud Platform - Windows Azure –Map Reduced – Packages of Interest – Designing a RESTful Web API.

UNIT – V **(13Hours)**

BIG DATA ANALYTICS, MULTIMEDIA CLOUD & CLOUD SECURITY

Big Data Analytics: Clustering Big data - Classification of Big Data – Recommendation systems. Multimedia Cloud: Case Study: Live Video Stream App - Streaming Protocols – Case Study: Video Transcoding App- Cloud Security: CSA Cloud Security Architecture **(ICT CLASS)** - Authentication-Authorization - Identity and Access management - Data Security - Key Management- Auditing- Cloud for Industry, Healthcare & Education.

Text Books

1. Buyya, Vecciola and Selvi, Mastering Cloud Computing: Foundations and Applications Programming, Tata McGraw Hill, 2013.
2. ArshdeepBahga, Vijay Madisetti, "Cloud Computing: A Hands – On Approach" Universities press (India) Pvt. limited 2016.

References:

1. Rittinghouse and Ransome, Cloud Computing: Implementation, Management, and Security, CRC Press, 2016.
2. Michael Miller "Cloud Computing Web based application that change the way you work and collaborate online". Pearson edition, 2008.
3. Kris Jamsa, Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile,Security and More, Jones & Bartlett Learning, 2012

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the Web API	K2
CO 2	Improve the knowledge in Standard infrastructure	K6
CO 3	Develop the talent in Cloud	K3
CO 4	Gather the details in Types of Cloud	K4
CO 5	Gather the details in Cloud Services	K4

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO - 1	2	3	2	2	3	2	2	3	2	2
CO - 2	3	2	2	3	2	2	2	3	2	2
CO - 3	2	2	3	2	2	3	2	2	3	2
CO - 4	2	3	2	2	2	2	3	2	2	2
CO - 5	2	2	3	2	2	3	2	3	2	2

Mean Overall Relationship is 2.28 which is HIGH

DISCIPLINE SPECIFIC ELECTIVE COURSE-1: ADVANCED COMPUTER NETWORKS (P1R2ITDSE1:2)

Hours/Week: 5 **Max. Marks: 100 (CIA:25+Ext.:75)**

Total Hours: 65 **Credit : 3**

Nature of the Course: Skill Development

Objectives

1. To study communication network protocols, differentcommunication layer structure.
2. To learn security mechanism for data communication.
3. To master the terminology and concepts of the OSI referencemodel and the TCP- IP reference model.
4. To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide areanetworks.
5. To be familiar with wireless networking concepts, and be familiarwith contemporary issues in networking technologies

Unit 1 **(13Hours)**

Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP models (**ASSIGNMENT**) – Example networks: Internet, 3G Mobile phone networks, Wireless LANs –RFID and sensor networks - Physical layer **(ICT CLASS)** – Theoretical basis for data communication - guided transmission media

Unit-2 **(13Hours)**

Wireless transmission - Communication Satellites – Digital modulation and multiplexing **(ICT CLASS)**- Telephones network structure – local loop, trunks and multiplexing, switching. Data link layer: Design issues – error detection and correction.

Unit 3 **(13Hours)**

Elementary data link protocols - sliding window protocols – Example Data Link protocols – Packet over SONET, ADSL - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols**(ICT CLASS)**.

Unit 4 **(13Hours)**

Network layer - design issues - Routing algorithms - Congestion control algorithms – Quality of Service – Network layer of Internet**(ICT CLASS)**- IP protocol – IP Address – Internet Control Protocol.

Unit 5 **(13Hours)**

Transport layer – transport service- Elements of transport protocol - Addressing, Establishing & Releasing a connection – Error control, flow control, multiplexing and crash recovery**(ICT CLASS)** - Internet Transport Protocol (**SEMINAR)**– TCP - Network Security: Cryptography.

Text Book

1. S. Tanenbaum, 2011, Computer Networks, Fifth Edition, Pearson Education, Inc.

Reference Books

1. B. Forouzan, 1998, Introduction to Data Communications in Networking, Tata McGraw Hill, New Delhi.
2. F. Halsall, 1995, Data Communications, Computer Networks and
3. Open Systems, Addison Wessley.D. Bertsekas and R. Gallagher, 1992, Data Networks, Prenticehall of India, New Delhi.
4. Lamarca, 2002, Communication Networks, Tata McGraw Hill, New Delhi.
5. Teresa C.Piliouras, "Network Design Management and Technical Perspectives, Second Edition", Auerbach Publishers, 2015.

Website, E-learning resources

1) http://peasonhighered.com/tanenbaum

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the computer networks	K2
CO 2	Improve the knowledge in wireless transmission	K6
CO 3	Develop the talent in protocols	K3
CO 4	Gather the details in Types of layers	K4
CO 5	Gather the details in network security	K4

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO - 1	2	3	2	3	2	3	3	3	2	2
CO - 2	2	3	2	2	2	3	2	2	3	2
CO - 3	2	2	2	2	2	2	2	2	2	2
CO - 4	2	3	3	2	2	3	2	3	3	2
CO - 5	2	3	3	3	3	2	2	2	2	2

Mean Overall Relationship is 2.34 which is HIGH

CORECOURSE – 6: ADVANCED WEB TECHNOLOGY (P2R2ITCC6)

Hours/Week: 5 **Max. Marks:100**
Total Hours: 65 **Credit: 5**
Nature of the Course: Employability

Objectives

1. To Explore the backbone of web page creation by developing .NETskill.
2. To Enrich knowledge about HTML control and web control classes.
3. To Provide depth knowledge about ADO.NET
4. To Understand the need of usability.
5. To evaluate methods for webservices

Unit - I **(13Hours)**

Introduction to CGI - Introduction – Server Browser Interaction **(ASSIGNMENT**) – CGI script structure – The CGI.pm Module – Perl variables – CGI Environment Variables – Processing Form – Sending mail – Validating the form data – Handling Checkboxes – Server Side Includes (SSI) **(ICT CLASS)**.

Unit – II **(13Hours)**

Developing ASP.NET Applications - ASP.NET Applications: ASP.NET applications– Code behind- The Global.asax application file- Understanding ASP.NET Classes- ASP.NET Configuration. Web Form fundamentals: A simple page applet- Improving the currency converter- HTML control classes **(ICT CLASS)**- The page class- Accessing HTML server controls. Web controls: Web Control Classes – Auto PostBack and Web Control events- Accessing web controls. Using Visual Studio.NET: Starting a Visual Studio.NET Project- Web form Designer- Writing code- Visual studio.NET debugging. Validation and Rich Controls: Validation- A simple Validation example- Understanding regular expressions- A validated customer form. State management - Tracing, Logging, and Error Handling.

Unit – III **(13Hours)**

Working with Data - Overview of ADO.NET - ADO.NET and data management- Characteristics of ADO.NET-ADO.NET object model. ADO.NET data access : SQL basics– Select , Update, Insert, Delete statements- Accessing data- Creating a connection- Using a command with a DataReader - Accessing Disconnected data**(ICT CLASS)** - Selecting multiple tables – Updating Disconnected data. Data binding: Single value Data Binding- Repeated value data binding- Data binding with data bases. Data list – Data grid – Repeater – Files, Streams and Email – Using XML

Unit - IV **(13Hours)**

Web Services - Web services Architecture : Internet programming then and now- WSDL–SOAP(SEMINAR)- Communicating with a web service-Web service discovery and UDDI. Creating Web services : Web service basics(ICT CLASS)- The StockQuote web service – Documenting the web service- Testing the web service- Web service Data types- ASP.NET intrinsic objects. Using web services: Consuming a web service- Using the proxy class- An example with TerraService.

Unit – V **(13Hours)**

Advanced ASP.NET - Component Based Programming: Creating a simple component – Properties and state- Database components- Using COM components. Custom controls: User Controls- Deriving Custom controls**(ICT CLASS)**. Caching and Performance Tuning: Designing and scalability– Profiling- Catching- Output catching- Data catching. Implementing security: Determining security requirements- The ASP.NET security model- Forms authentication- Windows authentication.

Text Books

1. N.P.Gopalan, J. Akilandeswari , "Web Technology – A Developers Perspective", PHI Learning Private Limited, Second Edition.

2. Mathew Mac Donald, "ASP.NET Complete Reference", TMH2005.

References

1. Crouch Matt J, "ASP.NET and VB.NET Web Programming",Addison Wesley 2002.
2. J.Liberty, D.Hurwitz, "Programming ASP.NET", Third Edition,O'REILLY, 2006.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the basic concept Dot Net Framework	K2
CO 2	Improve the knowledge of an ASP Application	K6
CO 3	Develop the Knowledge in Working with Data	K3
CO 4	Gather the details of web Services Architecture.	K4
CO 5	Gather the details of Advanced ASP Dot Net.	K4

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO – 1	2	3	2	2	3	2	3	3	2	2
CO – 2	3	2	3	3	2	2	2	3	2	2
CO – 3	3	2	2	2	2	2	2	3	2	2
CO – 4	3	2	2	2	2	2	3	2	2	2
CO – 5	3	2	2	3	2	2	3	3	2	2

Mean Overall Relationship is 2.32 which is HIGH

CORE COURSE – 7: DISTRIBUTED OPERATING SYSTEM (P2R2ITCC7)

Hours/Week: 5 **Max. Marks: 100 (CIA:25+Ext.:75)**

Total Hours: 65 **Credit : 5**

Nature of the Course: Employability

Objectives

1. To study distributed operating system concepts
2. To understand hardware, software and communication indistributed OS.
3. To learn the distributed resource management components.
4. Practices to learn concepts of OS
5. To practice Program the principles ofoperating system.

UNIT I: Introduction – (13Hours)

Operating System Definition – Functions of Operating System – Types of Advanced Operating System – Design Approaches – Synchronization Mechanisms – concepts of a Process – Critical Section Problem – Process Deadlock**(ICT CLASS)** – Models of Deadlock – Conditions for Deadlock – System with single-unit requests, Consumable Resources ,Reusable Resources.

UNIT II: Distributed Operating Systems: (13Hours)

Introduction- Issues – Communication Primitives – Inherent Limitations – Lamport's Logical Clock , Vector Clock, Global State , Cuts – Termination Detection – Distributed Mutual Exclusion – Non Token Based Algorithms**(ICT CLASS)** – Lamport's Algorithm - Token Based Algorithms –Distributed Deadlock Detection – Distributed Deadlock Detection Algorithms**(ASSIGNMENT)** – Agreement Protocols

UNIT III: Distributed Resource Management (13Hours)

Distributed File Systems – Architecture – Mechanisms – Design Issues – Distributed shared Memory – Architecture**(ICT CLASS)** – Algorithm – Protocols – Design Issues – Distributed Scheduling – Issues – Components – Algorithms.

UNIT IV: Failure Recovery and Fault Tolerance (13Hours)

Concepts**(ICT CLASS)** – Failure Classifications – Approaches to Recovery – Recovery in Concurrent Systems – Synchronous and Asynchronous Check pointing and Recovery –Check pointing in Distributed Database Systems – Fault Tolerance Issues – Two-Phase and Nonblocking Commit Protocols – Voting Protocols – Dynamic Voting Protocols.

UNIT V: Multiprocessor and Database Operating Systems (13Hours)

Structures – Design Issues**(ICT CLASS)** – Threads – Process Synchronization – Processor Scheduling –Memory management (**SEMINAR**) – Reliability/Fault Tolerance – Database Operating Systems – concepts – Features of Android OS, Ubuntu, Google Chrome OS and Linux operating systems.

Text Books

1. MukeshSinghalN.G.Shivaratri, "Advanced Concepts in OperatingSystems", McGraw Hill 2000.
2. Distributed Operating System – Andrew S. Tanenbaum, PHI.

Reference Books

1. Abraham Silberschatz, Peter B.Galvin, G.Gagne, "OperatingConcepts", 6th Edition Addison Wesley publications 2003.
2. Andrew S.Tanenbaum, "Modern Operating Systems", 2nd EditionAddison Wesley 2001.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the basic concept of an Operating System.	K2
CO 2	Improve the knowledge of Distributed Operating System.	K6
CO 3	Develop the Knowledge in Distributed File System.	K3
CO 4	Gather the details of Fault Tolerance.	K4
CO 5	Gather the details of Multi Processor and Database OS.	K4

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO – 1	2	3	2	2	3	2	3	3	2	2
CO – 2	3	2	3	3	2	2	2	3	2	2
CO – 3	3	2	2	2	2	2	2	3	2	2
CO – 4	3	2	2	2	2	2	3	2	2	2
CO – 5	3	2	2	3	2	2	3	3	2	2

Mean Overall Relationship is 2.32 which is HIGH

CORE COURSE- 8: MACHINE LEARNING (P2R2ITCC8)

Hours/Week: 5 **Max. Marks: 100 (CIA:25+Ext.:75)**

Total Hours: 65 **Credit : 5**

Nature of the Course: Skill Development

Objectives

1. To Learn about Machine Intelligence and Machine Learning applications
2. To implement and apply machine learning algorithms to real- world applications.
3. To identify and apply the appropriate machine learning technique.
4. To classification, pattern recognition, optimization and decision problems.
5. To understand how to perform evaluation of learning algorithms and model selection.

UNIT I **(13Hours)**

INTRODUCTION

What is AI? – The foundations of Artificial Intelligence – The History of Artificial Intelligence – The state of the Art **(ICT CLASS)**.

UNIT II **(13Hours)**

NEURAL NETWORKS AND GENETIC ALGORITHMS :Neural NetworkRepresentation(**ASSIGNMENT**) – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms– Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning**(ICT CLASS)**.

UNIT III **(13Hours)**

BAYESIAN AND COMPUTATIONAL LEARNING : Bayes Theorem– Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier**(ICT CLASS)** – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT IV **(13Hours)**

INSTANT BASED LEARNING : K- Nearest Neighbour Learning – Locallyweighted Regression – Radial Basis Functions**(ICT CLASS)** – Case Based Learning.

UNIT V **(13Hours)**

ADVANCED LEARNING :

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction**(SEMINAR)** – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning **(ICT CLASS)** – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

TEXT BOOKS

1. Sturart Russell, Peter Norvig – Artificial Intelligence – A Modern Approach, Pearson, Prentice Hall, 2nd Edition.

2. Tom M. Mitchell, —Machine Learning, McGraw Hill Education (India) Private Limited, 2013.

REFERENCES

1. EthemAlpaydin, —Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004.
2. Stephen Marsland, —Machine Learning: An Algorithmic Perspective, CRC Press, 2009.
3. Michael Affenzeller, Stephan Winkler, Stefan Wagner, Andreas Beham, "Genetic Algorithms and Genetic Programming", CRC Press Taylor and Francis Group.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the basic concept of Machine Learning.	K2
CO 2	Improve the knowledge of Neural Network and Genetic Algorithm	K6
CO 3	Develop the Knowledge in Bayesian and computational Learning.	K3
CO 4	Gather the details of Instant based Learning.	K4
CO 5	Gather the details of Advanced Learning.	K4

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO – 1	2	3	2	2	2	3	3	2	3	2
CO – 2	2	2	2	2	2	2	2	2	2	3
CO – 3	2	2	2	2	2	2	3	2	2	2
CO – 4	2	2	2	3	2	2	2	2	2	2
CO – 5	2	2	3	2	3	2	3	2	2	2

Mean Overall Relationship is 2.20 which is HIGH

CORE COURSE-9: ADVANCED DATABASE MANAGEMENT SYSTEMS (P2R2ITCC9)

Hours/Week: 5 **Max. Marks: 100 (CIA:25+Ext.:75)**

Total Hours: 65 **Credit : 5**

Nature of the Course: Skill Development

Objective

1. To Acquire Knowledge of Database Models.
2. To acquire Applications of DatabaseModels and Emerging Trends.
3. To Acquire Knowledge of spatial database.
4. To acquire knowledge of XML database
5. To acquire knowledge of temporal database.

Unit-I: Relational and parallel Database Design (13Hours)

Basics, Entity Types, Relationship Types **(ICT CLASS)**, ER Model, ER-to-Relational Mapping algorithm. **Normalization**: Functional Dependency, 1NF, 2NF, 3NF, BCNF,4NF and 5NF**.(ASSIGNMENT**) Architecture,I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism.

Unit-II: Distributed and Object based Databases (13Hours)

Architecture, Distributed data storage, Distributed transactions**(ICT CLASS)**, Commit protocols, Concurrency control, Query Processing. Complex Data Types, Structured Types and Inheritance, Table Inheritance, array and Multiset, Object Identity and Reference Types, Object Oriented versus Object Relational.

Unit-III: Spatial Database: (13Hours)

Spatial Database Characteristics, Spatial Data Model, Spatial Database Queries, Techniques of Spatial Database Query, Logic based Databases: Introduction, Overview**(ICT CLASS)**, Propositional Calculus, Predicate Calculus, Deductive Database Systems, Recursive Query Processing.

Unit-IV: XML Databases: (13Hours)

XML Hierarchical data model, XML Documents, DTD, XML Schema **(ICT CLASS)**, XML Querying, XHTML, Illustrative Experiments.

Unit-V: Temporal Databases (13Hours)

Introduction, Intervals, Packing and Unpacking Relations, Generalizing the relational Operators, Database Design **(ICT CLASS)**, Integrity Constraints, Multimedia Databases(**SEMINAR**): Multimedia Sources, Multimedia Database Queries, Multimedia Database Applications.

Text Book

1. Abraham Silberschatz, Henry F Korth , S Sudarshan, "Database System Comcepts", 6th edition , McGraw-Hill International Edition , 2011
2. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8th Edition, Pearson Education Reprint 2016.

Reference Books

1. Ramez Elmasri, Shamkant B Navathe, "Fundamental ofDatabaseSystems", Pearson, 7th edition 2016.
2. Thomas Connolly, Carolyn Begg., "Database Systems a practical approach to Design , Inmplementation and Management ", Pearson Education, 2014.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the basic concept of relational and parallel database design.	K2
CO 2	Improve the knowledge of Distributed Object Based Databases.	K6
CO 3	Develop the Knowledge in spatial Databases.	K3
CO 4	Gather the details of XML Databases..	K4
CO 5	Gather the details of Temporal Databases.	K4

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO – 1	2	3	3	3	2	2	3	3	2	2
CO – 2	2	3	2	2	3	2	3	2	2	2
CO – 3	2	3	2	2	3	3	3	2	3	2
CO – 4	2	3	2	3	2	2	3	3	2	2
CO – 5	2	3	2	2	3	2	2	3	3	2

Mean Overall Relationship is 2.42 which is HIGH

CORE COURSE- 10: ADVANCED WEB TECHNOLOGY PRACTICAL

(P2R2ITCC10P)

Hours/Week: 5 **Max. Marks: 100 (CIA:40+Ext.:60)**
Total Hours: 65 **Credit : 5**
Nature of the Course: Employability

Objective:

1. To learn effective problem solving HTML server Controls.
2. To analyze the Data grid control to access information's.
3. To determine the computational complexity of algorithms.
4. To gives stepwise procedure to E-Mail registration
5. To Efficient approach of solving problems using Data List control to access information's

ASP.Net:

1. Design ASP .Net web from using Html server Controls to enter job Seeker's details

2. Apply appropriate validation techniques in E-Mail registration form using Validation controls.

3. Create a web application using ADO .Net that uses which performs basic Data manipulations:
(i) Insertion (ii)Updating (iii) deletion (iv) Selection Hint: Do Operations using Ms-Access.
4. Create an application using Data grid control to access information's from table in MS-Access.

Python Programming:

5. How to reverse a string using Python?

6. Create a simple calculator to do all the arithmetic operations using Python.

7. Connect with MySQL and create address book using python.

8. Write a python program to prints out the two largest numbers and two smallest numbers using list.

WEKA Tool:

9. How to classify data using WEKA?

10. How to implement clustering concept using WEKA?

11. How to implement education dataset into weka?

12. Write down the procedure to implement association rule mining using weka.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the basic concept of HTML server controls.	K2
CO 2	Improve the knowledge of data grid control to access information.	K6
CO 3	Develop the Knowledge in spatial Databases.	K3
CO 4	Gather the details of E mail registration.	K4
CO 5	Gather the details of data list control to access information..	K5

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO – 1	3	2	2	3	2	3	3	3	2	2
CO – 2	2	3	2	3	3	2	3	2	3	2
CO – 3	3	2	2	3	3	2	2	2	2	2
CO – 4	2	2	2	3	2	2	2	3	2	2
CO – 5	2	2	3	3	2	3	2	2	3	2

Mean Overall Relationship is 2.38 which is HIGH

DISCIPLINE SPECIFIC ELECTIVE COURSE-2
DATA MINING (P2R2ITDSE2:1)

Hours/Week: 5 **Max. Marks: 100 (CIA:25+Ext.:75)**
Total Hours: 65 **Credit : 3**
Nature of the Course: Skill Development

Objective

1. To introduce the fundamental concepts of Data Mining techniques.
2. To various Algorithms used for Information Retrieval from Datasets
3. To acquire Frequent Patterns, Associations and Classification.
4. To various cluster Analysis.
5. To Spatial, Multimedia, Text and Web Data.

Unit I **(13Hours)**

Data Mining And Data Preprocessing: Data Mining – Motivation – Definition – Data Mining on Kind of Data –Functionalities – Classification**(ICT CLASS)** – Data Mining Task Primitives – Major Issues in Data Mining – Data Preprocessing – Definition – Data Clearing – Integration and Transformation – Data Reduction.

Unit II **(13Hours)**

Data Warehousing: Multidimensional Data Model (**ASSIGNMENT**)– Data Warehouse Architecture – Data Warehouse Implementation **(ICT CLASS)**–From data Warehousing to Data Mining – On Line Analytical Processing - On Line Analytical Mining.

Unit III **(13Hours)**

Frequent Patterns, Associations And Classification: The Apriori Algorithm – Definition of Classification and Prediction – Classification by Decision Tree Induction - Bayesian Classification**(ICT CLASS)** – Rule Based Classification – Classification by Back Propagation – Lazy Learners – K-Nearest Neighbor – Other Classification Methods.

Unit IV **(13Hours)**

Cluster Analysis: Definition – Types of data in Cluster Analysis – Categorization of major Clustering Techniques – Partitioning Methods - Hierarchical Clustering**(ICT CLASS)** – BIRCH - ROCK – Grid Based Methods – Model Based Clustering Methods – Outlier Analysis.

Unit V **(13Hours)**

Spatial, Multimedia, Text And Web Data: Spatial Data Mining**(SEMINAR)** – Multimedia Data Mining – Text Mining**(ICT CLASS)** – Mining the World Wide Web – Data Mining Applications – Trends in Data Mining.

Text Books

1. Jiawei Han and Micheline Kamber, "Data Mining: Concepts and Techniques (The Morgan Kaufmann Series in Data Management Systems) 3rd Edition, July 6, 2011.
2. Ian H. Witten, Eibe Frank, Mark A. Hall, "Data Mining: Practical Machine Learning Tools and Techniques", Elsevier; Third edition, 2014.

References

1. Margret H. Dunham, "Data Mining: Introductory and AdvancedTopics", Pearson Education, 2003.
2. M. Awad, Latifur Khan, Bhavani Thuraisingham, Lei Wang, "Design and Implementation of Data Mining Tools", CRC Press-Taylor & Francis Group, 2015.
3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, "Introduction to Data Mining-Instructor's Solution Manual", Pearson Education, First Edition, 2016.
4. Mohammed J.Zaki, Wagner Meira JR, "Data Mining and Analysis: Fundamental Concepts and Algorithms", Cambridge India, 2016.

Course Outcomes:

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the Data Mining Concepts	K4
CO 2	Improve the knowledge in Cluster Analysis	K3
CO 3	Develop depth knowledge in OLAP	K2
CO 4	Gather the knowledge in Association Mining	K1
CO 5	Gather the knowledge in Data Warehousing	K5

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO – 1	2	3	2	3	2	3	3	3	2	2
CO – 2	3	2	2	2	2	3	3	3	3	2
CO – 3	2	3	3	2	2	3	3	3	2	2
CO – 4	3	2	2	3	2	3	3	2	2	2
CO – 5	2	3	2	2	2	2	3	2	3	2

Mean Overall Relationship is 2.44 which is HIGH

DISCIPLINE SPECIFIC ELECTIVE COURSE-2
DATA SCIENCE AND BIG DATA ANALYTICS(P2R2ITDSE2:2)

Hours/Week: 5 **Max. Marks: 100 (CIA:25+Ext.:75)**

Total Hours: 65 **Credit : 3**

Nature of the Course: Skill Development

Objectives

1. To provides grounding in basic and advanced methods to big data technology and tools.
2. To including MapReduce and Hadoop and its ecosystem.
3. To provides Advanced Analytical Theory and Methods.
4. To provides classification decision tree.
5. To including Advanced Analytics-Technology and Tools

Unit I **(12Hours)**

Introduction to Big Data Analytics : Big Data Overview – Data Structures – Analyst Perspective on Data Repositories - State of the Practice in Analytics – BI Versus Data Science - Current Analytical Architecture – Drivers of Big Data **(ASSIGNMENT)**– Big Data Ecosystem **(ICT CLASS)**- Data Ana lytics Lifecycle – Data Discovery – Data Preparation – Model Planning –Model Building – Communicate Results – Operationalize.

Unit II **(12Hours)**

Basic Data Analytic Methods Using R : Introduction to R programming – R Graphical User Interfaces – Data Import and Export-Attribute and Data Types – Descriptive Statistics Exploratory Data Analysis : Visualization Befor Analysis – Dirty Data – Visualizing a Single Variable – Examining Multiple Variables Data Exploration Versus Presentation -– Statistical Methods of Evaluation : Hypothesis Testing**(ICT CLASS)** – Difference of Means – Wilcoxon Rank-Sum Test – Type I and Type II Errors – Power and Sample Size – ANOVA.

Unit III (12Hours)

Advanced Analytical Theory and Methods: Clustering – K Means –Use Cases – Overview – Determining number of clusters – Diagnostics- Reasons to choose and cautions – Additional Algorithms - Association Rules : A Priori Algorithm – Evaluation of Candidate Rules-Applications of Association Rules – Validation and Testing**(ICT CLASS)** – Diagnostics. Regression : Linear Regrression and Logistic Regression:– Use cases – Model Description – Diagnostics - Additional RegressionModels.

Unit IV **(12Hours)**

Classification : Decision Trees – Overview **(ICT CLASS)**– Genetic Algorithm – Decision Tree Algorithms – Evaluating Decision Tree – Decision Trees in R - Na'ive Bayes – Bayes Theorem – Naïve Bayes Clasifier – Smoothing – Diagnostics – Naïve Bayes in R – Diagnostics

of Classifiers – Additional Classification Methods - Time Series Analysis: Overview – Box – Jenkins Methodology**(SEMINOR) –** ARIMA Model – Autocorrelation Function – Autoregressive Models – Moving Average Models – ARMA and ARIMA Models – Building and Evaluating and ARIMA Model - Text Analysis : Text Analysis Steps – Example – Collecting – Representing Term Frequency – Categorizing – Determining Sentiments – Gaining Insights.

Unit V : (12Hours)

Advanced Analytics-Technology and Tools: MapReduce and Hadoop : Analytics for Unstructured Data .- *UseCases* - *MapReduce* - Apache Hadoop – The Hadoop Ecosystem – pig – Hive – Hbase – Manout – NoSQL - Tools in Database Analytics : SQL Essentials – Joins – Set operations – Grouping Extensions – In Database Text Analysis - Advanced SQL – Windows Functions**(ICT CLASS)** – User Defined Functions and Aggregates – ordered aggregates- MADiib - Analytics Reports Consolidation – Communicating and operationalizing and Analytics Project – Creating the Final Deliverables : Developing Core Material for Multiple Audiences – Project Goals – Main Findings – Approach Model Description – Key points support with Data - Model details – Recommendations – Data Visualization

Text Book

1. Data Science & Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", EMC Education Services Published by John Wiley & Sons, Inc. 2015

Reference Books

1. Noreen Burlingame , "The little book on Big Data", New Streetpublishers, 2012.
2. Anil Maheshwari, " Data Analytics", McGraw Hill Education,2017.
3. Norman Matloff, "The Art of R Programming: A Tour of StatisticalSoftware Design", Starch Press; 1 edition , 2011.
4. Sandip Rakshit, "R for Beginners", McGraw Hill Education, 2017
5. http://www.johndcook.com/R_language_for_programmers.html.
6. http://bigdatauniversity.com/
7. http://home.ubalt.edu/ntsbarsh/stat-data/topics.htm#rintroduction.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the concept of big data analytics.	K2
CO 2	Create knowledge in big data analytics method using R.	K1
CO 3	Improve the details of analytical theory and methods.	K2
CO 4	Improve the details of decision tree.	K4
CO 5	Improve the details of Advanced Analytics-Technology and Tools.	K6

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO - 1	3	2	2	3	3	3	3	3	2	2
CO - 2	2	3	2	3	3	2	3	2	2	2
CO - 3	3	2	3	3	3	3	2	2	2	2
CO - 4	2	2	2	3	2	2	3	3	2	2
CO - 5	2	2	2	3	2	2	2	2	2	2

Mean Overall Relationship is 2.44 which is HIGH

CORE COURSE – 11: DIGITAL IMAGE PROCESSING (P3R2ITCC11)

Hours/Week: 6 **Max. Marks: 100 (CIA:25+Ext.:75)**

Total Hours: 65 **Credit : 5**

Nature of the Course: Skill Development

Objectives

1. To provide complete knowledge on Digital Image Processing method.
2. To gain knowledge about processing methods in spatial domain and Frequency domain.
3. To provide Edge detection, Compression, Segmentation, and Morphological concepts.
4. To understand the concepts and implement them empirically.
5. To gain knowledge about image segmentation and morphological Image Processing.

UNIT–I (13Hours)

Fundamentals: Image Sensing and Acquisition, Image Sampling and Quantization, relationship between Pixels; Random noise **(ASSIGNMENT**); Gaussian Markov Random Field, σ-field, Linear and Non-linear Operations; Image processing models: Causal, Semi-causal, Non-causal models. **Color Models:** Color Fundamentals, Color Models, Pseudo-color Image Processing, Full Color Image Processing **(ICT CLASS)**, Color Transformation, Noise in Color Images.

UNIT–II (13Hours)

Spatial Domain: Enhancement in spatial domain: Point processing; Mask processing; Smoothing Spatial Filters; Sharpening Spatial Filters; Combining Spatial Enhancement Methods.**Frequency Domain:** Image transforms: FFT, DCT, Karhunen-Loeve transform,Hotlling's T^2 transform, Wavelet transforms and their properties**(ICT CLASS)**. Image filtering in frequency domain.

UNIT–III (13Hours)

Edge Detection: Types of edges; threshold; zero-crossing; Gradient operators: Roberts, Prewitt, and Sobel operators; residual analysis based technique; Canny edge detection**(ICT CLASS)**. Edge features and their applications.

UNIT–IV (13Hours)

Image Compression: Fundamentals, Image Compression Models, Elements of Information Theory. Error Free Compression: Huff-man coding; Arithmetic coding**(ICT CLASS)**; Wavelet transform basedcoding; Lossy Compression: FFT; DCT; KLT; DPCM; MRFM based compression; Wavelet transform based; Image Compression standards.

UNIT–V (13Hours)

Image Segmentation: Detection and Discontinuities: Edge Linking and Boundary Deduction; Threshold**(SEMINAR**); Region-Based Segmentation. Segmentation by Morphological watersheds. The use of motion in

segmentation, Image Segmentation based on Color**(ICT CLASS)**. **Morphological Image Processing:** Erosion and Dilation, Opening and Closing, Hit-Or-Miss Transformation, Basic Morphological Algorithms, Gray-Scale Morphology.

Text Books

1. Rafael Gonzalez, Richard E. Woods, "Digital Image Processing",Fourth Edition, PHI/Pearson Education, 2013.
2. A. K. Jain, Fundamentals of Image Processing, Second Ed., PHI,New Delhi, 2015.

References

1. B. Chan la, D. Dutta Majumder, "Digital Image Processing andAnalysis", PHI, 2003.
2. Nick Elford, "Digital Image Processing a practical introducingusing Java", Pearson Education, 2004.
3. Todd R.Reed, "Digital Image Sequence Processing, Compression,and Analysis", CRC Press, 2015.
4. L.Prasad, S.S.Iyengar, "Wavelet Analysis with Applications toImage Processing", CRC Press, 2015.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the DIP.	K2
CO 2	Create knowledge in Line drawing Algorithm.	K3
CO 3	Improve the details of 3D image.	K5
CO 4	Improve the details of Image Enhancement.	K4
CO 5	Improve the details of Image Transformation.	K6

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO - 1	3	3	3	3	2	2	3	2	2	2
CO - 2	2	3	2	2	3	3	3	2	2	2
CO - 3	2	3	2	2	3	3	3	3	2	2
CO - 4	2	3	3	2	2	2	3	2	2	2
CO - 5	2	3	2	2	3	3	3	3	2	2

Mean Overall Relationship is 2.44 which is HIGH

CORECOURSE- 12: COMPILER DESIGN (P3R2ITCC12)

Hours/Week: 6 **Max. Marks: 100 (CIA:25+Ext.:75)**
Total Hours: 65 **Credit : 5**

Nature of the Course: Skill Development

Objectives

1. To discover principles, algorithms and techniques that can be usedto construct various phases of compiler.

2. To acquire knowledge about finite automata and regular expressions

3. To learn context free grammars, compiler parsing techniques.

4. To explore knowledge about Syntax Directed definitions andtranslation Scheme.

5. To understand intermediate machine representations and actualcode generation

Unit – I (13Hours)

Lexical analysis - Language Processors, The Structure of a Compiler, Parameter passing mechanism – Symbol table - The role of the lexical analyzer - Input buffering **(ICT CLASS)**- Specification of tokens - Recognition of tokens(**ASSIGNMENT**) – Finite automata - Regular expression to automata.

Unit – II (13Hours)

Syntax Analysis - The role of the parser - Context-free grammars - Writing a grammar - Top down Parsing**(ICT CLASS)** - Bottom-up Parsing - LR parsers- LALR parsers.

Unit – III (13Hours)

Semantic Analysis - Inherited and Synthesized attributes – Dependency graphs – Ordering the evaluation of attributes – S- attributed definitions – L-attributed definitions – Applications of Syntax Directed translation**(ICT CLASS)** – Syntax Directed translations schemes - Storage organization – Stack allocation of space.

Unit – IV (13Hours)

Intermediate Code Generation - Variants of Syntax trees – Three Address code – Types and Declarations - Translation of Expressions – Type checking - Control flow**(ICT CLASS)** - Back patching - Switch Statements - Procedure calls.

Unit – V (13Hours)

Code Generation and Code Optimization - Issues in the design of a code generator**(SEMINAR)** - The target language – Address in the Target Code – Basic Block and Flow graphs**(ICT CLASS)** – Optimization of Basic Blocks - A simple code generator – Peephole Optimization.

Text Book

1. Alfred V. Aho, Monica S.Lam, Ravi Sethi and Jeffrey D. Ullman, "Compilers- Principles, Techniques and Tools", Second Edition, Pearson Education Asia, 2009.

References

1. A.V. Aho, Ravi Sethi, J.D. Ullman, Compilers - Principles,Techniques and Tools, Addison- Wesley, 2003.
2. Fischer Leblanc, Crafting Compiler, Benjamin Cummings, MenloPark, 1988.
3. Kennath C.Louden, Compiler Construction Principles andPractice, Vikas publishing House, 2004.
4. Allen I. Holub, Compiler Design in C, Prentice Hall of India, 2001.
5. S.Godfrey Winster, S.Aruna Devi, R.Sujatha, "Compiler Design",yesdee Publishers, Third Reprint 2019.

Course Outcomes:

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the concept of Lexical Analysis.	K1
CO 2	Create knowledge in Syntax Analysis.	K2
CO 3	Improve the details of Semantic Analysis.	K3
CO 4	Improve the details of Intermediate code Generation.	K5
CO 5	Improve the details of Intermediate code Generation and code optimization.	K6

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO - 1	3	2	2	3	3	3	3	3	2	2
CO - 2	2	3	2	3	3	2	3	2	2	2
CO - 3	3	2	3	3	3	3	2	2	2	2
CO - 4	2	2	2	3	2	2	3	3	2	2
CO - 5	2	2	2	3	2	2	2	2	2	2

Mean Overall Relationship is 2.38 which is HIGH

CORE COURSE – 13: INTERNET OF THINGS (P4R2ITCC13)

Hours/Week: 6 **Max. Marks: 100 (CIA:25+Ext.:75)**
Total Hours: 65 **Credit : 5**
Nature of the Course: Skill Development

Objective

1. To gain knowledge on bases of Internet of Things (IoT)
2. To gather the IoT Architecture, and the Protocols related to IoT
3. To understand theconcept of the Web of Thing and the relationship between the IoT and WoT.
4. To understand the web of things.
5. To understand the applications.

UNIT I **(12Hours)**

INTRODUCTION To IoT: Internet of Things - Physical Design- Logical Design- IoT Enabling Technologies - IoT Levels and Deployment Templates(**ASSIGNMENT)** - Domain Specific IoTs - IoT and M2M - IoT System Management with NETCONF-YANG- IoT Platforms DesignMethodology**(ICT CLASS)**.

UNIT II **(12Hours)**

IoT ARCHITECTURE: M2M high-level ETSI architecture - IETF architecture for IoT**(ICT CLASS)** - OGC architecture - IoT reference model - Domain model - information model - functional model - communication model
- IoT reference architecture

UNIT III **(12Hours)**

IoT PROTOCOLS: Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols**(ICT CLASS)** – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus– Zigbee Architecture – Network layer – 6LowPAN - CoAP - Security

UNIT IV **(12Hours)**

WEB OF THINGS: Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence.**(SEMINAR)** Cloud of Things: Grid/SOA and Cloud Computing**(ICT CLASS)** – Cloud Middleware – Cloud Standards – Cloud Providers and Systems – Mobile Cloud Computing – The Cloud of Things Architecture.

UNIT V **(12Hours)**

APPLICATIONS: The Role of the Internet of Things for Increased Autonomy and Agility in Collaborative Production Environments - Resource Management in the Internet of Things:

Clustering, Synchronisation and Software Agents. Applications - Smart Grid – Electrical Vehicle Charging**(ICT CLASS)**.

Text Books

1. Arshdeep Bahga, Vijay Madisetti, “Internet of Things – A hands-on approach”, Universities Press, 2015.
2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), “Architecting the Internet of Things”, Springer, 2011.
3. Jan Ho¨ ller, Vlasios Tsiatsis , Catherine Mulligan, Stamatis , Karnouskos, Stefan Avesand. David Boyle, "From Machine-to- Machine to the Internet of Things - Introduction to a New Age of Intelligence", Elsevier, 2014.
4. Networks, Crowds, and Markets: Reasoning About a Highly Connected World - David Easley and Jon Kleinberg, Cambridge University Press - 2010.
5. Olivier Hersent, David Boswarthick, Omar Elloumi , “The Internet of Things – Key applications and Protocols”, Wiley, 2012.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	**Understand the concept of** internet of things	K1
CO 2	**Create knowledge in IOT Architecture.**	K3
CO 3	**Improve the details of An IOT protocols.**	K2
CO 4	**Improve the details of web of things.**	K5
CO 5	**Improve the details of applications.**	K6

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO - 1	3	2	2	3	3	3	3	3	2	2
CO - 2	2	3	2	3	3	2	3	2	2	2
CO - 3	3	2	3	3	3	3	2	2	2	2
CO - 4	2	2	2	3	2	2	3	3	2	2
CO - 5	2	2	2	3	2	2	2	2	2	2

Mean Overall Relationship is 2.24 which is HIGH

CORE COURSE – 14: IMAGE PROCESSING PRACTICAL (P3R1ITCC14P)

Hours/Week: 6 **Max. Marks: 100 (CIA:40+Ext.:60)**

Total Hours: 65 **Credit : 5**

Nature of the Course: Employability

Objective:

1. To learn effective problem solving image enhancement.
2. To analyze the for color image processing.
3. To determine the for Edge detection using operators..
4. To gives stepwise procedure to solve for Blurring 8 bit color versus monochrome.
5. To Efficient approach of solving problems 2-D DFT and DC

1. Write a Mat Lab program for image enhancement using Mat lab.

2. Write a at Lab program for Filtering in frequency domain using Mat Lab.

3. Write a Mat Lab program for color image processing.

4. Write a Mat Lab program for image segmentation.

5. Write a Mat Lab program for image morphology.

6. Write a Mat Lab Program for Image Restoration.

7. Write a Mat Lab Program for Edge detection using operators.

8. Write a Mat Lab Program for Blurring 8 bit color versus monochrome .

9. Write a Mat Lab Program for Edge detection using Operators.

10. Write a Mat Lab Program for 2-D DFT and DCT.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the concept of image enhancement..	K2
CO 2	Create knowledge in color image processing.	K3
CO 3	Improve the details of edge detection using operators.	K5
CO 4	Improve the knowledge of 8 bit color versus monochrome..	K4
CO 5	Create the knowledge of 2D DFT and DCT.	K6

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO - 1	3	2	2	3	2	3	3	3	2	2
CO - 2	2	3	2	3	3	2	3	2	3	2
CO - 3	3	2	2	3	3	2	2	2	2	2
CO - 4	2	2	3	3	2	2	2	3	2	2
CO - 5	2	2	3	3	2	3	2	2	3	2

Mean Overall Relationship is 2.40 which is HIGH

SKILL ENHANCEMENT COURSE-1

DOT NET PROGRAMMING (P3R2ITSEC1:1)

Hours/Week: 6 **Max. Marks: 100 (CIA:25+Ext.:75)**

Total Hours: 60 **Credit : 3**

Nature of the Course: Skill Development

Objectives

1. To explore the backbone of web page creation by developing .NETskill.

2. To Familiar with Application, session and view state management

3. To Provide depth knowledge about ADO.NET
4. To understand the need of usability, evaluation methods forweb services.
5. To acquire knowledge on the usage of recent platforms in developing web applications.

Unit – I **(12Hours)**

The .NET Framework - Learning the .NET languages - Introduction - Net revolution - .Net framework and its architecture – CLR**(ICT CLASS)** – What is Assembly – Components of Assembly – DLL hell and Assembly Versioning- Objects and Namespaces(**ASSIGNMENT)** - Setting Up ASP.NET and IIS

Unit – II **(12Hours)**

Developing VB.NET Applications - Introduction to VB.Net, The .Net Frame work and Common language runtime, Building VB. Net Application, VB IDE, forms, properties, events, VB language-console application and 46 windows application, data type, declaring variable, scope of variable, operators and statements - Windows Applications**(ICT CLASS)**- forms, adding controls to forms, handling events, MsgBox, Input Box, multiple forms, handling mouse and Keyboard events, object oriented programmingcreating and using classes and objects, Handling Exceptions- on Error Goto

Unit – III **(12Hours)**

Developing ASP.NET Applications - ASP.NET Applications – Understanding ASP.NET Controls - Overview of ASP.NET framework, Web Form fundamentals - Web control classes**(ICT CLASS)** – Using Visual Stdio.NET - Validation and Rich Controls -State management – Tracing, Logging, and Error Handling.

Unit – IV **(12Hours)**

Developing C#.NET Applications - Introducing C# - overview of C# - Literals,Variables- Data Types, -Operators, -checked and unchecked operators – Expressions – Branching -Looping-*Object Oriented Aspects Of C#:* Class – Objects - Constructors and its types**(ICT CLASS)**- inheritance, properties, indexers, index overloading – polymorphism - sealed class and methods - interface, - abstract class, operator overloading, - delegates, events, errors and exception - Threading.

Unit – V **(12Hours)**

ADO.NET - Overview of ADO.NET - ADO.NET data access**(SEMINAR**) – Connected and Disconnected Database, Create Connection using ADO.NET Object Model, Connection Class, Command Class Data binding

– Data list – Data grid**(ICT CLASS)** – Repeater – Files, Streams and Email – Using XML.

Text Books

1. Struts: The Complete Reference,James Holmes 2nd Edition 2007McGraw Hill Professional
2. Mathew Mac Donald, "ASP.NET Complete Reference", TMH 2005
3. Herbert Schildt, "The Complete Reference: C# 4.0", Tata McGrawHill, 2012.
4. Christian Nagel et al. "Professional C# 2012 with .NET 4.5", WileyIndia, 2012
5. ASP.NET Unleashed, C# programming – Wrox publication
6. Visual Basic. NET Black Book, by Steven Holzner

Reference Books

1. Jesse Liberty , 'Programming C#, " , 4th Edition, O'Reilly Media
2. Mario Szpuszta, Matthew MacDonald , "Pro ASP.NET 4 in C#2010: Includes Silverlight 2, "Apress, Third Edition
3. J.Liberty, D.Hurwitz, "Programming ASP.NET", Third Edition,O'REILLY, 2006.
4. Visual Basic. Net programming in easy steps by Tim Anderson, Dreamtech Press.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the concept of Dot Net Frame Work.	K1
CO 2	Create knowledge in VB.Net Applications.	K3
CO 3	Improve the details of an ASP.Net Applications.	K2
CO 4	Improve the details of C#.Net Applications.	K6
CO 5	Improve the details of an ADO.Net.	K4

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO – 1	2	2	3	2	3	3	2	2	3	2
CO – 2	2	2	2	2	2	2	2	2	2	2
CO – 3	2	3	3	3	2	2	2	3	2	2
CO – 4	2	3	2	3	3	2	3	2	3	2
CO – 5	2	2	3	3	3	2	2	3	3	2

Mean Overall Relationship is 2.36 which is HIGH

SKILL ENHANCEMENT COURSE-1

SOFT COMPUTING (P3R2ITSEC1:2)

Hours/Week: 6 **Max. Marks: 100 (CIA:25+Ext.:75)**
Total Hours: 60 **Credit: 3**
Nature of the Course: Skill Development

Objectives

1. Develop the skills to gain a basic understanding of neuralnetwork theory.
2. To improve the concept of fuzzy logic theory.
3. To introduce students about artificial neural networks.
4. To improve fuzzytheory from an engineering perspective.
5. To understand the concept of genetic algorithm.

UNIT I Introduction: (12 Hours)

Soft Computing Constituents – Soft Computing Vs Hard Computing – Characteristics - Applications - Artificial Neural Network (ANN): Fundamental Concept **(ICT CLASS)** – Application Scope - Basic Terminologies – Neural Network Architecture (**ASSIGNMENT**) – Learning Process – Basic Models of ANN: McCulloch-Pitts Model – Hebb Network – Linear Separability.

UNIT II Supervised Learning Networks: (12 Hours)

Perceptron Networks – Adaline and Madaline Networks – Back Propagation Network – Radial Basis Function Network. Associative Memory Networks**(ICT CLASS)** – BAM - Hopfield Network - Boltzmann Machine. Unsupervised Learning Networks: Kohonen Self Organizing Network – Counter Propagation Network – ART Network.

UNIT III: Fuzzy Sets (12 Hours)

Basic Concept – Crisp Set Vs Fuzzy Set - Operations on Fuzzy Set – Properties of Fuzzy Sets – Fuzzy Relations: Concept – Fuzzy Composition – Fuzzy Equivalence and Tolerance Relation - Membership Functions: Features – Fuzzification **(ICT CLASS)**– Methods of Membership value assignments – Defuzzification – Methods.

UNIT IV: Fuzzy Arithmetic and Decision Making (12 Hours)

Extension Principle – Fuzzy Measures – Fuzzy Rules and Fuzzy Reasoning: Fuzzy Propositions – Formation of Rules – Decomposition of Rules – Aggregation of Rules – Approximate Reasoning – Fuzzy Inference and Expert Systems – Fuzzy Decision Making – Fuzzy Logic Control Systems**(ICT CLASS)**.

UNIT V: Genetic Algorithm (12 Hours)

Fundamental Concept – Basic Terminologies – Traditional Vs Genetic Algorithm - Elements of GA**(ICT CLASS)** - Encoding - Fitness Function – Genetic Operators: (**SEMINAR**) Selection – Cross Over - Inversion and Deletion - Mutation – Simple and General GA – The Schema Theorem - Classification of Genetic Algorithm – Genetic Programming – Applications of GA.

Text Book

1. S.N. Sivanandam, S.N. Deepa, "Principles of Soft Computing", Wiley India, 2007.

Reference Book

1. S. Rajasekaran, G.A.V. Pai, "Neural Networks, Fuzzy Logic, Genetic Algorithms", Prentice Hall India, 2004.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the concept of Soft Computing.	K1
CO 2	Create knowledge in Learning Networks..	K2
CO 3	Improve the details of Fuzzy sets.	K4
CO 4	Improve the details of Fuzzy Arithmetic.	K5
CO 5	Improve the details of Genetic Algorithm.	K6

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO - 1	2	2	3	3	3	2	2	3	2	2
CO - 2	3	2	2	3	2	2	2	3	2	2
CO - 3	3	2	2	2	3	2	3	3	3	2
CO - 4	2	3	2	2	2	2	2	2	2	2
CO - 5	2	2	2	2	2	2	2	2	2	2

Mean Overall Relationship is 2.26 which is HIGH

GENERIC ELECTIVE COURSE-1

WEB SERVICES (P4R2ITGEC1)

Hours/Week:6 **Max. Marks: 100 (CIA:25+Ext.:75)**

Total Hours: 65 **Credit : 3**

Nature of the Course: Skill Development

Objectives

1. To enable the student to be familiar with distributed services,XML and web services
2. To study the use of web services in B2C and B2B applications.
3. To understand the design principles and application of SOAP and REST based web services.
4. To Design collaborating web services according to a specification.
5. To implement an application that uses multiple web services in a realistic business scenario.

Unit – I **(13Hours)**

Overview of Distributed Computing. Introduction to web services – Industry standards, Technologies and concepts underlying web services – their support to web services **(ICT CLASS)**. Applications that consume web services.

Unit – II **(13Hours)**

XML – its choice for web services – network protocols to back end databases(**ASSIGNMENT)**-technologies – SOAP, WSDL – exchange of information between applications in distributed environment – locating remote web services – its access and usage. UDDI specification **(ICT CLASS)** – an introduction.

Unit - III **(13Hours)**

A brief outline of web services – conversation – static and interactive aspects of system interface and its implementation, work flow – orchestration and refinement, transactions, security issues – the common attacks – security attacks facilitated within web services quality of services**(ICT CLASS)** – Architecting of systems to meet users requirement with respect to latency, performance, reliability, QOS metrics, Mobile and wireless services – energy consumption, network bandwidth utilization, portals and services management.

Unit – IV **(13Hours)**

Building real world enterprise applications using web services – sample source codes to develop web services **(ICT CLASS)** – steps necessary to build and deploy web services and client applications to meet customer s requirement – Easier development, customization, maintenance, transactional requirements, seamless porting to multiple devices and platforms.

Unit - V **(13Hours)**

Deployment of Web services and applications onto Tomcat application server and axis SOAP server (both are free wares)(**SEMINAR**) – Web services platform as a set of enabling technologies for XML based distributed computing**(ICT CLASS)**

Textbooks

1. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services : An Architects Guide , Prentice Hall, Nov 2003.
2. Heather Williamson, "XML: The Complete Reference ",Tata McGraw-Hill Education India.

References

1. Martin Kalin, "Java Web Services: Up and Running", O'Reilly Publishers.

Course Outcomes

Upon Completion of the course students would be able to		Knowledge Level
CO 1	Understand the Distributed computing	K2
CO 2	Improve the knowledge of XML concept	K6
CO 3	Develop the Knowledge in QOS matrix	K3
CO 4	Gather the details of web Services	K4
CO 5	Gather the details in SOAP Server.	K4

Relationship Matrix for CO, PO, PSO

Course Outcome (CO)	Programme Outcome (PO)					Programme Specific Outcome (PSO)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO - 1	2	3	2	2	3	2	3	3	2	2
CO - 2	3	2	3	3	2	2	2	3	2	2
CO - 3	3	2	2	2	2	2	2	3	2	2
CO - 4	3	2	2	2	2	2	3	2	2	2
CO - 5	3	2	2	3	2	2	3	3	2	2

Mean Overall Relationship is 2.32 which is HIGH

CORE COURSE - 15

PROJECT WORK (P4R2ITCC15PW)

Credits: 8 **Max. Marks: 100**

Nature of the Course: Employability/ Entrepreneurship

FRONT END : WEB DESIGN TOOLS
MIDDLE END : SERVER SIDE SCRIPTING LANGUAGES
BACK END : RDBMS PACKAGES