

2020

M.Sc INFORMATION TECHNOLOGY

Course Structure and Syllabus

(For the candidates admitted from the academic year 2020-2021 onwards)

CHOICE BASED CREDIT SYSTEM (CBCS)



THANTHAI HANS ROEVER COLLEGE (AUTONOMOUS)

(Nationally Re-Accredited by NAAC with B⁺⁺)

(Affiliated to Bharathidasan University, Tiruchirappalli)

ELAMBALUR, PERAMBALUR – 621 220



VISION:

- To be a Centre of excellence in education and research in the frontier areas of Computer Science

MISSION:

- To facilitate quality transformative education in Computer Science
- To promote quality research and innovation in technology for meeting global challenges
- To transform students to competent professionals to cater to the needs of the society.

Programme Outcomes (POs):

Postgraduate Programmes

Upon completion of the programme, the postgraduate will be able to

- ✓ Gain advanced knowledge resulting in entrepreneurship; innovation and newer opportunities for being employable in public and private sectors, research and development organizations.
- ✓ Apply enhanced new techniques and adopt new technologies needed in the respective disciplines.
- ✓ Appreciate the diversity of the behavior in professional practice and act in accordance with the core values of chosen profession.
- ✓ Demonstrate the knowledge, values and skills to be critical consumer of research practice and possess investigative skills to evaluate the practice.
- ✓ Engage in lifelong learning process, have the ability to communicate the findings of language / Commerce / Management Studies / Social Work / Computer Sciences / Physical Sciences / Biological Sciences / Life Sciences with the current knowledge.

Program Specific Outcomes (PSOs):

- ✓ At the end of the programme, the student should be able to understand the concepts and applications in the field of Information Technology.
- ✓ Apply the learning from the courses and develop applications for real world problems.
- ✓ Understand the technological developments in the usage of modern design and development tools to analyze and design for a variety of applications.
- ✓ Competent and complete software professional to meet the requirement of corporate world and Industry standard to provide solutions to industry, society and business.
- ✓ A thorough and practical expert in the use of state of the art techniques for developing Software based systems.

Thanthai Hans Roever College (Autonomous), Elambalur, Perambalur - 621 220

M.Sc., INFORMATION TECHNOLOGY - Course Structure Under CBCS

(For the candidates admitted from the academic year 2020-2021 onwards)

Semester	Course Code	Title of the Course	Ins. Hours/Weeks	Credits	Exam Hours	CIA (Max)	ESE (Max)	Total (Max)
1	20PIT1CC1	Distributed Technologies	6	4	3	25	75	100
1	20PIT1CC2	Advanced Database Management System	6	4	3	25	75	100
1	20PIT1CC3	OOAD and UML	6	4	3	25	75	100
1	20PIT1CC4	Organizational Behaviour	6	4	3	25	75	100
1	20PIT1CP1	Distributed Technologies Lab	6	4	3	40	60	100
Total			30	20	-	-	-	500
2	20PIT2CC5	Mobile Computing	6	5	3	25	75	100
2	20PIT2CC6	Design and Analysis of Algorithms	6	5	3	25	75	100
2	20PIT2EC1:1/ 20PIT2EC1:2/ 20PIT2EC1:3	Cloud Computing / Grid Computing / Parallel Computing	6	5	3	25	75	100
2	20PIT2EC2:1/ 20PIT2EC2:2/ 20PIT2EC2:3	Management Information System / E-Commerce / Marketing Management	6	5	3	25	75	100
2	20PIT2CP2	Mobile Computing Lab	6	4	3	40	60	100
Total			30	24	-	-	-	500
3	20PIT3CC7	J2EE Technologies	6	5	3	25	75	100
3	20PIT3CC8	Machine Learning	6	5	3	25	75	100
3	20PIT3EC3:1/ 20PIT3EC3:2/ 20PIT3EC3:3	Big Data Analytics / Digital Image Processing / Pattern Recognition	6	5	3	25	75	100
3	20PIT3EC4:1/ 20PIT3EC4:2/ 20PIT3EC4:3	Software Engineering / Software Testing / Software Metrics	6	5	3	25	75	100
3	20PIT3CP3	J2EE Technologies Lab	6	4	3	40	60	100
Total			30	24	-	-	-	500
4	20PIT4CC9	Internet of Things	6	5	3	25	75	100
4	20PIT4CC10	Open Source Web Application Development	6	5	3	25	75	100
4	20PIT4EC5:1/ 20PIT4EC5:2/ 20PIT4EC5:3	Pervasive Computing / Human Computer Interaction / Soft Computing	6	4	3	25	75	100
4	20PIT4CP4	Open Source Technologies Lab	6	4	3	40	60	100
4	20PIT4PW	Project Work	6	4	-	-	-	100
Total			30	22	-	-	-	500
Grand Total			120	90	-	-	-	2000

List of Elective Courses

Elective	Course Code	Title of the Course
Elective -1	20PIT2EC1:1 20PIT2EC1:2 20PIT2EC1:3	Cloud Computing / Grid Computing / Parallel Computing
Elective -2	20PIT2EC2:1 20PIT2EC2:2 20PIT2EC2:3	Management Information System / E-Commerce / Marketing Management
Elective - 3	20PIT3EC3:1 20PIT3EC3:2 20PIT3EC3:3	Big Data Analytics / Digital Image Processing / Pattern Recognition
Elective - 4	20PIT3EC4:1 20PIT3EC4:2 20PIT3EC4:3	Software Engineering / Software Testing / Software Metrics
Elective -5	20PIT4EC5:1 20PIT4EC5:2 20PIT4EC5:3	Pervasive Computing / Human Computer Interaction / Soft Computing

Note:

Project : 100 Marks
Dissertation : 80 Marks
Viva Voce : 20 Marks

Core Papers - 10
Core Practical - 4
Elective Papers - 5
Project - 1

1. Theory Internal 25 marks External 75 marks
2. Practical Internal 25 marks 60 marks 40 marks
3. Separate passing minimum is prescribed for Internal and External
 - a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
 - b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks)
 - c) The passing minimum not less than 50% in the aggregate.

SEMESTER – I

Course Code: 20PIT1CC1
Instruction Hours: 6
Credits: 4

Exam Hours: 3
Internal Marks: 25
External Marks: 75

CORE COURSE-I - DISTRIBUTED TECHNOLOGIES

Course Outcomes:

- Recognize the architecture of various distributed technologies
- Understand the software components of distributed programming
- Understand the ASP .NET environment and how to develop small programs
- Understand ADO .NET and develop database applications
- Performing Database operations for Windows Form and web applications.

Unit I

Introduction to distributed Computing – Challenges involved in establishing remote connection – Strategies involved in remote computation – Current Distributed computing practices through Dot Net and Java technologies

Unit II

Advanced ADO.NET – Disconnected Data Access – Gridview, Details View, Form View controls – Crystal Reports – Role of ADO.NET in Distributed Applications

Unit III

Advanced ASP.NET – AdRotator, Multiview, Wizard and Image Map Controls – Master Pages – Site Navigation – Web Parts – Uses of these controls and features in Website development

Unit IV

Advanced features of ASP.NET – Security in ASP.NET – State Management in ASP.NET – Mobile Application development in ASP.NET – Critical usage of these features in Website development

Unit V

Web services – Role of Web services in Distributed Computing – WSDL, UDDI, SOAP concepts involved in Web Services – Connected a Web Service to a Data Base – Accessing a Web Service through an ASP.NET application

Text Book(s):

1. Walther, “ASP.NET 3.5”, SAMS Publication, 2005.

Reference Book(s):

1. “ASP. NET Black Book”, Dream Tech.
2. Dave Mercer, “ASP.NET: A Beginner’s Guide”, Tata Mcgraw Hill Publishing Company Limited, New Delhi.
3. Dino Esposito, “Introducing Microsoft ASP.NET 2.0”, Prentice Hall of India Private Limited.
4. Rebecca M. Riorden, “Microsoft ADO.NET Step by Step”, Prentice Hall of India Private Limited.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
I	20PIT1CC1	DISTRIBUTED TECHNOLOGIES					6	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓	✓	✓		
CO3	✓	✓	✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓		✓	
CO5	✓	✓	✓	✓		✓	✓		✓	✓	
Number of matches (✓) = 37, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – I

Course Code: 20PIT1CC2
Instruction Hours: 6
Credits: 4

Exam Hours: 3
Internal Marks: 25
External Marks: 75

CORE COURSE II - ADVANCED DATABASE MANAGEMENT SYSTEM

Course Outcomes:

- Design ER-models to represent simple database application scenarios and improve the database design by normalization.
- Acquire Knowledge of Database Models,
- Applications of Database Models and Emerging Trends
- Analyze and Select storage and recovery techniques of database system.
- Familiar with various (Parallel, Distributed, Spatial and Multimedia) database storage structures and access techniques.

Unit-I

Relational and parallel Database Design: Basics, Entity Types, Relationship Types, ER Model, ER-to-Relational Mapping algorithm. Normalization: Functional Dependency, 1NF, 2NF, 3NF, BCNF, 4NF and 5NF. Architecture, I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism.

Unit-II

Distributed and Object based Databases: Architecture, Distributed data storage, Distributed transactions, 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: Spatial Database Characteristics, Spatial Data Model, Spatial Database Queries, Techniques of Spatial Database Query, Logic based Databases: Introduction, Overview, Propositional Calculus, Predicate Calculus, Deductive Database Systems, Recursive Query Processing.

Unit-IV

XML Databases: XML Hierarchical data model, XML Documents, DTD, XML Schema, XML Querying, XHTML, and Illustrative Experiments.

Unit-V

Temporal Databases: Introduction, Intervals, Packing and Unpacking Relations, Generalizing the relational Operators, Database Design, Integrity Constraints, Multimedia Databases: Multimedia Sources, Multimedia Database Queries, Multimedia Database Applications.

Text Book(s):

1. Abraham Silberschatz, Henry F Korth , S Sudarshan, “Database System Concepts”, 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 Book(s):

1. Ramez Elmasri, Shamkant B Navathe, "Fundamental of Database Systems", Pearson, 7th edition 2016.
2. Thomas Connolly, Carolyn Begg., "Database Systems a practical approach to Design, Implementation and Management", Pearson Education, 2014.
3. S K Singh, "Database Systems Concepts, Design and Applications", Pearson Education, 2006.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits				
I	20PIT1CC2	ADVANCED DATABASE MANAGEMENT SYSTEM					6	4				
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	✓	✓		✓		✓		✓				
CO2	✓	✓				✓	✓	✓	✓			
CO3	✓	✓	✓	✓		✓		✓	✓			
CO4	✓		✓	✓	✓	✓	✓	✓		✓		
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Number of matches (✓) = 36, Relationship: High												

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – I

Course Code: 20PIT1CC3
Instruction Hours: 6
Credits: 4

Exam Hours: 3
Internal Marks: 25
External Marks: 75

CORE COURSE III - OOAD AND UML

Course Outcomes:

- Ability to analyze and model software specifications.
- Ability to abstract object-based views for generic software systems.
- Explain OOAD concepts and various UML diagrams
- Select an appropriate design pattern
- Illustrate about domain models and conceptual classes

UNIT I

Structured approach to system construction: SSADM/SADT - An overview of object oriented systems development & Life cycle

UNIT II

Various object oriented methodologies – Introduction to UML

UNIT III

Object oriented analysis – Use cases- Object classification, relationships, attributes, methods

UNIT IV

Object oriented design – Design axioms – Designing classes – Layering the software design: - data access layer, User interface layer, Control/business logic layer

UNIT - V

UML - Examples on: Behavioural models – Structural models – Architectural models from real world problems.

Text Book(s):

1. Bahrami Ali, Object oriented systems development, Irwin McGrawHill, 2005 (First 4 units covered here).
2. Booch Grady, Rumbaugh James, Jacobson Ivar, The Unified modeling language – User Guide, Pearson education, 2006 (ISBN 81-7758-372-7) IT -5 covered here).

Reference Book(s):

1. Grady Booch, “Object – Oriented Analysis and Design with Applications“, Pearson Education, 9th Indian Reprint, 2002.
2. Tom Pender, “UML 2 Bible“, Wiley Publishing Inc., USA.
3. Hans-Erik Eriksson and Magnus Penker, “UML Toolkit“, Wiley Computer Publishing, New York.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
I	20PIT1CC3	OOAD and UML					6	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓					✓	✓	✓		
CO3		✓	✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓		✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – I

Course Code: 20PIT1CC4
Instruction Hours: 6
Credits: 4

Exam Hours: 3
Internal Marks: 25
External Marks: 75

CORE COURSE IV - ORGANIZATIONAL BEHAVIOUR

Course Outcomes:

- Analyze individual and group behaviour, and understand the implications of organizational behaviour on the process of management.
- Identify different motivational theories and evaluate motivational strategies used in a variety of organizational settings.
- Evaluate the appropriateness of various leadership styles and conflict management strategies used in organizations.
- Describe and assess the basic design elements of organizational structure and evaluate their impact on employees.
- Explain how organizational change and culture affect working relationships within organizations.

UNIT I

Introduction: Elements of OB – Nature and Scope of OB – Contributing Disciplines to OB. Organisational Behaviour in Historical Perspective – Foundations of Individual Behaviour: Introduction – The Individual and Individual Differences – Human Behaviour and its Causation.

UNIT II

Personality – Perception – Attitudes: Concept of Attitudes – Formation of Attitudes – Types of Attitudes – Measurement of Attitude – Change of Attitude. Values: Concept of Value – Types of Values – Formation of Values – Values and Behaviour - Job Satisfaction.

UNIT III

Learning: Meaning and Definition – Determinants of Learning – Learning Theories – Learning Principles – Reinforcement – Punishment – Learning and Behaviour, Motivation: Concepts – Meaning of Motivation – Nature of Motivation – Motivation Cycle or Process– Need for Motivation – Theories of Motivation – Motivation and morale.

UNIT IV

Organisational Conflicts: Definition of Conflict – Sources of Conflict – Types of Conflicts – Aspects of Conflicts – Functional Conflict – Dysfunctional Conflict – Conflict Process – Conflict Management - Job Frustration – Stress Management.

UNIT V

Communication: Nature and Need for Communication – Communication Process – Communication Channel – Communication Networks – Communication Barriers – Effective Communication - Leadership – Organisational Structure – Organisational Culture.

Text Book(s):

1. S.S Khanka, “Organizational Behaviour”, S.Chand and Company Ltd, 2002.

Reference Book(s):

1. John W Newstorm and Keith Davis, "Organizational Behaviour", TMH, 2001.
2. Dwivedi, R. S., "Human Behaviour and Organisational Behaviour" (Oxford & IBH).
3. Stephen P. Robins, "Organisational Behaviour", Prentice Hall of India Ltd, New Delhi, 2000.
4. Fred Luthans, "Organisational Behaviour", Tata McGraw Hill Com. Ltd, New Delhi, 1999.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
I	20PIT1CC4	ORAGANIZATIONAL BEHAVIOUR					6	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓		✓	✓		✓		✓			
CO2	✓	✓				✓		✓	✓		
CO3	✓	✓	✓	✓		✓	✓	✓	✓		
CO4	✓	✓		✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓		✓	✓	
Number of matches (✓) = 36, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – I

Course Code: 20PIT1CP1
Instruction Hours: 6
Credits: 4

Exam Hours: 3
Internal Marks: 40
External Marks: 60

CORE COURSE PRACTICALS I - DISTRIBUTED TECHNOLOGIES LAB

Course Outcomes:

- Understand the ASP .NET environment and how to develop small programs
 - Develop menu based program for text manipulation
 - Understand ADO .NET and develop database applications
 - Develop the applications using Data Grid for displaying records
 - Develop applications for distributed environments.
- 1) Create a table and insert a few records using Disconnected Access.
 - 2) Develop a project to update and delete few records using Disconnected Access.
 - 3) Develop a project to view the records using GridView, DetailsView, FormView Controls.
 - 4) Develop a project to generate a crystal report from an existing database.
 - 5) Design a web page that makes uses of Ad Rotator Control.
 - 6) Design a web page involving Multi View or Wizard Control.
 - 7) Make use of Image Control involving two hot spots in a web page.
 - 8) Design a simple web site that makes use of Master Pages.
 - 9) Establish the security features in a simple web site with five pages.
 - 10) Use state management concepts in a mobile web application.
 - 11) Develop a web service that has an ASP.NET client.
 - 12) Develop a web service to fetch a data from a table and send it across to the client.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
I	20PIT1CP1	DISTRIBUTED TECHNOLOGIES LAB					6	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓	✓	✓		
CO3	✓		✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Number of matches (✓) = 38, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – II

Course Code: 20PIT2CC5
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

CORE COURSE V - MOBILE COMPUTING

Course Outcomes:

After completion of this course, student will be able to

- Understand fundamentals of wireless communications.
- Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.
- Demonstrate basic skills for cellular networks design.
- Apply knowledge of TCP/IP extensions for mobile and wireless networking.
- Understand the concepts of GSM and GPRS

UNIT I

Introduction: Mobile Computing – Networks – Middleware and Gateways – Developing Mobile Computing Applications – Mobile Computing Architecture: Architecture for Mobile Computing – Three-Tier Architecture –Emerging Technologies: - Bluetooth – Rfid -Wireless Broadband (WiMax) - Mobile IP – IPV6 - Java Card.

UNIT II

Global System for Mobile Communications: GSM Architecture – GSM Entities - Call Routing in GSM – GSM Addresses and Identifiers – Network Aspects in GSM – GSM Frequency Allocation – Authentication and Security- Short Message Service (SMS): Mobile Computing Over SMS – Value Added Services through SMS.

UNIT III

GPRS: - GPRS and Packet Data Network – GPRS Network Architecture – GPRS Network Operations –Data Services in GPRS Applications for GPRS – Limitations of GPRS. CDMA and 3G: Spread Spectrum Technology- CDMA Versus GSM – Wireless Data – Third Generation Networks – Applications on 3G.

UNIT IV

Getting Started with Android – Activities, Fragments and Intents – Android User Interface: Understanding the Components of a screen - Adapting to Display Orientation – Designing User Interface with views – Displaying Pictures and Menus with Views – Data Persistence.

UNIT V

Content Providers – Messaging – Location Based Services – Networking – Developing Android Services – Publishing Android Applications.

Text Book(s):

1. Ashok K Talukder, Hasan Ahmed, Roopa R Yavagal, "Mobile Computing", 2nd Edition, Tata McGraw Hill Publishing Company Limited, 2010.
2. Wei Meng Lee, "Beginning Android 4 Application Development", Wiley India Pvt. Ltd., 2012.

Reference Book(s):

1. Prasant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning.
2. Jochen Schiller, "Mobile Communications", Pearson Education, 2008.
3. Reto Meir, "Professional Android 4 Application Development", Wiley India Pvt. Ltd., 2012.
4. Pradeep Kotari, "Android Application Development Black Book", Dreamtech Press, 2014.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
II	20PIT2CC5	MOBILE COMPUTING					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2		✓				✓	✓	✓	✓		
CO3	✓	✓	✓	✓			✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – II

Course Code: 20PIT2CC6
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

CORE COURSE VI - DESIGN AND ANALYSIS OF ALGORITHMS

Course Outcomes:

- Understanding of cloud computing basic concepts.
- Systematic knowledge of the fundamental technologies, architecture, and security.
- Explain the core issues of cloud computing such as security, privacy, and interoperability.
- Choose the appropriate technologies, algorithms, and approaches for the related issues.
- Identify problems, and explain, analyze, and evaluate various cloud computing solutions.

Unit I

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

Unit II

Divide and Conquer: The General Method – Defective Chessboard – Binary Search – Finding the Maximum and Minimum – Merge Sort – Quick Sort – Selection - Strassen's Matrix Multiplication.

Unit III

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

Unit IV

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 – Connected Components and Spanning Trees– Disconnected Components and DFS.

Unit V

Backtracking: The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem Branch and Bound: Least Cost searched - 0/1 Knapsack Problem.

Text Book(s):

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

References Book(s):

1. "Data Structures Using C", Langsam, Augenstein, Tenenbaum, PHI.
2. "Data structures and Algorithms", V.Aho, Hopcroft, 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.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
II	20PIT2CC6	DESIGN AND ANALYSIS OF ALGORITHMS					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓		✓	✓		
CO3	✓	✓	✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓		✓	✓	✓		
CO5		✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 36, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – II

Course Code: 20PIT2EC1:1
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE I - 1. CLOUD COMPUTING

Course Outcomes:

- Understanding of cloud computing basic concepts.
- Systematic knowledge of the fundamental technologies, architecture, and security.
- Explain the core issues of cloud computing such as security, privacy, and interoperability.
- Choose the appropriate technologies, algorithms, and approaches for the related issues.
- Identify problems, and explain, analyze, and evaluate various cloud computing solutions.

UNIT I

FOUNDATIONS: -Introduction to Cloud Computing : Cloud Computing in a Nutshell – Roots of Cloud Computing – Layers and types of Clouds – Desired features of a Cloud – Cloud Infrastructure Management – Challenges and Risks – Migrating into a Cloud: - Introduction – Broad Approaches – The Seven step model – Enriching the ‘Integration as a Services’ Paradigm for the Cloud Era: - Introduction – The Evolution of SaaS. The Challenges of SaaS Paradigm – Approaching the SaaS Integration Enigma-New Integration Scenarios – The Integration Methodologies – SaaS Integration Services – The Enterprise Cloud Computing Paradigm: - Introduction – Background – Issues – Transition Challenges – The Cloud Supply Chain.

UNIT II

INFRASTRUCTURE AS A SERVICE:-Virtual Machine Provisioning and Migration Services: Introduction – Background – Manageability – Migration Services – Management of Virtual Machines for Cloud Infrastructures: - Anatomy of Cloud Infrastructures – Distributed Management of Virtual Infrastructures – Scheduling techniques for Advance Reservation of Capacity – Enhancing Cloud Computing Environments Using a Cluster as a Service: - Introduction – Related Work – RVWS Design – The Logical Design – Secure Distributed Data Storage in Cloud Computing: - Introduction – Cloud Storage from LANs to WANs – Technologies for Data Security – Challenges.

UNIT III

PLATFORM AND SOFTWARE AS SERVICE (PAAS/IAAS) Aneka- Integration of Private and Public Clouds: Introduction– Technologies and Tools – Aneka Cloud Platform - Aneka Resource Provisioning Service – Hybrid Cloud Implementation – CometCloud: An Autonomic Cloud Engine: - Introduction – CometCloud – Architecture – Autonomic Behavior of CometCloud – Overview of CometCloud based Applications – Implementation and Evaluation.

UNIT IV

PLATFORM AND SOFTWARE AS SERVICE (PAAS/IAAS)T- Systems Cloud-based Solutions for Business Applications: Introduction – Enterprise Demand of Cloud Computing – Dynamic ICT Service-Importance of Quality and Security in Clouds – Dynamic Data Centre- Producing Business-ready; Dynamic ICT Services – The MapReduce Programming Model and Implementations: - Introduction – MapReduce Programming Model – MapReduce implementations for the Cloud.

UNIT V

MONITORING AND MANAGEMENT: An Architecture for Federated Cloud Computing Introduction – A typical Use case – The Basic Principles of Cloud Computing – A Federated Cloud Computing Model – Security Considerations – Service Providers Perspective of SLA Management in Cloud Computing: - Traditional Approaches to SLO Management – Types of SLA – Life Cycle of SLA-SLA Management in Cloud –Automated Policy-based Management – Performance Prediction for HPC on Clouds: - Introduction – Background – Grid and Cloud – Performance related issues of HPC in the Cloud.

Text Book(s):

1. Rajkumar Buyya, James Broberg, Andrzej Goscinsky, “Cloud Computing Principles and Paradigms”, Wiley India Pvt. Ltd., 2011.

Reference Book(s):

1. Barrie Sosinsky, “Cloud Computing Bible”, 1st Edition, Wiley India Pvt. Ltd., New Delhi, 2011.
2. Michael Miller, “Cloud Computing”, 1st Edition, Pearson Education Inc., New Delhi, 2008.
3. RajkumarBuyya, Christian Vecchiola, S. ThamaraiSelvi, “Mastering Cloud Computing”, McGraw Hill Education (India) Private Limited Publications, First Reprint, 2013.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits				
II	20PIT2EC1:1	CLOUD COMPUTING					6	5				
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	✓	✓	✓	✓		✓		✓				
CO2	✓	✓				✓	✓	✓	✓			
CO3	✓	✓	✓	✓		✓	✓	✓	✓			
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Number of matches (✓) = 40, Relationship: High												

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – II

Course Code: 20PIT2EC1:2
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE I – 2.GRID COMPUTING

Course Outcomes:

- Understand and explain the basic concepts of Grid Computing.
- Explain the advantages of using Grid Computing within a given environment.
- Understand Data management and transfer in Grid environments.
- Use of distribution techniques for grid and cloud environments.
- Deployment and exploitation of the developed software in clusters, grids and clouds.

UNIT I

Introduction: Early Grid Activities – Current Grid Activities – An Overview of Grid Business Areas - Grid Applications-Grid Infrastructure. Grid Computing Organizations and Their Roles: Organizations Developing Grid Standards and Best Practice Guidelines - Organizations Developing Grid Computing Toolkits and the Framework - Organizations Building and Using Grid-Based Solutions to Solve Computing, Data and Network Requirements - The Grid Computing Anatomy: The Grid problem.

UNIT II

The Grid Computing Road Map: Autonomic Computing - Business on Demand and Infrastructure Virtualization - Service-Oriented Architecture and Grid - Semantic Grids. Merging the Grid Services Architecture with the Web Services Architecture: Service-Oriented Architecture – XML Related Technologies and their Relevance to Web Services - XML Messages and Enveloping - Service Message Description Mechanisms - Relationship between Web Service and Grid Service.

UNIT III

Open Grid Services Architecture (OGSA): Introduction - OGSA Architecture and Goal - Some Sample Use Cases that Drive the OGSA: - Commercial Data Center (CDC) - National Fusion Collaborator (NFS) - Online Media and Entertainment - The OGSA Platform Components: -Open Grid Services Infrastructure (OGSI): Introduction - Grid Services - A High-Level Introduction to OGSI - Technical Details of OGSI Specification - Introduction to Service Data Concepts.

UNIT IV

OGSA Basic Service: Common Management Model (CMM) - Service Domains - Policy Architecture - Security Architecture - Metering and Accounting - Common Distributed Logging -Distributed Data Access and Replication - GLOBUS GT3 Toolkit: Architecture: GT3 Software Architecture Model.

UNIT V

GLOBUS GT3 Toolkit: Programming Model: Introduction-Service Programming Model - Grid Service Behaviour Implementation - Operation Providers - Grid Service Lifecycle Callbacks and Lifecycle Management - Client Programming Model - GLOBUS GT3 Toolkit - High Level Services: Introduction - Resource Discovery and Monitoring - Resource Allocation - Data Management - Information Services - Index Services – Resource

Information Provider Service –Resource Management Services – Data Management Services.

Text Book(s):

1. Joshy Joseph, Craig Fellenstein, “Grid Computing”, Pearson Education, 2004.

Reference Book(s):

1. Rawel Plaszczall, Richard Wellner Jr. “Grid Computing”, Pearson Education, 2006.
2. Daniel Minoli, “A Networking Approach to Grid Computing”, Wiley Publication, 2004.
3. Frederic Megoules, “Fundamentals of Grid Computing”, Publisher CRC Press, Taylor & Francis groups, 2009.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
II	20PIT2EC1:2	GRID COMPUTING					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓		✓	✓		
CO3		✓	✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓		✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – II

Course Code: 20PIT2EC1:3
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE I - 3. PARALLEL COMPUTING

Course Outcomes:

- To develop an understanding of various basic concepts associated with parallel computing environments.
- To understand the effects that issues of synchronization, latency and bandwidth have on the efficiency and effectiveness of parallel computing applications
- To gain experience in a number of different parallel computing paradigms including memory passing, memory sharing, data-parallel and other approaches
- To earn experience in designing and testing parallel computing solutions to programming problems.
- To develop improved communication and collaborative skills.

UNIT I

Introduction to Parallel Computing – Motivating Parallelism – Scope of Parallel Computing – parallel programming platforms: Implicit parallelism trend in microprocessor architecture – Limitations of memory system performances – Dichotomy of parallel platforms – Physical organization of platforms Communication cost in parallel machines – Routing mechanism for interconnection networks

UNIT II

Principles of parallel algorithm Design – Preliminaries – Decomposition techniques – Characteristics of task and interactions – Mapping techniques for load balancing

UNIT III

Methods for containing interaction overhead – Parallel Algorithm models – one –to – All Broadcast and All – to – One Reduction – All – to – All Broadcast and Reduction

UNIT IV

Analytical Modeling of Parallel Programs – Sources of overhead in parallel programs – Performance metrics for parallel systems – The effect of Granularity on performances – Scalability of parallel systems – Minimum execution time and minimum cost – optimal execution time – Asymptotic analysis of parallel programs

UNIT V

Sorting – Issues in sorting on parallel computers – Sorting Networks – Bubble sort and its variables – Quicksort – Bucket and sample sort – Others sorting algorithms

Text Book(s):

1. “Introduction to Parallel Computing”, Second edition, Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, Pearson Education,

Reference Book(s):

1. “Introduction to Parallel Processing Algorithms and Architecture”, Bchrooz Parhami, Plenum Series, 2002.

2. Michael J.Quinn, “Parallel Computing, Theory and Practice”, McGrawHill, International Edition, Singapore, 1994.
3. “Algorithms and Parallel Computing”, Fayez Gebali, University of Victoria, John Willey & Sons, Inc Publications, 2011.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
II	20PIT2EC1:3	PARALLEL COMPUTING					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1		✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓	✓	✓		
CO3	✓	✓	✓	✓		✓		✓	✓		
CO4	✓	✓		✓	✓	✓	✓	✓		✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 36, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – II

Course Code: 20PIT2EC2:1
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE II - 1. MANAGEMENT INFORMATION SYSTEMS

Course Outcomes:

- Evaluate the role of information systems in today's competitive business environment.
- Define an information system from both a technical and business perspective and distinguish between computer literacy and information systems literacy.
- Assess the relationship between the digital firm, electronic commerce, electronic business and internet technology.
- Identify the major management challenges to building and using information systems in organizations and identify managerial risks related to information system organization processing and utilizing.
- To inculcate the principles and use of computer based information systems for Management of Businesses and Organizations.

UNIT I

Introduction to Information Systems: Why study Information System? – Why Business need Information Technology? - Fundamentals of Information Systems – Overview of Information Systems.

UNIT II

Solving Business Problems with Information Systems: System Approach to Problem Solving – Developing Information System Solution. Database Management: Managing Data Resources – Technical Foundation of Database Management.

UNIT III

Information Systems for Strategic Advantage: Fundamentals – Strategic Advantage – Strategic Applications and Issues in IT - Managing: Enterprise and Global Management.

UNIT IV

Business Applications of Information Technology: The Internet Electronic Commerce – Fundamentals of Electronic Commerce – Information System for Business Operations – Business Information System – Transaction Processing Systems.

UNIT V

Information Systems for Managerial Decision Support: Decision Support Systems – Artificial Intelligence Technology in Business – Management IT – Planning for Business Change with IT – Implementing Business Changes with IT – Security and Control Issues in I/S – Ethical and Societal Challenge of Information Technology.

Text Book(s):

1. James A. O'Brien, "Management Information Systems", Galgotia Publications, Fourth Edition, 1999.

Reference Book(s):

1. Gordon B. Davis, Margrethe H. Olson, "Management Information Systems", McGraw Hill, 2000.
2. Ravi Kalakota and Marcia Robinson, "E-Business Roadmap for Success", Addison-Wesley, New Delhi, 2000.
3. W.S. Jaswadekar, "Management Information Systems", Tata McGraw Hill, New Delhi, 1998.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
II	20PIT2EC2:1	MANAGEMENT INFORMATION SYSTEM					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2		✓				✓	✓	✓	✓		
CO3	✓	✓	✓	✓		✓	✓		✓		
CO4	✓		✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓		✓	✓	✓	
Number of matches (✓) = 36, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:**Checked by:****HOD:**

SEMESTER – II

Course Code: 20PIT2EC2:2
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE II - 2. E-COMMERCE

Course Outcomes:

- Demonstrate an understanding of the foundations and importance of E-commerce.
- Demonstrate an understanding of retailing in E-commerce by:
 - Analyzing, branding and pricing strategies.
 - Using and determining the effectiveness of market research
 - Assessing the effects of disintermediation.
- Analyze the impact of E-commerce on business models and strategy.
- Describe Internet trading relationships including Business to Consumer, Business-to-Business, Intra-organizational.
- Describe the infrastructure for E-commerce and describe the key features of Internet, Intranets and Extranets and explain how they relate to each other.

UNIT I

Electronic Commerce Framework – Electronic Commerce and Media Convergence – The Anatomy of E-Commerce Applications – Electronic Commerce Consumer Applications – Electronic Commerce Organization Applications. The Network Infrastructure for Electronic Commerce: Components of the High way – Network Access Equipment – Global information Distribution Networks.

UNIT II

The Internet as a Network Infrastructure: The Internet Terminology – NSFNET Architecture and components – National Research and Education Network – Internet Governance – An overview of Internet Applications. The Business of Internet Commercialization: Telco/Cable/On-Line Companies - National Independent ISPs – Regional Level ISPs – Local –level ISPs – Internet Connectivity options.

UNIT III

Electronic Commerce and the World Wide Web: Architectural Framework for Electronic Commerce – World Wide Web as the Architecture – Technology behind the Web – Security and the Web, Consumer-Oriented Electronic Commerce: Consumer- Oriented Applications – mercantile process model – mercantile models from the consumer’s perspective.

UNIT IV

Electronic Payment Systems: Types of Electronic Payment Systems – Digital Token based Electronic Payment Systems – Credit Card – Based Electronic Payment Systems – Risk and Electronic Payment Systems – Designing Electronic Payment Systems. Inter Organizational Commerce and EDI: Electronic Data Interchange – EDI Applications in Business – EDI: Legal, Security and Privacy issues.

UNIT V

Advertising and the Marketing on the Internet: The New Age of Information Search and Retrieval – Electronic Commerce Catalogs – Information filtering – Consumer – Data

Interface – Emerging Tools. On Demand Education and Digital Copyrights: Computer- based Education and Training – Technological Components of Education on demand. Software Agents: Characteristics and Properties of Agents – The Technology behind Software Agents – Applets, Browsers and Software Agents.

Text Book(s):

1. “Frontiers of Electronic Commerce”, Ravikalakota & Andrew Whinston, Adison Wesley, 2000.

Reference Book(s):

1. “Electronic Commerce”, Pete Loshin & Paul A.Murphy, Second edition, Jaico Publishing House, 2000.
2. David Whiteley, "E-Commerce Strategy, Technologies and Applications", 1st Edition, Tata Mc-Graw-Hill, 2001.
3. Kamalesh K Bajaj and Debjani Nag, "E-Commerce - The cutting edge of Business", 2nd Edition, Tata McGraw-Hill Education, 2005.
4. Alexis Leon and Mathews Leon, "Internet for Everyone", 15th Anniversary Edition, Leon Tech world, UBS Publications, 2012.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
II	20PIT2EC2:2	E-COMMERCE					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2		✓				✓	✓	✓	✓		
CO3	✓	✓	✓	✓		✓	✓		✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓		✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – II

Course Code: 20PIT2EC2:3
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE II - 3. MARKETING MANAGEMENT

Course Outcomes:

- Formulate a marketing plan that will meet the needs or goals of a business or organization.
- Develop an integrated marketing communications plan for a product, concept, good and/or service based on an identified market need or target.
- Evaluate the impact of using different marketing strategies for a product, concept, good and/or service, on the finances, Return on Investment (ROI) and business goals of an organization.
- Apply the principles of business ethics and corporate social responsibility to business decisions.
- Employ the management techniques of planning, organizing, directing, and controlling of marketing functions and activities in response to the business needs of the organization.

UNIT I

Marketing Management: Meaning of Market, Marketing and Marketing Management – Marketing Functions – Marketing Concepts – Marketing Environment – Approaches to Study of Marketing – Market Segmentation – Brand Positioning – Factors Influencing Buyer's Behaviour.

UNIT II

New Product Development: Meaning of Product, Idea Screening – Concept Development and Testing – Strategy Development – Market Testing – Commercialization – Consumer Adoption Process – Product Life Cycle – Product Mix Decisions – Product Line Decisions – Individual Product Decision – Product Positioning.

UNIT III

Managing Marketing Channels: Nature of Marketing channels – Channel Design Decisions – Channel Management Decisions – Channel Dynamics – Retailing – Types – Decisions – Trends – Wholesaling – Types – Decision Trends – Physical Distribution – Objective – Order Processing – Warehousing – Inventory – Transportation – Distribution Cost Analysis – Packing.

UNIT IV

Advertising and Sales Promotion: Advertising – Setting and Objectives – Deciding on the Message – Deciding on the Media – Evaluating the Effectiveness – Sales Promotion – Purpose of Sales Promotion – Decision in Sales Promotion – Objectives of Sales Promotion – Developing Sales Promotion Programme – Pretesting Sales Promotion Programme – Implementing Sales Promotion Programme – Evaluating Sales Promotion Programme – Management of Sales Force.

UNIT V

Pricing of Product / Service: Setting the Price – Adopting the Price – Methods of Pricing.

Text Book(s):

1. Philip Kotler, “Marketing Management”, Dorling Kindersley Pvt Ltd., 2009.

Reference Book(s):

1. Gordon B. Davis Margrethene H. Olson, “Management Information Systems”, McGraw Hill, 2000.
2. Edward W. Cundiff, Richard Ralph Still, Norman A. P. Govoni, “Fundamentals of Modern Marketing”, Prentice Hall of India, 1980.
3. Philip Kotler, Kevin Lane Keller, Abraham Koshy, Mithileshwar Jha (2013), “Marketing Management”, Pearson Education, New Delhi.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
II	20PIT2EC2:3	MARKETING MANAGEMENT					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓	✓			
CO3	✓	✓	✓	✓		✓		✓	✓		
CO4	✓		✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓		✓	✓	✓	✓	
Number of matches (✓) = 36, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – II

Course Code: 20PIT2CP2
Instruction Hours: 6
Credits: 4

Exam Hours: 3
Internal Marks: 25
External Marks: 75

CORE PRACTICALS II - MOBILE COMPUTING LAB

Course Outcomes:

- To demonstrate critical thinking skills in the field of computer science.
- To demonstrate the ability to solve problems related to the program content.
- To demonstrate an understanding of the concepts and principles of software systems.
- To analyze, design and document a system component using appropriate computer science techniques and models.
- To make a formal presentation of software system project including the demonstration of a working application.

1. Create an Application which deals with the Android Content Providers.
2. Create Application using Android Layouts, Views and Events
3. Create an application which uses Files, Preferences and Notifications
4. Create Application to Create, Modify and Query an SQLite Database
5. Create an application for Querying web services and Parsing response
6. Create Application which uses the concept of Services and Background Threats
7. Creating Android Audio Video Application
8. Create an Application which uses Map Activity and points the locations onto the Map Locations
9. Create an Application with One-Time, Repeating Alarms, and Long- Running Background Task as Service.
10. Create an Application for Simple Mobile Game.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
II	20PIT2CP2	MOBILE COMPUTING LAB					6	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓		✓		
CO3	✓	✓	✓	✓		✓		✓	✓		
CO4	✓		✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – III

Course Code: 20PIT3CC7
Instruction Hours: 6
Credits: 4

Exam Hours: 3
Internal Marks: 25
External Marks: 75

CORE COURSE VII – J2EE TECHNOLOGIES

Course Outcomes:

- Understand the architecture of client/server systems and able to develop applications using client/server communication.
- you will learn the basics and history of XML,CORBA,RMI,JMS and how to write your own XML documents.
- Develop JSP applications using JSP Tags, JSP Scriptlets and JavaBeans
- Understand the role of EJB in the broader Java EE platform.
- To learn basics of programming with a modern programming language, Java.

UNIT I

Client – Server Architecture: Two Tier Model – 3 Tier Model – n Tier Model – J2EE Architecture - .net Architecture – MPC Architecture.

UNIT II

Interaction Services: RMI – CORBA – XML – JMS.

UNIT III

Presentation Services: JSP – Javamail – Servlet.

UNIT IV

Component Model: EJB: Session beans: Stateless and Statefull – Entity beans – CMP and BMP – Message Driven Beans.

UNIT V

Struts Framework: Introduction – Building a simple struts – Model layers –View layer – controller layer – Validator – Tiles –Declarative Exception Handling –Struts Modules.

Text Books:

1. Jim Keogh “The Complete Reference J2EE “Tata McGraw – Hill Edition 2002.
2. James Holmes “The Complete References Struts Second Edition “Tata McGraw Hill Edition-2007.

Reference Books:

1. Jusin Couch, Daniel H. Steinberg, “J2EE Bible” Wily India (P) Ltd, New Delhi 2002.
2. Paul Tremblett, “Instant Enterprise Java Y-Beans”, Tata McGraw Hill Publishing Company, New Delhi, 2001.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3CC7	J2EE TECHNOLOGIES					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓	✓	✓		
CO3	✓		✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 39, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – III

Course Code: 20PIT3CC8
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

CORE COURSE VIII – MACHINE LEARNING

Course Outcomes:

On completion of the course students will be expected to:

- To Learn about Machine Intelligence and Machine Learning applications
- Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
- Have an understanding of the strengths and weaknesses of many popular machine learning approaches.
- Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.
- Be able to design and implement various machine learning algorithms in a range of real-world applications

Unit- I

INTRODUCTION: Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search

Unit- II

NEURAL NETWORKS AND GENETIC ALGORITHMS: Neural Network Representation – Problems – Perceptions – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms– Hypothesis Space Search– Genetic Programming – Models of Evaluation and Learning.

Unit - III

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

Unit - IV

INSTANT BASED LEARNING: K-Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.

Unit - V

ADVANCED LEARNING: Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

Text Book(s):

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

Reference Book(s):

1. Ethem Alpaydin, —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.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3CC8	MACHINE LEARNING					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓	✓	✓		
CO3	✓	✓	✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 40, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:**Checked by:****HOD:**

SEMESTER – III

Course Code: 20PIT2EC3:1
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE III – 1. BIG DATA ANALYTICS

Course Outcomes:

- Identify big data and its business implications.
- List the components of hadoop and hadoop eco-system.
- Access and process data on distributed file system.
- Manage job execution in hadoop environment.
- Develop big data solutions using hadoop eco system.

Unit I

Introduction to big data: Data, Characteristics of data and Types of digital data: Unstructured, Semi-structured and Structured, Sources of data, Working with unstructured data, Evolution and Definition of big data, Characteristics and Need of big data, Challenges of big data, Data environment versus big data environment

Unit II

Big data analytics: Overview of business intelligence, Data science and Analytics, Meaning and Characteristics of big data analytics, Need of big data analytics, Classification of analytics, Challenges to big data analytics, Importance of big data analytics, Basic terminologies in big data environment

Unit III

Big data technologies and Databases: Introduction to NoSQL, Uses, Features and Types, Need, Advantages, Disadvantages and Application of NoSQL, Overview of NewSQL, Comparing SQL, NoSQL and NewSQL, Introduction to MongoDB and its needs, Characteristics of MongoDB, Introduction of apache cassandra and its needs, Characteristics of Cassandra

Unit IV

Hadoop foundation for analytics: History, Needs, Features, Key advantage and Versions of Hadoop, Essential of Hadoop ecosystems, RDBMS versus Hadoop, Key aspects and Components of Hadoop, Hadoop architectures

Unit V

HadoopMapReduce and YARN framework: Introduction to MapReduce, Processing data with Hadoop using MapReduce, Introduction to YARN, Components, Need and Challenges of YARN, Dissecting YARN, MapReduce application, Data serialization and Working with common serialization formats, Big data serialization formats

Text Book

1. Seema Acharya and Subhashini Chellappan, “Big Data and Analytics”, Wiley India Pvt. Ltd., 2016

Reference Books

1. “Big Data” by Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, Wiley Publications, 2014.
2. “Big Data Imperatives : Enterprise Big Data Warehouse, BI Implementations and Analytics” by Soumendhra Mohanty, Madhu Jagadeesh and Harsha Srivatsa, Apress Media, Springer Science + Business Media New York, 2013
3. “Mining of Massive Datasets”, Anand Rajaraman, Jure Leskovec, Jeffery D. Ullman, Springer, July 2013.
4. “Hadoop: The definitive Guide”, Tom White, O'Reilly Media, 2010.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3EC3:1	BIG DATA ANALYTICS					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓	✓	✓		
CO3	✓	✓		✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 39, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – III

Course Code: 20PIT2EC3:2
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE III – 2. DIGITAL IMAGE PROCESSING

Course Outcomes:

- Review the fundamental concepts of a digital image processing system.
- Analyze images in the frequency domain using various transforms.
- Evaluate the techniques for image enhancement and image restoration.
- Categorize various compression techniques and interpret image compression standards.
- Interpret image segmentation and representation techniques.

Unit I

Images and Digital Processing – Digitizing Images – Digital Image Display – Image Processing Software.

Unit II

The Gray Level Histogram – Point Operations – Algebraic Operations – Geometric Operations.

Unit III

Linear System Theory - Harmonic Signals and Complex Signal Analysis – The Fourier Transform : - Filter Design - Processing Sampled Data.

Unit IV

Discrete Image Transforms –Wavelet Transforms Optics and System Analysis- Image Restoration – Image Compression.

Unit V

Pattern Recognition: Image Segmentation – Object Measurement – Classification and Estimation - Color and Multispectral Image Processing – Three Dimensional Image Processing.

Text Book:

1. Kenneth R. Castelman, “Digital Image Processing”, Pearson Education Inc. New Delhi, 2007.

Reference Book:

1. Rafael C. Gonzalez, Richard E. Woods, “Digital Image Processing” 3rd Edition, PHI Publications, New Delhi, 2008.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3EC3:2	DIGITAL IMAGE PROCESSING					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓		✓		
CO3	✓	✓	✓	✓		✓	✓	✓	✓		
CO4	✓		✓	✓	✓	✓	✓	✓	✓		
CO5	✓	✓	✓	✓	✓	✓		✓	✓	✓	
Number of matches (✓) = 36, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – III

Course Code: 20PIT2EC3:3
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE III – 3.PATTERN RECONGNITION

Course Outcomes:

- Explain and compare a variety of pattern classification, structural pattern recognition, and pattern classifier combination techniques.
- Summarize, analyze, and relate research in the pattern recognition area verbally and in writing.
- Apply performance evaluation methods for pattern recognition, and critique comparisons of techniques made in the research literature.
- Apply pattern recognition techniques to real-world problems such as document analysis and recognition.
- Implement simple pattern classifiers, classifier combinations, and structural pattern recognizers.

Unit I

Introduction and Bayesian Decision Theory: Introduction to pattern recognition, Systems, design cycles, learning and adaptation, Bayesian decision theory, minimum error-rate classification, classifiers, discriminant functions and decisions surfaces.

Unit II

Maximum – Likelihood and Bayesian parameter estimation: Maximum – Likelihood estimation, Bayesian estimation, Bayesian parameter estimation, Gaussian case and general theory, problems of dimensionality, Hidden marker models.

Unit III

Nonparametric Techniques: Density estimation, Parzen windows, K_n – Nearest neighbor estimation, The nearest neighbor rule, metrics and nearest – neighbor classification, fuzzy classification, approximations by series expansions.

Unit IV

Linear Discriminant Functions: Linear Discriminant Functions: Linear Discriminant Functions: Linear Discriminant Functions: Linear discriminant functions and decision surfaces, generalized linear discriminant functions, The two category linearly separable case, minimizing the perception criterion function, relaxation procedures, nonseparable behaviour, Minimum squared-error procedures, The Ho–Kashyap Procedures, support vector machines, multcategory generalizations.

Unit V

Multilayer Neural Networks: Feedforward operation and classification, back propagation algorithm, error surfaces, back propagation as feature mapping, back propagation, Bayes theory and probability, practical techniques for improving backpropagation, regularization, complexity adjustment and pruning.

Text Book:

1. Richard O. Duda, Peter E. Hart and David G. Stork, "Pattern Classification", 2nd Edition, John Wiley & Sons, 2012.

Reference Book:

1. John Hertz, Andres Krogh & Richard G. Palmer, "Introduction to the theory of Neural Computation", Addison Wesley, 1991.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3EC3:3	PATTERN RECOGNITION					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓		✓	✓		
CO3	✓		✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CO5	✓	✓	✓		✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 36, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – III

Course Code: 20PIT2EC4:1
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE IV – 1. SOFTWARE ENGINEERING

Course Outcomes:

- Understanding Basic knowledge of the analysis and design of complex systems.
- Ability to apply software engineering principles and techniques.
- Ability to develop, maintain and evaluate large-scale software systems.
- To produce efficient, reliable, robust and cost-effective software solutions.
- Ability to perform independent research and analysis.

UNIT I

Need for S/w Engineering: Need for S/w engineering – About software and S/w engineering – A systems approach, - Engineering approach – Members of the development team – Change in S/w engineering. - Modeling the process and Life cycle: The meaning of process – S/w process models – Tools and techniques for process modeling – Practical process modeling.

UNIT II

Planning and Managing the project: Tracking progress – Project personnel – Effort estimation – Risk management – The project plan – Process models and project management.

UNIT III

Capturing the requirements : The requirement process – Types of Requirements – Characteristics of requirements – Expressing requirements – Additional requirements notations – Prototyping requirements – Requirements Documentation – Participants in the requirements process – Requirements validation – Measuring requirements – Choosing a requirements specification Techniques.

UNIT IV

Designing the system : Design Introduction – Decomposition and Modularity – Architectural styles and strategies – Characteristics of good design – Techniques for improving design – Design evaluation and validation – Documenting the design – Programming standards and procedures – Programming guidelines – Documentation.

UNIT V

Testing Strategies : Testing strategic issues – Test strategies for conventional S/w – Test strategies for object oriented S/w – Validation testing – system testing – S/w testing. Fundamentals – Black-box and White-box testing – White box testing – Black box testing – McCall's Quality factors – ISO 9126 - QF – S/w Engineering – S/w Maintenance – A S/w engineering process model.

Text Books:

- 1.Shari Lawrence P. Fleeger, “*Software Engineering Theory and Practice*”, 2nd Edition, Pearson Education, Delhi, 2001. [(for Units 1–4) Chapters 1, 2, 3, 4, 5, 7]
2. Roger S. Pressman, “*Software Engineering A Practitioner’s Approach*”, 6th Edition, Tata McGraw Hill Publication, [(for Unit 5) Chapters : 13, 14, 15, 31]

Reference Books:

- 1.Ian Sommerville, “*Software Engineering*”, 6th Edition, Pearson Education, Delhi, 2005.
- 2.Douglas Bell, “*Software Engineering for Students-A Programming Approach*”, 4th Edition, Pearson Education, Delhi 2007.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3EC4:1	SOFTWARE ENGINEERING					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓					✓	✓	✓	✓		
CO3	✓	✓	✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓		✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 38, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – III

Course Code: 20PIT2EC4:2
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE IV – 2. SOFTWARE TESTING

Course Outcomes:

- Understand the students Various test processes and continuous quality improvement and types of errors and fault models
- Methods of test generation from requirements and Behavior modeling using UML: Finite state machines (FSM)
- Test generation from FSM models and Input space modeling using combinatorial designs
- Understand the Combinatorial test generation and test adequacy assessment using: control flow, data flow, and program mutations
- Understand the use of various test tools and Application of software testing techniques in commercial environments

UNIT I

Software Development Life Cycle Models: Phases of Software Project – Quality, Quality Assurance and Quality control – Testing, Verification & Validation – Process Model – Life Cycle Models - White Box Testing: What is White Box Testing? – Static Testing – Structural Testing – Challenges - Black Box Testing: What is Black Box Testing? – Why Black Box Testing? – When to do Black Box Testing? – How to do Black Box Testing?

UNIT II

Integration Testing: What is Integration Testing? – Integration Testing as a Type of Testing – Integration Testing as a Phase of Testing – Scenario testing – Defect Bash - System and Acceptance Testing: Overview – Why System Testing? – Functional Vs Non Functional Testing – Functional System Testing – Non Functional Testing – Acceptance Testing – Summary of Testing Phases.

UNIT III

Performance Testing: Factors governing Performance Testing – Methodology for Performance Testing – Tools for Performance Testing – Process for Performance Testing - Regression Testing: – What is Regression Testing – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

UNIT IV

Internationalization (I_{18n}) Testing: Primer – Test Phases – Enabling Testing – Locale Testing – Validation – Language Testing – Localization Testing – Tools – Challenges and Issues – Ad hoc Testing: - Overview – Buddy Testing – Pair Testing – Exploratory Testing – Iterative Testing – Agile and Extreme Testing – Defect Seeding – Usability and Accessibility Testing: - What is Usability Testing? – Approach – When to do Usability Testing? – How to Achieve Usability? – Quality Factors – Aesthetics Testing – Accessibility Testing – ToolsLab Setup – Test Roles

UNIT V

Test Planning, Management, Execution and Reporting: Test Planning -Test Management – Test Process – Test Reporting – Best Practices - Software Test Automation: What is Test Automation – Terms used in Automation – Skills Needed for Automation – What to Automate, Scope of Automation – Design & Architecture for Automation – Generic Requirement for Test Tool Framework – Process model for Automation – Selecting a Test tool – Automation for Extreme Programming Model – Challenges in Automation.

Text Book:

1. Srinivasan Desikan, Gopalaswamy Ramesh, Software Testing – Principle & Practices, Pearson Education, New Delhi, 2006.

Reference Books:

1. Ron Patton, “*Software Testing*”, 2nd Edition, Pearson Education, New Delhi, 2006.
2. William E. Perry, “*Effective Methods for Software Testing*”, 3rd Ed., Wiley India, 2006.
3. Renu Rajani, Pradeep Oak, “*Software Testing – Effective Methods, Tools and Techniques*”, TMH Publishing Company Limited, New Delhi, 2004.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3EC4:2	SOFTWARE TESTING					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓	✓	✓		
CO3		✓	✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓		✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Number of matches (✓) = 37, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – III

Course Code: 20PIT2EC4:3
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE IV – 2. SOFTWARE METRICS

Course Outcomes:

- Understand the students identify and apply various software metrics, which determines the quality level of software
- Identify and evaluate the quality level of internal and external attributes of the software product
- Compare and Pick out the right reliability model for evaluating the software
- Evaluate the reliability of any given software product
- Design new metrics and reliability models for evaluating the quality level of the software based on the requirement

UNIT I

Measurement – measurement in everyday life – measurement in software engineering – the scope software metrics - Basics of measurement - The representational theory of measurement – measurement and models - measurement scales and scale types – meaningfulness in measurement - A goal-based framework for software measurement- classifying software measures- determining what to measure- applying the framework- software measurement validation- software measurement validation in practice

UNIT II

Empirical Investigation – four principles of investigation – planning formal experiments planning case studies – Software metrics data collection- what is good data – how to define data – how to collect data- how to store and extract data- Analyzing software measurement data – Introduction – analyzing the results of experiments – examples of simple analysis techniques – more advanced methods – overview of statistical tests

UNIT III

Software-Engineering Measurement – Measuring internal product attributes : size – Aspect of software size – length – reuse – functionality – complexity – Measuring internal product attributes – structure –Types of structural measures – control flow structure – modularity and information flow attributes – object oriented metrics- data structure – difficulties with general complexity measures –Measuring external product attributes – modelling software quality – measuring aspects of quality

UNIT IV

Software Reliability : Measurement and Prediction - basics of reliability theory – the software reliability problem – parametric reliability growth models – predictive accuracy – the recalibration of software – reliability growth predictions – the importance of operational environment – wider aspect of software reliability – Resource measurement : Productivity, teams and tools - the meaning of productivity-productivity of what? - Measuring productivity – teams, tools, methods – Making process predictions – Good estimates – cost estimation problems and approaches – models of effort and cost – problems with existing modelling methods – dealing with problems of current estimation methods – implication for process prediction

UNIT V

Measurement and Management : Planning a measurement program – what is a metrics plan – Why and What : developing goals, questions and metrics – Where and When: mapping measures to activities – How: measurement tools – Who: measurers , analysts and audience - revising the plan – Measurement in Practice – Success criteria – Measurement in the small – Measurement in large – lessons learned – Empirical Research in Software Engineering - Problem with empirical research – investigating products – investigating resources - investigating processes - measurement today and tomorrow.

Text Book:

1. “**Software Metrics**”, Norman E. Fenton, Shari Lawrence Pfleeger A Rigorous & Practical Approach Second Edition 2010, International Thomson Publishing

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3EC4:3	SOFTWARE METRICS					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓					✓	✓	✓	✓		
CO3	✓	✓	✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓		✓	✓	✓	
CO5	✓	✓		✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – III

Course Code: 20PIT3CP3
Instruction Hours: 6
Credits: 4

Exam Hours: 3
Internal Marks: 40
External Marks: 60

CORE COURSE RACTICAL III – J2EE TECHNOLOGIES LAB

Course Outcomes:

- Understand the students how to create dynamic web pages, using Servlets and JSP.
- understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB).
- invoke the remote methods in an application using Remote Method Invocation (RMI)
- learn to access database through Java programs, using Java Data Base Connectivity (JDBC)
- make a reusable software component, using Java Bean.

1. To find the marks of the students using Remote Method Invocations.
2. To write a Servlet program to calculate the bonus of an employee
3. To write a Servlet program to implement Session Tracking.
4. To write a Servlet program to check authentication for user using Cookies.
5. To write a Servlet program and use JDBC in it.
6. To write a simple program for JSP.
7. To write a JSP program that works with JDBC.
8. To write a JSP Program with Bean Class.
9. To write a EJB Stateless Program to create bonus of an employee.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	20PIT3CP3	J2EE TECHNOLOGIES LAB					6	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓		✓		
CO3	✓		✓	✓		✓	✓	✓			
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – IV

Course Code: 20PIT4CC9
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

CORE COURSE IX – INTERNET OF THINGS

Course Outcomes:

- Gain the basic knowledge about IoT
- Able to use IoT related products in real life
- It helps to rely less on physical resources
- To start their work smarter
- Able to understand building blocks of Internet of Things

UNIT I

Requirements of IoT: The definition of the Internet of Things, main assumptions and perspectives- Platform for IoT devices. Economics and Technology of the IoT –Issues in IoT and solutions-Architecture of IoT. Anatomy of IoT: Traditional Internet Protocol Vs Chirps – Applying network intelligence at propagator nodes-Transport and functional architectures.

UNIT II

IoT Devices-Temporary and Ad-hoc devices-Addressing issues-End devices in dedicated networks- Converting states to chirps-RFID integration in the IoT-End devices with higher demands- Small data-Building a web of things-Autonomy and co- ordination-Structuring a tree- Housekeeping message-Role of integrator function- Degrees of functionality-Aggregating end points-Packaging options.

UNIT III

Data and Human Interaction: Functions of IoT-Analysis and control-Neighborhood and affinities- Public private and other kinds of data- Publishing agent- Searching for and managing agents- High and low level loops- Human interface and control points- Collaborative scheduling tools-Packaging and provisioning- Distributed integrator functions- Filtering the streams-IP Alternative-Protocol based on category classification-Skeletal architecture of chirp packets- Pattern driven-Propagator node networks and operation-Power of local agents and integrator functions-High level interchange.

UNIT IV

IoT APPLICATIONS: Moore's Law –Intelligence near the edge- Incorporating legacy devices- Staying in the loop -Social machines-Applications of IoT–Agriculture- Home healthcare- Efficient process control-Factory application- Home automation- Natural sciences- Living applications- Origin of IoT- Open source networking solutions- Shared software and business process vocabularies.

UNIT V

Creating the IoT projects: Sensor project-Actuator project – Controller-Camera. Using an IoT service platform- Selecting an IoT. Platform- The claysterplatform- Interfacing our devices using XMPP- Creating control application.

Text Books:

1. “Rethinking the Internet of Things-A scalable approach to connecting everything”, by Francis DaCosta, Apress open publication, 2013.
2. “Learning Internet of Things” by Peter Waher, PACKT Publishing-Birmingham-mumbai-2015.

Reference Books:

1. “Internet of Things: A Hands on Approach”, by Arhdeep Bahga and Vijay Madiseti (<http://www.internet-of-things-book.com/>).
2. “Getting started with the internet of things”, by Cuno Pfister, O’Rielly Publication.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
IV	20PIT4CC9	INTERNET OF THINGS					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓	✓	✓		
CO3	✓	✓	✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 40, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – IV

Course Code: 20PIT4CC10
Instruction Hours: 6
Credits: 5

Exam Hours: 3
Internal Marks: 25
External Marks: 75

CORE COURSE X – OPEN SOURCE WEB APPLICATION DEVELOPMENT

Course Outcomes:

- Ability to install Operating Systems and able to run open-source operating systems
- Ability to gather information about Free and Open Source Software projects from software
- Releases and from sites on the internet
- Ability to build software
- Ability to modify Open Source Software packages.

UNIT-I

Installing LAMP stack (Linux, Apache, MySQL, PHP suite)- Configuring installation – Creating PHP pages – ingenerating MySQL with PHP.

UNIT-II

Web forms and user data manipulation – Basic data manipulation using PHP/MySQL forms

UNIT-III

Validating user inputs – Handling errors in form.

UNIT-IV

Case study: Building content management system using LAMP stack

UNIT-V

Configuring log files to improve LAMP stack based web site – Troubleshooting web site.

TEXT BOOK:

1. Naramore Elizabeth, Gerner Jason, et aln., Beginning PHP5, Apache, MySQL web development, Wrox press/Wiley Dreamtech press, 2005 edition. (ISBN 81-265-0581-8) [Unit-1 :(Chapters 1,2); Unit-2 : (Chapters 3,4,5,6); Unit-3 (Chapters 8,9); Unit-4 (Chapters 13), Unit-5 (Chapters 17,18)]
2. Bayross Ivan, Web enabled commercial application development using HTML,DHTML, JavaScript, Perl CGI., BPB publications, 2nd revised edition, 2002.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
IV	20PIT4CC10	OPEN SOURCE WEB APPLICATION DEVELOPMENT					6	5			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓	✓	✓		
CO3	✓		✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓		✓		✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – IV

Course Code: 20PITEC5:1
Instruction Hours: 6
Credits: 4

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE IV – 1. PERVASIVE COMPUTING

Course Outcomes:

- Understand the fundamental theoretical concepts in pervasive computing.
- Understand the aspects of context awareness
- Study the methods for efficient resource allocation and task migration
- Learn and Analyze the HCI Service Selection and HCI migration framework
- Design and implement pervasive application systems.

UNIT I

Pervasive Computing: Past, Present and Future Pervasive Computing-Pervasive Computing Market-m-Business-Application examples: Retail, Airline check-in and booking-Sales force automation-Health care-Tracking-Car information system-E-mail access via WAP

UNIT II

Device Technology: Hardware-Human Machine Interfaces-Biometrics-Operating Systems-Java for Pervasive devices

UNIT III

Device Connectivity: Protocols-Security-Device Management Web Application Concepts: WWW architecture-Protocols-Transcoding-Client authentication via internet

UNIT IV

WAP and Beyond: Components of the WAP architecture-WAP infrastructure-WAP security issues-WML-WAP push-Products-i-Mode-Voice Technology: Basics of Speech recognition-Voice Standards-Speech applications-Speech and Pervasive Computing

UNIT V

PDA: Device Categories-PDA operation Systems-Device Characteristics-Software Components-Standards-Mobile Applications-PDA Browsers Pervasive Web Application architecture: Background-Scalability and availability-Development of Pervasive Computing web applications-Pervasive application architecture

Text Book:

1. Pervasive Computing, Technology and Architecture of Mobile Internet Applications, Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, Pearson Education, 2006

Reference Book:

1. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, McGraw Hill edition, 2006

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
IV	20PIT4EC5:1	PERVASIVE COMPUTING					6	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓	✓	✓		
CO3		✓	✓	✓		✓	✓		✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓		✓	✓	✓	✓	✓	✓	✓		
Number of matches (✓) = 36, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – IV

Course Code: 20PITEC5:2
Instruction Hours: 6
Credits: 4

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE IV – 2. HUMAN COMPUTER INTERACTION

Course Outcomes:

- Identify the basic concepts of HCI and evolution of HCI
- Discuss the design issues and interaction design processes
- Use different models of interaction design principles /rules
- To understand the concepts and techniques for effective interaction between Human and Computers
- Ability to develop HCI technique based applications.

UNIT I

Cognitive Psychology and Computer Science - Capabilities of Human–Computer Interaction-Goals of Human–Computer Interaction-Roles of Human, Computer and Interaction in HCI-Basic User Interfaces - Advanced User Interfaces - Justification of Interdisciplinary Nature- Standard Framework of HCI-HCI Design Principles-Interface Levels in HCI-Steps in Designing HCI Applications - Graphical User Interface Design -Popular HCI Tools - Architecture of HCI Systems-Advances in HCI-Overview -HCI Sample Exercises - HCI and Usability Engineering-Usability Engineering Attributes - Process of Usability-Need for Prototyping.

UNIT II

Understanding Process Modelling:Goals, Operators, Methods, Selection Rules-Cognitive Complexity Theory- Adaptive Control of Thought-Rational-State, Operator, and Result-Belief-Desire-Intention-ICARUS-Connectionist Learning with Adaptive Rule Induction On-line (CLARION)-Subsumption Architecture-Spoken Dialogue System- Factors Defining Dialogue System-General Architecture of Spoken Dialogue System-Dialogue Management Strategies-Computational Models for Dialogue Management- Statistical Approaches to Dialogue Management-Learning Automata as Reinforcement Learners.

UNIT III

Recommender Systems: HCI Study Based on Personalisation - Personalisation in Recommender Systems -Application Areas of Recommender Systems-Recommender System Field as an Interdisciplinary Area of Research -Phases of Recommender Systems -User Profiling Approaches-Classification of Recommendation Techniques -Advantages and Disadvantages of Recommender System Approaches -Need of Software Agent-based Approach in Recommender Systems -Evaluating Recommender Systems-Integrated Framework for Recommender Systems - Case Study.

UNIT IV

Advanced Visualisation Methods: Ontology Definition -Ontology Visualisation Method -Space Dimensions of Ontology Visualisation -Ontology Languages -Ontology Visualisation Tools - Ontology Reasoning –Reasoner.

UNIT V

Ambient Intelligence: The New Dimension of Human–Computer Interaction - Ambient Intelligence Definition-Context-aware Systems and Human–Computer Interaction -Middleware -

Modelling Data for AmI Environment -Development of Context-awareness Feature in Smart Class Room— A Case Study - Context- aware Agents for Developing AmI Applications—A Case Study.

Text Book:

1. K. Meena, R. Sivakumar, “Human–Computer Interaction”, PHP Learning Private limited Delhi-110092, 2015.

Reference Books:

1. JohnM. Carroll, “HumanComputerInteraction–intheNew Millennium”, Pearson Education, 2007.
2. Lan Dix, Janet Finlay, Gregory D. Abowd, Russell Beale, “Human-Computer Interaction”, Pearson Education, 2009.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
IV	20PIT4EC5:2	HUMAN COMPUTER INTERACTION					6	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2		✓				✓	✓	✓	✓		
CO3	✓	✓	✓	✓		✓	✓		✓		
CO4	✓	✓	✓		✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – IV

Course Code: 20PITEC5:3
Instruction Hours: 6
Credits: 4

Exam Hours: 3
Internal Marks: 25
External Marks: 75

ELECTIVE COURSE IV – 3. SOFT COMPUTING

Course Outcomes:

- Learn about soft computing techniques and their applications
- Analyze various neural network architectures
- Understand perception and counter propagation networks.
- Define the fuzzy systems
- Analyze the genetic algorithms and their applications

UNIT I

FUZZY SET THEORY: Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set – Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

UNIT II

OPTIMIZATION: Derivative based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton’s Method – Step Size Determination – Derivative Free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

UNIT III

NEURAL NETWORKS: Supervised Learning Neural Networks – Perceptrons – Adaline Backpropagation Multilayer perceptrons – Radial Basis Function Networks – Unsupervised Learning and Other Neural Networks – Competitive Learning Networks – Kohonen Self – Organizing Networks – Learning Vector Quantization – Hebbian Learning.

UNIT IV

NEURO FUZZY MODELING: Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm Learning Methods that Cross fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

UNIT V

APPLICATION OF COMPUTATIONAL INTELLIGENCE: Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

TEXT BOOK

1. J. S. R. Jang, C.T. Sun and E. Mizutani, “Neuro Fuzzy and Soft Computing”, PHI, Pearson Education, 2004.

REFERENCE BOOKS

1. Timothy J. Ross, “Fuzzy Logic with Engineering Application, “ Mc Graw Hill, 1977.
2. Davis E. Goldberg, “Genetic Algorithms Search, Optimization and Machine Learning”, Addison Wesley, 1989.

3. S. Rajasekaran and G.A.V. Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2003. Emereo Pty Limited, July 2008

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
IV	20PIT4EC5:3	SOFT COMPUTING					6	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓					✓	✓	✓		
CO3	✓	✓	✓	✓		✓		✓	✓		
CO4		✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – IV

Course Code: 20PIT4CP4
Instruction Hours: 6
Credits: 4

Exam Hours: 3
Internal Marks: 40
External Marks: 60

CORE COURSE RACTICAL IV – OPEN SOURCE TECHNOLOGY LAB

Course Outcomes:

- Understand the installation of various packages in open source operating systems
 - Create simple GUI applications using PHP function to develop program.
 - Understand various versions of control system
 - Understand the kernel configuration and virtual environment
 - Implement various applications using build systems
-
1. Write a server side PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.
 2. Write a PHP program that adds products that are selected from a web page to a shopping cart.
 3. Write a PHP program to access the data stored in a mysql table.
 4. Write a PHP program interface to create a database and to insert a table into it.
 - i). Write a PHP program using classes to create a table.
 - ii). Write a PHP program to upload a file to the server.
 5. Write a PHP program to create a directory, and to read contents from the directory.
 6. Write a shell program to find the details of an user session.
 7. Write a shell program to change the extension of a given file.
 8. Create a mysql table and execute queries to read, add, remove and modify a record from that table.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
IV	20PIT4CP4	OPEN SOURCE TECHNOLOGIES LAB					6	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓					✓	✓	✓			
CO3	✓	✓	✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓		✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 37, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:

Checked by:

HOD:

SEMESTER – IV

Course Code: 20PIT4PW
Instruction Hours: 6
Credits: 4

Exam Hours: 3
Internal Marks: 0
External Marks: 0

DISSERTATION AND VIVA VOCE (INDUSTRY/RESEARCH)

Course Outcomes:

- Interpret literature with the purpose of formulating a project proposal
- Planning, analyzing, designing and implementing a software project using SDLC model
- Finding the solution of identified problem with help of modern technology
- Giving priority to real life problem
- Learning to work as a team and to focus on getting a working project done within a stipulated period of time.

S.No	Work Description	Maximum Marks
1	Dissertation	80
2	Viva voce	20
Total		100

Note: PASSING MINIMUM – 50 MARKS

I Review –December last week

- Confirmation letter from the company
- Project type & title
- Company profile
- Synopsis
- Contact number & mail_id of the external guide
- S/w selection

II Review – January 3rd week

- Data or System flow diagram
- Documentation of first three chapters
- Database design
- Input design – Forms
- Output design – Reports

III Review – February 3rd week

- Complete coding
- Test plan with demo
- Rough documentation of the entire project

IV Review – March 1st week

- Corrected rough draft
- Explanation of the entire project
- Execution of Implementation Work

Note:

- ✚ Attending all the review is compulsory
- ✚ PPT and necessary Documentation should be brought for each Review
- ✚ Font size in documentation has to be 12, Times New Roman, Space 1.5
- ✚ Document should be neatly aligned and justified
- ✚ No change can be made in the review marks later
- ✚ Internal mark will be submitted at the same day of review to controller section.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
Iv	20PIT4PW	PROJECT WORK					6	4			
Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓		✓		✓			
CO2	✓	✓				✓	✓	✓	✓		
CO3	✓		✓	✓		✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of matches (✓) = 39, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared by:**Checked by:****HOD:**