

# **PRISTUNIVERSITY** VALLAM, THANJAVUR.

# **DEPARTMENT OF**

# **COMPUTER SCIENCE & ENGINEERING**

# **PROGRAM HANDBOOK**

# **M.Tech**

# COMPUTER SCIENCE AND ENGINEERING [PART TIME]

# [REGULATION 2022] [for candidates admitted to M.Tech CSE program from June 2017 onwards]

DEAN ENGINEERING AND TECHNOLOGY HOD DEPT.OF CSE

# COURSE STRUCTURE

# **SEMESTER - I**

Semester. no	Subject Code	ct Code Subject Title	Periods per Week			С
			L	Т	Р	
Ι	22248S11AP	Higher Mathematics	4	1	0	4
Ι	22250H12P	Adhoc & Sensor Networks	4	0	0	4
Ι	22250H13P	Advanced Data Structures	4	0	0	4
		Practical				
Ι	22250L14P	Advanced Web Technologies Lab	-	-	3	3
Total no of Credits					-	15

# **SEMESTER - II**

Semester. no Sub	Subject Code	Subject Title	Periods per Week			С
			L	Т	Р	
II	22250H21P	Middleware Technologies	3	1	0	4
II	22250H22P	Internet of Things	4	0	0	4
II	22250E23_P	Elective I	3	0	0	3
		Practical				
Π	22250L24P	.NET Technologies Lab	-	-	3	3
II	222TECWRP	Technical Writing /Seminars	-	-	3	3
Total no of Credits					17	

# **SEMESTER - III**

Semester.no	Subject Code	Subject Title	Periods per Week			C
			L	Т	Р	
III	22250H31P	Modern Operating System	4	0	0	4
ш	22250E32P	Machine Learning Techniques	4	0	0	4
III	22250E33_P	Elective-II	3	0	0	3
Total no of Credits						11

# **SEMESTER - IV**

Semester no.	Subject Code	Subject Title	I pe	С		
			L	Т	Р	
IV	22250H41P	Object Oriented Software Engineering	4	0	0	4
IV	22250H42P	Software Project Management	4	0	0	4
IV	22250E43_P	Elective-V	3	0	0	3
IV	22250P44P	Project Work- Phase I	-	-	6	10
Total no of Credits						21

# SEMESTER - V

Semester no.	Subject Code	Subject Title	l po	С		
			L	Т	Р	
V	22250E51_P	Elective-IV	3	0	0	3
V	22250E52_P	Elective-V	3	0	0	3
V	22250E53_P	Elective-VI	3	0	0	3
Total no of Credits						9

# **SEMESTER - VI**

Semester no.	Subject Code	Subject Title	Periods per Week			С
			L	Т	Р	
VI	22250P61P	Project Work- Phase II	0	0	15	15
Total no of Credits						15

# LIST OF ELECTIVES

# SEMESTER - II ELECTIVE - I

Semester no	Subject Code	Subject Title	F pe	Period er We	С	
			L	Т	Р	
II	22250E23AP	Advanced Distributed Computing	3	0	0	3
II	22250E23BP	Data Warehousing & Data Mining	3	0	0	3
II	22250E23CP	Information Retrieval Techniques	3	0	0	3

# SEMESTER - III ELECTIVE - II

Semester no	Subject Code	Subject Title	F pe	Period er We	С	
			L	Т	Р	
III	22250E33AP	Multimedia Systems	3	0	0	3
III	22250E33BP	Web Engineering	3	0	0	3
III	22250E33CP	Software Metrics	3	0	0	3

SEMESTER - IV - ELECTIVE - III

Semester	r Subject Title		P pe	Period er Wee	С	
по	Subject Code		L	Т	Р	
II	22250E43AP	Service Oriented Architecture	3	0	0	3
Π	22250E43BP	High Speed Networks	3	0	0	3
II	22250E43CP	Language Technologies	3	0	0	3

# **SEMESTER - V -** ELECTIVE - IV

Semester		Subject Title	F pe	Period er Wee	ls ek	С
по	Subject Code		L	Т	Р	
III	22250E51AP	Cloud Computing	3	0	0	3
Ш	22250E51BP	Speech Processing and Synthesis	3	0	0	3
III	22250E51CP	Soft Computing	3	0	0	3

# **SEMESTER - V -** ELECTIVE - V

Semester		Subject Title	F	Perio per W	С	
no	Subject Code	-		Т	Р	
III	22250E52AP	Advanced Database Technology	3	0	0	3
Ш	22250E52BP	Reconfigurable Computing	3	0	0	3
III	22250E52CP	Green Computing	3	0	0	3

# **SEMESTER - V -** ELECTIVE - VI

Semester	Subject Code	Subject Title		F pe	С	
			L	Т	Р	
III	22250E53AP	Software Quality Assurance	3	0	0	3
ш	22250E53BP	Bio-inspired Computing	3	0	0	3
III	22250E53CP	Wireless Application Protocols	3	0	0	3

Semester	The Cou	Theory Courses		Elective Courses		actical ourses	Project	Total
Semester	Nos	Credit	Nos	Credit	Nos	Credit	Credit	Credit
Ι	3	12	-	-	1	03	-	15
II	2	08	1	03	2	06	-	17
III	2	08	1	03	-	-	-	11
IV	2	08	1	03	1	-	10	21
V	-	-	3	9	-	-	-	9
VI	-	-	-	-	-	-	15	15
TOTAL	9	36	6	18	3	9	21	87
	TOTAL CREDITS							88

# CREDITS DISTRIBUTION

ТОТ	ALCREDITS
Semester – I	15
Semester – II	17
Semester – III	11
Semester – IV	21
Semester –V	9
Semester –VI	15
TOTAL	88

# 22248S11AP - HIGHER MATHEMATICS

LTPC 31 0 4

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**Total No of periods: 45** 

# AIM

To extend student's mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.

# **OBJECTIVES**

At the end of the course, students would

- Have knowledge of the concepts needed to test the logic of a program. •
- Have gained knowledge which has application in expert system, in data base and a ٠ basic for the prolog language.
- Have an understanding in identifying patterns on many levels. ٠
- Be aware of a class of functions which transform a finite set into another finite set ٠ which relates to input output functions in computer science.
- Be exposed to concepts and properties of algebraic structures such as semigroups, ٠ monoids and groups.

# UNIT I SETS, RELATIONS AND FUNCTIONS

Basic Concepts - Relationships between sets-Operations on sets-Principles of inclusion and exclusion - Minterms and Maxterms of a set - Relations partial ordering relation-Equivalence relation-Binary relations-Cyclic order relation  $-a = \pmod{m}$  relations: Partitions sets - Hassee diagram- functions: Properties- Composition - inverse function 9

#### UNIT II LOGIC

Propositional logic - Logical connectivity's-Truth table-Normal forms (Connective and disjunctive)-Predicate logic-Universal and existential quantifiers induction.

# UNIT III COMBINATORICS

Basic of counting - counting arguments - Pigeonhole principle - Permutations and combinations -Recursion and Recurrence relations - Generating functions.

#### MODELLING COMPUTATION AND LANGUAGES UNIT IV

Finite state machines-Deterministic and Non-Deterministic finite state machines-Turing Machines-Formal Languages-Classes of Grammars-Type\_0 - Context Sensitive-Context-Free-Regular Grammars-Ambiguity.

# UNIT V LATICE AND BOOLEAN ALGEBRA

Partial order relation, poset-lattices, Hasse diagram-Boolean Algebra

# **REFERENCES:**

- 1. J.P.Tremblay and R.Manohar, "Discrete Mathematical Structures with Application to Computer Science", TMH,NY-1997
- 2. M.K.Venkatraman, N.Sridharan and N.Chandrasekaran, "Discrete Mathematics", The National Publishing Company,2003
- 3. K.H.Rosen, Discrete Mathematics and its Applications, Mc-Graw Hill Book, 1999.

CSE/Semester - I

со	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	1	2	3	-	-	1	
2	3	-	2	2	-	3	
3	-	-	1	-	3	2	
4	2	1	3	2	2	2	
5	2	2	1	-	1	2	
Avg	2	1.67	2	2	2	2	

# 22250H12P -ADHOCAND SENSOR NETWORK

# L T P C 40 0 4

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# AIM:

To understand the current and emerging applications of the adhoc sensor networks.

# **OBJECTIVE:**

To understand

- A broad overview of the state of wireless and ad hoc networking.
- The overview of the physical, networking and architectural issues of ad hoc networks.
- The technologies that will enable the next generation of ad hoc networks and the proliferation of ubiquitous computing.
- The sensor networks and the unique set of design challenges that they introduce.

# UNIT I AD-HOC MAC

Introduction – Issues in Ad-Hoc Wireless Networks. MAC Protocols – Issues, Classifications of MAC protocols, Multi channel MAC & Power control MAC protocol.

# UNIT II AD-HOC NETWORK ROUTING & TCP

Issues – Classifications of routing protocols – Hierarchical and Power aware. Multicast routing – Classifications, Tree based, Mesh based. Ad Hoc Transport Layer Issues. TCP Over Ad Hoc – Feedback based, TCP with explicit link, TCP-BuS, Ad Hoc TCP, and Split TCP.

# UNIT III WSN -MAC

Introduction – Sensor Network Architecture, Data dissemination, Gathering. MAC Protocols – self-organizing, Hybrid TDMA/FDMA and CSMA based MAC.

# UNIT IV WSN ROUTING, LOCALIZATION & QOS

Issues in WSN routing – OLSR, AODV. Localization – Indoor and Sensor Network Localization. QoS in WSN.

# UNIT V MESH NETWORKS

Necessity for Mesh Networks – MAC enhancements – IEEE 802.11s Architecture – Opportunistic routing – Self configuration and Auto configuration – Capacity Models – Fairness – Heterogeneous Mesh Networks – Vehicular Mesh Networks.

Total : 45 hrs

# **REFERENCES:**

1. C.Siva Ram Murthy and B.Smanoj, "Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2004.

2. Feng Zhao and Leonidas Guibas, "Wireless Sensor Networks", Morgan Kaufman Publishers, 2004.

3. C.K.Toh, "Ad Hoc Mobile Wireless Networks", Pearson Education, 2002.

4. Thomas Krag and SebastinBuettrich, "Wireless Mesh Networking", O'Reilly Publishers, 2007.

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	1	1	1	1	1	1	
2	2	2	3	2	2	1	
3	2	2	2		2		
4	1		3		3	1	
5	2	2	2	1	2		
Avg	1.60	1.75	2.20	1.33	2.00	1.00	

#### 22250H13P - ADVANCED DATA STRUCTURE LTPC 31 0 4

# AIM:

To make the learners to understand the Analysis of algorithms and Data Structures.

# **OBJECTIVES**:

To Understand

- The Different Heap Structures, Search Structures and Multimedia Structures.
- The various coding scheduling and algorithms.
- The various multimedia structures.

#### UNIT I **FUNDAMENTALS:** 9+3 Mathematical Induction -Asymptotic Notations -Properties of Big-oh Notation -Conditional Asymptotic Notation –Algorithm Analysis –Amortized Analysis -NP-Completeness –NP-Hard –Recurrence Equations –Solving Recurrence Equations –Memory Representation of Multi-Dimensional Arrays -Time-Space Tradeoff. UNIT II **HEAP STRUCTURES:** 9+3 Min/Max heaps -Deaps -Leftist Heaps -Binomial Heaps -Fibonacci Heaps -Skew Heaps -Lazy-Binomial Heaps. UNIT III **SEARCH STRUCTURE:** 9+3 Binary Search Trees - AVL Trees - Red-Black trees - Multi-way Search Trees - B-Trees -Splay Trees – Tries. UNIT IV **MULTIMEDIA STRUCTURES:** 9+3

Segment Trees -k-d Trees - Point Quad Trees -MX -Quad Trees - R-Trees -TV -Trees. 9+3

#### UNIT V **ALGORITHMS:**

Huffman Coding -Convex Hull -Topological Sort -Tree Vertex Splitting -Activity Networks -- Flow Shop Scheduling -- Counting Binary Trees -- Introduction to Randomized Algorithms.

Total :60 hrs

# REFERENCES

1. E. Horowitz, S.Sahni and Dinesh Mehta, Fundamentals of Data structures in C++, University Press, 2007.

2. E. Horowitz, S. Sahni and S. Rajasekaran, Computer Algorithms/C++, Second Edition, University Press, 2007.

3. G. Brassard and P. Bratley, Algorithmics: Theory and Practice, Printice -Hall, 1988.

4. V.S. Subramanian, Principles of Multimedia Database systems, MorganKaufman, 1998

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	3	2	2	3	1	3	
2	3	1	-	-	2	3	
3	3	-	1	1	-	2	
4	3	2	1	-	2	1	
5	3	3	1	1	-	1	
Avg	3.00	2.00	1.25	1.67	1.67	2.00	

# 22250L14P -ADVANCED WEB TECHNOLOGIES LAB

L T P C 0 0 3 3

- 1. Creation of HTML pages with frames, links, tables and other tags.
- 2. Usage of internal and external CSS along with HTML pages.
- 3. Client side Programming
  - i. Java script for displaying date and comparing two dates.
  - ii. Form Validation including text field, radio buttons, check boxes, list box and other controls.
- Usage of ASP/JSP objects response, Request, Application, Session, Server, ADO etc.

   Writing online applications such as shopping, railway/air/bus ticket reservation system
   with set of ASP/JSP pages.
  - ii. Using sessions and cookies as part of the web application.
- 5. Writing Servlet Program using HTTP Servlet.
- 6. Any online application with database access.
- 7. Creation of XML document for a specific domain.
- 8. Writing DTD or XML schema for the domain specific XML document.
- 9. Parsing an XML document using DOM and SAX Parsers.
- 10. Sample web application development in the open source environment.

со	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	3	3	3	3	3	3	
2	2	3	3	3	2	2	
3	3	1	2	2	1	2	
4	2	3	1	2	-	-	
Avg	2.5	2.5	2.25	2.5	2	2.34	

# 22250H21P - MIDDLEWARE TECHNOLOGIES

# LTPC 31 0 4

## AIM:

The aim of the course is to teach the role of middleware in the distributed environment and its common services.

# **OBJECTIVES:**

- To study the set of services that a middleware system constitutes of.
- To understand how middleware facilitates the development of distributed applications in heterogeneous environments.
- To study how it helps to incorporate application portability, distributed application component interoperability and integration.
- To learn the object oriented middleware basics through the example of the following CORBA objects.
- To understand the basics of Web services that is the most often-used middleware technique.

# UNIT - I

Introduction: What is a distributed system- Client server Architecture – Multi-tierArchitecture-Middleware - Classification of middleware- Event based middleware-Object based Middleware -Message based middleware and its Principal functions- Introduction to concepts of database middleware.

# UNIT - II

RPC & message Passing middleware - Introduction to procedure calls - Principles of RPC Architecture- Structure of Communication - Java RMI

# UNIT – III

Other middleware: Introduction to EJB- Introduction to JDBC &ODBC Interface Definition Language: Introduction to specification - IDL Identifiers-Attributes type correction -Classes-Arrays- Documentation -Any type-Modules -Interfaces- Exception handling -pre Compiler Directives -OO Design using IDL.

# UNIT-IV

CORBA: CORBA 2 Standard- Standard Object model- CORBA Architecture-CORBA Client and Object Implementation- Interface & Implementation repository-CORBA Services- Key Issues- Naming Services -Relationships- Event Services- life Cycle services- Object Query Services-properties Services-Time Services- CORBA facilities & CORBA Domains.

# UNIT –V

COM: Classes- Objects-Query Interface-Dynamic Composition-Apartments-In process Activation -Server Lifetime-Server Lifetime-COM Control- Token Security-Access management- Introduction to DCOM.

# **Total :60hrs**

# 9+3

# 9+3

9+3

# 9+3

# 9+3

# **REFERENCE BOOKS:**

1. Daniel Serian, "Middleware", Springer Verlag, 1999.

2. Troy Bryan Downing, "Java RMI: Remote Method Invocation", IDG Books India, 2000.

3. Thomas J Mowbray& William A Ruh, "Inside CORBA Distributed Objects and

Application", Addison Wesley, 1999.

4. Alan Pope, "CORBA Complete Reference Guide", Addison Wesley, 1998.

5. Don Box, "Essential Com", Addison Wesley, 1999

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	3	3	1	3	1	3	
2	2	2	2	2	2	2	
3	1	3	1	1	2	2	
4	1	2	2	2	1	1	
5	2		2	1	2	2	
Avg	1.80	2.50	1.60	1.80	1.60	2.00	

# 22250H22P - INTERNET OF THINGS

L T P C 4 0 0 4

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## AIM:

To introduce the student to various IOT techniques.

# **OBJECTIVES:**

- To understand the fundamentals of Internet of Things
- To learn about the basics of IOT protocols
- To build a small low cost embedded system using

Raspberry Pi.

• To apply the concept of Internet of Things in the real world scenario.

# UNITI INTRODUCTION TO IoT

Internet of Things - Physical Design- Logical Design- IoT Enabling Technologies - IoT Levels &Deployment Templates - Domain Specific IoTs - IoT and M2M - IoT System Management with NETCONF-YANG-IoTPlatformsDesign Methodology

# UNITII IoT ARCHITECTURE

M2Mhigh-levelETSIarchitecture-IETFarchitectureforIoT-OGCarchitecture-IoTreference model-Domainmodel-informationmodel-functionalmodel-communicationmodel-IoT reference architecture

# UNITIII IoT PROTOCOLS

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Unified Data Standards – Protocols – IEEE 802.15.4 – BAC Net Protocol – Modbus–Zig bee Architecture–Network layer–6LowPAN-CoAP-Security

# UNITIV BUILDING IoT WITH RASPBERRY PI&ARDUINO

Building IOT with RASPERRY PI-IoT Systems - Logical Design using Python – IoT Physical Devices & Endpoints - IoT Device -Building blocks -Raspberry Pi -Board - Linux on Raspberry Pi –Raspberry Pi Interfaces –Programming Raspberry Pi with Python- Other IoT Platforms- Arduino.

# UNITV CASE STUDIESAND REAL-WORLD APPLICATIONS

RealworlddesignconstraintsApplicationsAssetmanagement,Industrialautomation,smartgrid,Com mercialbuildingautomation,Smartcities- participatory sensing-Data Analytics for IoT–Software& Management Tools for IoT Cloud Storage Models & Communication APIs–Cloud for IoT-Amazon Web Services for IoT.

# **TOTAL: 45PERIODS**

# **REFERENCES:**

- 1. ArshdeepBahga, VijayMadisetti, InternetofThings-Ahands-on approach I, UniversitiesPress, 2015
- 2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), —Architecting theInternetofThingsl,Springer,2011.
- 3. HonboZhou,—TheInternetofThingsintheCloud:AMiddlewarePerspectivel, CRCPress,2012.
- 4. Jan Ho<sup>--</sup> ller, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Aves and .David Boyle, "From Machine-to-Machine totheInternetofThings- Introductiontoa NewAgeofIntelligence",Elsevier, 2014.

5. Olivier Hersent, David Boswarthick, Omar Elloumi, —The Internet of Things – KeyapplicationsandProtocols, Wiley, 2012

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	1	1	2	1	1	3	
2	3	2	1	2	3	2	
3	1	1	2	1	3	3	
4	2	3	2	1	2	2	
5	1	2	1	2	1	1	
Avg	1.60	1.80	1.60	1.40	2.00	2.20	

# 22250L24P - .NET TECHNOLOGIES LAB

L T P C 0033

# Develop the following in ASP.NET or VB.NET.

- 1. Query textbox and Displaying records
- 2. Display records by using database
- 3. Data list link control
- 4. Databinding using drop down list control
- 5. Datagrid paging

# **Develop the following in C#.NET.**

- 1. Demonstrate Use Of Virtual and override keyword in C# with a simple Program.
- 2. Write a Program in C# to implement Stack operations.
- 3. Write a Program to demonstrate Operator overloading.
- 4. Demonstrate arrays of interface types with a C# program.
- 5. Write a Program in C# to build a class which implements an interface which already exists.

со	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	3	-	3	2	3	2	
2	2	2	3	1	1	1	
3	3	-	3	2	2	2	
4	1	2	3	1	1	1	
5	2	-	3	2	2	1	
Avg	2.20	2.00	3.00	1.60	1.80	1.40	

# 22250H12 – MODERN OPERATING SYSTEM

# LTPC 4004

# AIM:

To have a thorough knowledge of processes, scheduling concepts, memory management, I/O and file systems, multimedia operating system and recent operating systems.

# **OBJECTIVES:**

- To have an overview of different types of operating systems.
- To know the components of an operating system.
- To have a thorough knowledge of process management.
- To have a thorough knowledge of storage management.
- To know the concepts of I/O and file systems.
- To know the concepts of multimedia operating systems.

# UNIT 1

Introduction-computer hardware review-operating system zoo-operating system concept-system call-Operating system Structure-Process and Threads: Processes-Threads-Interprocessor-Communication-Scheduling.

# UNIT II

Memory Management Memory: Abstraction: Address, spaces, No memory Abstraction-Virtual Memory-

Page Replacement Algorithm-Modeling Place Replacement Algorithm-Design Issue for paging system Segmentation-File system: File Directives File System Implementation.

# UNIT III

Deadlocks-Introduction to Deadlock-The Ostrich Algorithm-Deadlock Detection and Recovery-Deadlock Avoidance-Deadlock Preventation-Other Issues-Input/output Principles of I/O Hardware-Principle of I/O Software-I/O Software Layer-Disks-Locks-Thin Clients.

# UNIT IV

Multiple Processor system-multiprocessor-multicomputer-virtualization-distributed system-multimedia Operating System-Multimedia files-video compression audio compression-multimedia scheduling-Disk scheduling for multimedia.

# UNIT V

Case Study - LINUX, WINDOWS VISTA, SYMBIAN OS

Total: 45 hrs

# **TEXT BOOK:**

1. Andrew S. Tanenbaum, "Modern Operating Systems", Pearson Education, 3<sup>rd</sup> Edition, 2009

# CSE/Semester - I

# **REFERENCE BOOKS:**

- 1. Silberschatz, Galvin, Gagne "Operating System Concepts" Sixth Edition, 2003
- 2. Achut S. Godbole and KahateAtul, "Operating Systems & Systems Programming ", Tata Mcgraw Hill, 2003.
- 3. Charles Crowley, "Operating systems: A Design Oriented Approach", Tata McGraw Hill, 999.

со	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	1	3	2	2	1	3	
2	2	2	3	2	1	-	
3	1	1	-	3	2	1	
4	1	1	2	1	2	2	
5	-	-	-	-	-	-	
Avg	1.25	1.75	2.33	2.00	1.50	2.00	

# 22250E32P - MACHINE LEARNING TECHNIQUES

LTPC 4004

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# AIM:

The main objective of this paper is to make the students to know the need of Machine Learning Techniques.

# **OBJECTIVES:**

To introduce students to the basic concepts and techniques of Machine Learning. To have a thorough understanding of the Supervised and Unsupervised learning techniques To study the various probability based learning techniques To understand graphical models of machine learning algorithms

#### UNITI **INTRODUCTION**

Learning - Types of Machine Learning - Supervised Learning - The Brain and the –Design a Learning System -Perspectives and Issues in Machine Learning Neuron Concept Learning Task–Concept Learning as Search–Finding a Maximally Specific Hypothesis- Version Spaces and the Candidate Elimination Algorithm -Linear Discriminants – Perceptron – Linear Separability –Linear Regression.

#### UNITH **LINEARMODELS**

Multi-layer Perceptron - Going Forwards - Going Backwards: Back Propagation Error -Multi-layer Perceptron in Practice - Examples of using the MLP - Overview Deriving Back-Propagation-RadialBasisFunctionsandSplines-Concepts-RBFNetwork-Curse of Dimensionality-Interpolations and Basis Functions-Support Vector Machines. 9

#### TREE ANDPROBABILISTICMODELS UNITII

Learning with Trees- Decision Trees-Constructing Decision Trees-Classification and Regression Trees-Ensemble Learning-Boosting-Bagging-Different ways to Combine Classifiers-Probability and Learning-Data into Probabilities-Basic Statistics-Gaussian Mixture Models-Nearest Neighbor-Methods-Unsupervised Learning-K means Algorithm-Vector Quantization-Self Organizing Feature Map.

UNITIV DIMENSIONALITY REDUCTION AND ENVOLUTIONARY MODELS Dimensionality Reduction-Linear Discriminant Analysis-Principal Component Analysis-Factor Analysis-Independent Component Analysis-Locally Linear Embedding-Isoman-Least Square Optimization-Evolutionary Learning-Genetic Algorithm-Genetic Off spring-Genetic Operator-Using Genetic Algorithm-Reinforcement Learning-Overview-Getting Lost Example-Makrov Decision Process.

# UNITV GRAPHICALMODELS

Markov ChainMonteCarloMethods–Sampling–ProposalDistribution–MarkovChainMonte Carlo– Graphical Models–Bayesian Networks–Markov Random Fields– Hidden Markov Models– Tracking Methods

# Total: 45 hrs

9

# **REFERENCES:**

- 1. EthemAlpaydin,—IntroductiontoMachineLearning3e(AdaptiveComputationandMachineLearning Series)||, ThirdEdition,MITPress,2014
- 2. JasonBell,—MachinelearningHandsonforDevelopersandTechnicalProfessionals||,FirstE dition,Wiley, 2014
- 3. PeterFlach,—MachineLearning:TheArtandScienceofAlgorithmsthatMakeSenseofDatal,First Editio n, Cambridge University Press,2012.
- 4. Stephen Marsland, --- Machine Learning--
- 5. AnAlgorithmicPerspectivel,SecondEdition,ChapmanandHall/CRCMachineLearningan dPatter nRecognitionSeries,2014.
- 6. TomMMitchell,—MachineLearningl,FirstEdition,McGrawHillEducation,2013.

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	2	2	1	3	3	2	
2	1	1	1	3	2	1	
3	2	1	2	3	3	3	
4	1	2	2	1	2	3	
5	2	2	3	3	1	3	
Avg	1.60	1.60	1.80	2.60	2.20	2.40	

# 22250H41P - OBJECT ORIENTED SOFTWARE ENGINEERING LTPC 4004

# AIM:

To learn the advanced software engineering principles and methodologies for Effective software development.

## **OBJECTIVES:**

- To learn about software prototyping, analysis and design.
- To learn UML and its usage.
- Case studies to apply the principles.

# UNIT - 1 INTRODUCTION 8

Software Engineering Paradigms - Software Development process models - Project & Process - Project management – Process & Project metrics - Object Oriented concepts & Principles.

# UNIT - 2PLANNING & SCHEDULING9Software prototyping - Software project planning - Scope - Resources - Software Estimation -Empirical Estimation Models-Planning-Risk Management - Software Project Scheduling -Object Oriented Estimation & Scheduling.

UNIT - 3ANALYSIS & DESIGN12Analysis Modeling - Data Modeling - Functional Modeling & Information Flow-Behavioral<br/>Modeling-Structured Analysis - Object Oriented Analysis - Domain Analysis-Objectoriented<br/>Analysis process - Object Relationship Model - Object Behaviour Model. Design Concepts &<br/>Principles - Design Process - Design Concepts - Modular Design – Design Effective Modularity -<br/>Introduction to Software Architecture - Data Design – TransformMapping – Transaction<br/>Mapping – OOD - Design System design process - Object design process -Design Patterns.12

# UNIT - 4 IMPLEMENTATION & TESTING 8

Top-Down, Bottom-Up, object oriented product Implementation& Integration. Software testing methods-White Box, Basis Path-Control Structure –Black Box-Unit Testing- Integration testing-Validation & System testing. Testing OOA & OOD models-Object oriented testing strategies.

# UNIT – 5 MAINTENANCE

Maintenance process-System documentation-program evolution dynamics-Maintenance costs-Maintainability measurement – Case StudiesThe laboratory shall include development of systems applying the Software Engineering principles and methods for specific applications.

Total: 45 hrs

#### CSE/Semester - II

8

#### **TEXT BOOKS:**

1. Roger S. Pressman, "Software Engineering A Practitioner's Approach", Fifth Edition, Tata McGraw Hill.

2. Grady Booch, James Rumbaugh, Ivar Jacobson – "the Unified Modeling Language User Guide" – Addison Wesley, 1999. (Unit III)

#### **REFERENCE BOOKS:**

1. Ian Sommerville, "Software Engineering", V Edition Addison- Wesley 1996.

2. PankajJalote "An Integrated Approach to Software Engineering" Narosa Publishing House 1991

3. Carlo Ghezzi Mehdi Jazayer, Dino Mandrioli "Fudamentals of Software Engineering"Prentice Hall of India 2002.

4. Fairley, "Software Engineering Concepts", Mc.Graw Hill 1985.

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	3	3	3	3	3	3	
2	2	3	3	3	2	2	
3	3	1	2	2	1	2	
4	2	3	1	2	-	-	
Avg	2.5	2.5	2.25	2.5	2	2.34	

# 22250H42P - SOFTWARE PROJECT MANAGEMEN

# AIM:

Software Project Management provides insight to the importance of careful project management

# **OBJECTIVES:**

- Understand Project planning and management.
- Identify Client management and project definition.
- Understand testing based approach to development.
- Team management and ongoing schedule tracking.

# UNIT I FUNDAMENTALS

Conventional Software Management – Evolution of Software Economics – Improving Software Economics – Conventional versus Modern Software Project Management.

UNIT IISOFTWARE MANAGEMENT PROCESS FRAMEWORK9Lifecycle Phases – Artifacts of the Process – Model Based Software Architectures – Workflowsof the Process – Checkpoints of the Process.

## UNIT III SOFTWARE MANAGEMENT DISCIPLINES

Iterative Process Planning – Organization and Responsibilities – Process Automation – Process Control and Process Instrumentation – Tailoring the Process.

UNIT IVMANAGED AND OPTIMIZED PROCESS9Data Gathering and Analysis – Principles of Data Gathering – Data Gathering Process –<br/>Software Measures – Data Analysis – Managing Software Quality – Defect Prevention.9UNIT VCASE STUDIES9COCOMO Cost Estimation Model – Change Metrics – CCPDS–R.9

# **TEXT BOOKS:**

1. Walker Royce "Software Project Management A Unified Framework", Pearson Education, 2004

2. Humphrey Watts, "Managing the software process", Addison Wesley, 1989. (Unit IV) **REFERENCES:** 

1. Ramesh Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.

2. Bob Hughes, Mikecotterell, "Software Project Management", 3rd Edition, Tata cGraw Hill, 2004.

СО	POs							
	PO1	PO2	PO3	PO4	PO5	PO6		
1	3	3	3	3	2	3		
2	2	2	2	3	2	3		
3	3	1	1	2	1	3		
4	2	2	2	3	2	1		
5	1	1	1	3	1	2		
Avg	2.20	1.80	1.80	2.80	1.60	2.40		

Total: 45hrs

LTPC 4004

# 22250CRM - RESEARCH METHODOLOGY

LTPC 3003

# AIM:

To give an exposure to development of research questions and the various statistical methods suitable to address them through available literature, with basic computational operators.

# **OBJECTIVES:**

- To understand the approaches towards and constraints in good research.
- To identify various statistical tools used in research methodology
- To appreciate and compose the manuscript for publication
- To train in basic computational and excel- skills for research in engineering.

# **OUTCOME:**

Ability to develop research questions and the various research strategies, and compile research results in terms of journal manuscripts.

# **PREREQUISITES:**

Research Methodology course in UG level or equivalent knowledge.

# UNIT I

Introduction to Research — Criteria of Good Research, Research Problem: Definition of research problem, selecting the problem - Necessity of defining the problem - Techniques involved in defining the problem-Basic principles of experimental Designs-Descriptive and experimental design – different types of experimental design – Validity of findings – internal and external validity – Variables in Research – Measurement and Scaling – Different scales. Ethics & Misconduct in research, Plagiarism,

# UNIT II

Formulation of Hypothesis – Sampling techniques –Sampling error and sample size-Methods of data collection – Primary and secondary data – observation – Collection of literature, manual collection from library, usage of library, collection of literature from Scopus, Science Direct etc., compiling literature, software utilization in literature collection- Processing and analysis of data – editing – coding – transcription – tabulation –outline of statistical analysis.

## **UNIT III**

Data Analysis using Excel- Tabulation of Data in excel (Creating Master Table and Sub Table), Formulas and Functions, Filters and Sort and Validation Lists, Data from External Sources. Data Analysis Using Charts and Graphs(Pivot Table & Charts), Time Value of Money, Measure of central tendency: mean, median, mode, Measure of dispersion: variance, standard deviation, Coefficient of variation. Correlation, regression lines. Z-test, t- test F-test, ANOVA one way classification, Chi square test, independence of attributes. Time series: forecasting Method of least squares, Moving average method, Introduction to presentation tool, features and functions, Creating Presentation, Customizing presentation.

#### **UNIT IV**

Various r e s e a r c h M e t h o d s -Design o f Experiments, Response Surface Methodology, Taguchi Methods- Modeling & Simulation of Engineering Systems, Artificial Neural Networks, Fuzzy Logic, MATLAB - Graph Theory- Finite Element Methods, Computational Fluid Dynamics -R programming in Statistics- open source software

### UNIT V

Review of literature, Report writing – target audience – types of reports – contents of reports – styles and Conventions in reporting – steps in drafting a report. Basic concept of research paper writing for Journals and formats of publications in Journals, Report Structure - writing research abstract - introduction, review of literature, result, conclusions, Concepts of Bibliography and references

# **References**:

1. C. R. Kothari, Research Methodology, New Age International Publishers. New Delhi, 2004.

2. Rajammal.P. Devadas, 1976, A hand book of methodology of research, RMM Vidyalaya Press.

3. R.A Day and A.L. Underwood, Quantitative analysis, Prentice Hall, 1999.

4. R. Gopalan, Thesis writing, Vijay Nicole Imprints Private Ltd., 2005.

5. W.J. DeCoursey, Statistics and Probability for Engineering Applications With Microsoft® Excel, Newnes, 2003.

6. Archibald Fripp, Jon Fripp, Michael Fripp; Just-in-Time Math for Engineers, Elsevier Science & Technology Books, 2003.

# SESEMESTER - I - ELECTIVE - I 22250E23AP - ADVANCED DISTRIBUTED COMPUTING

L T P C 4 0 0 4

9

# AIM:

This course discusses the depth concepts of distributed computing and its features.

# **OBJECTIVES:**

Understanding the concepts of

- processing . distributed systems, operating system issues.
- learn about distributed transaction
- study about the distributed databases.

# UNIT-I INTRODUCTION

Characterization of Distributed Systems - Examples - Resource Sharing and the Web - Challenges – System Models - Architectural and Fundamental Models - Networking and Internetworking - Types of Networks - Network Principles - Internet Protocols - Case Studies: Ethernet, WiFi.

# UNIT-II PROCESSES AND DISTRIBUTED OBJECTS

Interprocess Communication - The API for the Internet Protocols - External Data Representation and Marshalling - Client-Server Communication - Group Communication - Case Study: Interprocess communication in UNIX - Distributed Objects and Remote Invocation -Communication Between Distributed Objects - Remote Procedure Call - Events and Notifications - Case Study: Java RMI.

# UNIT-III OPERATING SYSTEM ISSUES 9

The OS Layer - Protection - Processes and Threads - Communication and Invocation - OS Architecture - Security - Overview - Cryptographic Algorithms - Digital Signatures - Cryptography Pragmatics - Case Studies Kerberos, 802.11 WiFi - Distributed File Systems - File Service Architecture - Sun Network File System - Distributed Debugging - Distributed Mutual Exclusion - Elections - Multicast Communication Related Problems.

# UNIT-IV DISTRIBUTED TRANSACTION PROCESSING 9 Transactions - Nested Transactions - Locks - Optimistic Concurrency Control - Timestamp Ordering - Comparison - Flat and Nested Distributed Transactions - Atomic Commit Protocols -Concurrency Control in Distributed Transactions - Transaction Recovery - Overview of Replication And Distributed Multimedia Systems.

# UNIT-V DISTRIBUTED DATABASES

9

Features of Distributed versus Centralized Databases -Principles of Distributed Databases -Levels of Distribution Transparency -Reference Architecture for Distributed Databases - Types of Data Fragmentation - Integrity Constraints in Distributed Databases.

> Total : 45 hrs CSE/Elective –II/Semester - II

# **TEXT BOOKS :**

1 George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Pearson Education, 4th Edition, 2005.

1. Distributed Database Principles & Systems, Stefano Ceri, Giuseppe Pelagatti McGraw -Hill

# **REFERENCES:**

1 SapeMullender, "Distributed Systems", Addison Wesley, 2 nd Edition, 1993.

2 Albert Fleishman, "Distributes Systems - Software Design and Implementation", Springer - Verlag, 1994.

3 M.L.Liu, "Distributed Computing Principles and Applications", Pearson Education, 2004.

4 Andrew S Tanenbaum, Maartenvan Steen,"Distributed Systems –Principles and Pardigms",Pearson Education, 2002.

5 Mugesh Singhal, Niranjan G Shivaratri, "Advanced Concepts in Operating Systems", Tata McGraw Hill Edition, 2001.

7. Principles of Distributed Database Systems, M.Tamer Ozsu, Patrick Valduriez –Pearson Education.

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	3	2	2	3	1	3	
2	3	1	-	-	2	3	
3	3	-	1	1	-	2	
4	3	2	1	-	2	1	
5	3	3	1	1	-	1	
Avg	3.00	2.00	1.25	1.67	1.67	2.00	

# CSE/Elective –II/Semester - II 22250E23BP- DATA WAREHOUSING & DATA MINING LTPC 4004

# AIM:

To serve the students with an emphasis on the design aspects of Data Mining and Data Warehousing.

# **OBJECTIVES:**

• To introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues, and implication. Core topics like classification, clustering and association rules are exhaustively dealt with.

• To introduce the concept of data warehousing with special emphasis on architecture and design.

# UNIT-I INTRODUCTION

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining, Data Warehousing and Business Analysis: - Data warehousing Components –Building a Data warehouse – Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata – reporting – Query tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.

#### UNIT-II DATA MINING AND ASSOCIATION RULE MINING 9 Data Mining - Data Mining Functionalities – Data Preprocessing – Data Cleaning –

Data Mining: - Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

Association Rule Mining: - Efficient and Scalable Frequent Item set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

# UNIT-III CLASSIFICATION AND PREDICTION

Classification and Prediction: - Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification –

Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

9

# UNIT IV CLUSTER ANALYSIS

Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High- Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

# UNIT VMINING OTHER DATA9Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and<br/>Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining<br/>– Text Mining – Mining the World Wide Web.

# TOTAL = 45HRS

9

# **REFERENCES:**

1. Jiawei Han and Micheline Kamber "Data Mining Concepts and Techniques" Second Edition, Elsevier, Reprinted 2008.

2. Alex Berson and Stephen J. Smith "Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, Tenth Reprint 2007.

3. K.P. Soman, Shyam Diwakar and V. Ajay "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.

4. G. K. Gupta "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.

5. Pang-Ning Tan, Michael Steinbach and Vipin Kumar "Introduction to Data Mining", Pearson Education, 2007.

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	-	-	2	2	3	2	
2	3	2	3	-	-	-	
3	2	-	-	2	3	3	
4	3	3	-	2	3	3	
5	2	3	3	2	3	3	
Avg	2.5	2.7	2.7	2	3	2.75	

# 22250E23C- ARTIFICIAL NEURAL NETWORKS LTPC 4004

# AIM:

To give out the students with an importance on the various aspects of artificial neural networks.

## **OBJECTIVES:**

- To introduce the concepts of artificial neural networks such as biological neural networks, clustering and structures
- To study the linear models for regression, classification, kernel methods and feed forward neural networks

# UNIT-I Introduction to artificial neural networks 9

Biological neural networks - Pattern analysis tasks: Classification, Regression, Clustering - Computational models of neurons - Structures of neural networks - Learning principles.

# UNIT-IILinear models for regression and classification9Polynomial curve fitting - Bayesian curve fitting - Linear basis function models - Bias -<br/>variance decomposition - Bayesian linear regression - Least squares for classification - Logistic

# UNIT-IIIFeedforward neural networks9Pattern classification using perception - Multilayer feed forward neural networks(MLFFNNs) - Pattern classification and regression using MLFFNNs - Error back propagationlearning - Fast learning methods: Conjugate gradient method – Auto associative neural networks- Bayesian neural networks.

# UNIT-IV Kernel methods for pattern analysis

regression for classification - Bayesian logistic regression for classification

Statistical learning theory - Support vector machines for pattern classification - Support vector regression for function approximation - Relevance vector machines for classification and regression - **Self-organizing maps:** Pattern clustering - Topological mapping - Kohonen's self-organizing map.

# UNIT-V Feedback neural networks 9 Pattern storage and retrieval - Hopfield model - Boltzmann machine - Recurrent neural networks.

# Total: 45 hrs

# **TEXT BOOKS:**

- 1. B.Yegnanarayana, Artificial Neural Networks, Prentice Hall of India, 1999
- 2. Satish Kumar, Neural Networks A Classroom Approach, Tata McGraw-Hill, 2003
- 3. S.Haykin, Neural Networks A Comprehensive Foundation, Prentice Hall, 1998
- 4. C.M.Bishop, Pattern Recognition and Machine Learning, Springer, 2006

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	3	3	1	3	1	3	
2	2	2	2	2	2	2	
3	1	3	1	1	2	2	
4	1	2	2	2	1	1	
5	2		2	1	2	2	
Avg	1.80	2.50	1.60	1.80	1.60	2.00	

	SEMES	STER - III ·	- ELECTIV	<b>'E</b> - II			
	22250E33AI	P - MULTI	MEDIA S	YSTEMS	]	LTPC 4004	
AIM: To imp	art knowledge o	on Multimedia	system and de	sion			
OBJECTIVE	S:		system and de.	sign.			
• To stuc	ly the graphics t	echniques and	algorithms				
<ul> <li>To stud</li> </ul>	ly the multimed	ia concepts and	l various I/O te	chnologies			
UNIT 1 Intro	duction	iu concepto une		ennorogies	9		
Line - Curve	and Ellipse D	rawing Algori	thms – Attrib	outes – Two-I	Dimensional C	Geometric	
Transformation	ns – Two-Dime	nsional Clippir	ng and Viewing	g.			
UNIT II Thre	e-Dimensional	Concepts	0		9		
Three-Dimens	ional Object F	Representations	s – Three-Dir	mensional Ge	ometric and	Modeling	
Transformation	ns – Three-Dim	ensional Viewi	ing – Color me	odels – Animat	ion.	-	
UNIT IIIMult	timedia System	ıs Design			9		
An Introducti	on – Multimed	dia application	is – Multimed	dia System A	rchitecture –	Evolving	
technologies f	or Multimedia	- Defining ol	bjects for Mu	ltimedia syste	ms – Multime	edia Data	
interface stand	ards – Multime	dia Databases.					
UNIT IVMult	UNIT IVMultimedia File Handling 9						
Compression &	& Decompression	on – Data & Fi	le Format stan	dards – Multin	nedia I/O techi	nologies -	
$\mathbf{D}^{\prime} \cdot \cdot 1 \cdot 1$	1 1' T						
Digital voice	and audio $-$ V	/ideo image a	nd animation	– Full motion	n video – Sto	orage and	
retrieval.	and audio $-$ V	/ideo image a	nd animation	– Full motion	n video – Sto	orage and	
retrieval. UNIT V Hype	and audio – V ermedia	/ideo image a	nd animation	– Full motion	n video – Sto 9	orage and	
retrieval. UNIT V Hype Multimedia A	and audio – V ermedia .uthoring & U	ser Interface	nd animation – Hypermedia	– Full motion a messaging -	n video – Sto 9 Mobile Mes	ssaging –	
Digital voice retrieval. <b>UNIT V Hype</b> Multimedia A Hypermedia r	and audio – V ermedia uthoring & U nessage compo	/ideo image a ser Interface onent – Creati	nd animation – Hypermedia ng Hypermed	– Full motion a messaging - ia message –	n video – Sto 9 Mobile Mes Integrated m	orage and ssaging – ultimedia	
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2	I	1	1	2	1	2
3	2	1	-	-	2	2
4	1	-	2	1	1	2
5	2	1	1	1	2	2
	3	1	2	1	2	3
Avg	1.80	1.00	1.50	1.25	1.60	2.20
						33

# 22250E33BP- GENETIC ALGORITHMS

LTPC 40 0 4

# AIM:

To make the students learn the fundamentals of Genetic Algorithms and search technique used in computing.

# **OBJECTIVES:**

1. Understand and be able to apply fundamental GA theory.

- 2. be able to implement or modify simple genetic algorithms.
- 3. be able to apply GAs to problems in the student's field.
- 4. to find exact or approximate solutions to optimization and search problems.

# UNIT-I

Introduction : Abrief history of evolutionary computation, Elements of Genetic Algorithms, A simple genetic algorithm, Applications of genetic algorithms. Genetic Algorithms in Scientific models - Evolving computer programs, data analysis & prediction, evolving neural networks, modeling interaction between learning & evolution, modeling sexual selection, measuring evolutionary activity.

# **UNIT-II**

**Theoretical Foundation of genetic algorithm :**Schemas & Two-Armed and k-armed problem, royal roads, exact mathematical models of simple genetic algorithms, Statistical- Mechanics Approaches.

## **UNIT-III**

**Computer Implementation of Genetic Algorithm :** Data structures, Reproduction, crossover & mutation, mapping objective functions to fitness form, fitness scaling, coding, a multiparameter, mapped, fixed point coding, discretization and constraints.

# **UNIT-IV**

Some applications of genetic algorithms : The risk of genetic algorithms, De Jong & function optimization, Improvement in basic techniques, current application of genetic algorithms

## **UNIT-V**

Advanced operators & techniques in genetic search :Dominance, duplicity, & abeyance, inversion &otherreordering operators, other micro operators, Niche & speciation, multi objective optimization, knowledge based techniques, genetic algorithms & parallel processors.

## **TEXT BOOKS:**

1. David E. Goldberg, "Genetic algorithms in search, optimization & Machine Learning" Pearson Education, 2006

# CSE/Elective -I/Semester - I

## 35

9

Total: 45hrs

# 9

# 9

# **REFERENCE BOOKS:**

- 1. Melanle Mitchell, "An introduction to genetic algorithms", Prentice HallIndia, 2002.
- 2. Michael D. Vose, "The simple genetic algorithm foundations and theory, Prentice Hall India, 1999.
- 3. Masatoshi Sakawa, "Genetic Algorithms & Fuzzy Multiobjective Optimization", Kluwer Academic Publisher, 2001
- 4. D. Quagliarella, J Periaux, C Poloni& G Winter, "Genetic Algorithms in Engineering & Computer science", John Wiley & Sons, First edition, 1997

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	3	3	1	3	1	3	
2	2	2	2	2	2	2	
3	1	3	1	1	2	2	
4	1	2	2	2	1	1	
5	2		2	1	2	2	
Avg	1.80	2.50	1.60	1.80	1.60	2.00	

# 22250E33CP- SOFTWARE METRICS

L T P C 40 0 4

# AIM:

To understand software quality metrics.

# **OBJECTIVES:**

- To introduce an integrated approach to software development incorporating quality management methodologies.
- To study about the quality improvements in software
- To understand the Software Quality software standards

# UNIT I MEASUREMENTS THEORY

- Measurements In Software Engineering - Scope Of Software Metrics - Measurements Theory - Goal Based Framework – Software Measurement Validation.

# UNIT II DATA COLLECTION AND ANALYSIS

Empirical Investigation - Planning Experiments - Software Metrics Data Collection - Analysis Methods – Statistical Methods.

# **UNIT III PRODUCTS METRICS**

Measurement Of Internet Product Attributes - Size And Structure - External Product Attributes - Measurement Of Quality.

# UNIT IV QUALITY METRICS

Software Quality Metrics - Product Quality - Process Quality - Metrics For Software Maintenance - Case Studies Of Metrics Program - Motorola - Hp And IBM.

# **UNIT V MANAGEMENT METRICS**

Quality Management Models - Rayleigh Model - Problem Tracking Report (PTR) Model - Reliability Growth Model - Model Evaluation - Orthogonal Classification.

# TOTAL = 45hr

# **REFERENCES:**

**1.** Norman E – Fentar, Share Lawrence Pflieger, "Software Metrics", International Thomson Computer Press, 1997.

**2.** Stephen H. Kin, "Metric and Models in Software Quality Engineering", Addison Wesley

СО	POs							
	PO1	PO2	PO3	PO4	PO5	PO6		
1	3	2	2	3	1	3		
2	3	1	-	-	2	3		
3	3	-	1	1	-	2		
4	3	2	1	-	2	1		
5	3	3	1	1	-	1		
Avg	3.00	2.00	1.25	1.67	1.67	2.00		

# **SEMESTER - IV -** ELECTIVE - III

# 22250E43AP- SERVICE ORIENTED ARCHITECTURE

#### AIM:

To familiarize the students with the concepts of service oriented architectures. (SOA).

# **OBJECTIVES:**

- Understand SOA, service orientation and web services
- Analyzing and designing business based on SOA principles. •
- Learning the concepts of XML.

# UNIT I

Software Architecture - Types of IT Architecture - SOA - Evolution - Key components perspective of SOA - Enterprise-wide SOA - Architecture - Enterprise Applications -Solution Architecture for enterprise application - Software platforms for enterprise Applications -Patterns for SOA – SOA programming models.

# UNIT II

Service-oriented Analysis and Design – Design of Activity, Data, Client and business process services - Technologies of SOA - SOAP - WSDL - JAX - WS - XML WS for.NET - Service integration with ESB – Scenario – Business case for SOA – stake holder objectives – benefits of SPA – Cost Savings

## UNIT III

SOA implementation and Governance – strategy – SOA development – SOA governance – trends in SOA – event-driven architecture – software s a service – SOA technologies – proof-ofconcept - process orchestration - SOA best practices

# UNIT IV

Meta data management – XML security – XML signature – XML Encryption – SAML – XACML – XKMS – WS-Security – Security in web service framework – advanced messaging

# UNIT V

Transaction processing – paradigm – protocols and coordination – transaction specifications – SOA in mobile – research issues

Total: 45 hrs

## 39

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# **REFERENCES:**

1. Shankar Kambhampaly, "Service – Oriented Architecture for Enterprise Applications", Wiley India Pvt Ltd, 2008.

2. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Pearson Education.
 3. Mark O' Neill, et al., "Web Services Security", Tata McGraw-Hill Edition, 2003.

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	1	2	1	3	1	1	
2	2	3	1	2	1	2	
3	1	1	2	1	-	2	
4	2	2	-	-	-	3	
5	3	3	1	1	1	3	
Avg	1.80	2.20	1.25	1.75	1.00	2.20	

# AIM: 22250E43BP - HIGH SPEED NETWORKS

# L T P C 40 0 4

To study the various performance and analysis issues involved in high-speed data transmission.

# **OBJECTIVES:**

Be able to

- Describe and interpret the basics of high speed networking technologies.
- Apply the concept learnt in this course to optimize and troubleshoot high-speed network.
- Demonstrate the knowledge of network planning and optimization

# **UNIT - 1 : HIGH SPEED NETWORKS**

Frame Relay Networks - Asynchronous transfer mode - ATM Protocol Architecture, ATM logical Connection, ATM Cell - ATM Service Categories - AAL. High Speed LANs: Fast Ethernet, Gigabit Ethernet, Fiber Channel - Wireless LANs: applications, requirements - Architecture of 802.11

# **UNIT - 2: CONGESTION AND TRAFFIC MANAGEMENT**

Queuing Analysis- Queuing Models - Single Server Queues - Effects of Congestion - Congestion Control - Traffic Management - Congestion Control in Packet Switching Networks - Frame Relay Congestion Control.

# UNIT - 3: TCP AND ATM CONGESTION CONTROL

TCP Flow control - TCP Congestion Control - Retransmission - Timer Management -Exponential RTO backoff - KARN's Algorithm - Window management - Performance of TCP over ATM. Traffic and Congestion control in ATM - Requirements - Attributes - Traffic Management Frame work, Traffic Control - ABR traffic Management - ABR rate control, RM cell formats, ABR Capacity allocations - GFR traffic management.

# UNIT - 4: INTEGRATED AND DIFFERENTIATED SERVICES

Integrated Services Architecture - Approach, Components, Services- Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ - Random Early Detection, Differentiated Services

# **UNIT - 5 : PROTOCOLS FOR QOS SUPPORT**

RSVP - Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms -Multiprotocol Label Switching - Operations, Label Stacking, Protocol details - RTP - Protocol Architecture, Data Transfer Protocol, RTCP.

Total: 45 hrs

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# **TEXT BOOK:**

1. William Stallings, "HIGH SPEED NETWORKS AND INTERNET", Pearson Education, Second Edition, 2002.

# **REFERENCES:**

1. Warland & Pravin Varaiya, "HIGH PERFORMANCE COMMUNICATION NETWORKS", Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.

2. Irvan Pepelnjk, Jim Guichard and Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	1	3	2	-	1	-	
2	1	3	3	3	-	1	
3	1	3	3	2	2	2	
4	1	2	2	1	2	1	
5	1	3	1	1	1	2	
Avg	1.00	2.80	2.20	1.75	1.50	1.50	

# 22250E43CP- EMBEDDED SYSTEMS

**AIM:** To give sufficient background for embedded systems design.

# **OBJECTIVES:**

- To introduce students to the embedded systems, its hardware and software.
- To introduce devices and buses used for embedded networking.
- To explain programming concepts and embedded programming in C and C++.
- To explain real time operating systems, inter-task communication and an exemplary case of MUCOS IIRTOS.

# UNIT-I INTRODUCTION TO EMBEDDED SYSTEMS

Definition and Classification – Overview of Processors and hardware units in an embedded system – Software embedded into the system – Exemplary Embedded Systems – Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits

# UNIT-II DEVICES AND BUSES FOR DEVICES NETWORK

I/O Devices - Device I/O Types and Examples – Synchronous - Iso-synchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices - UART and HDLC - Parallel Port Devices - Sophisticated interfacing features in Devices/Ports- Timer and Counting Devices - '12C', 'USB', 'CAN' and advanced I/O Serial high speed buses- ISA, PCI, PCI-X, cPCI and advanced buses.

# UNIT-III EMBEDDED PROGRAMMING

Programming in assembly language (ALP) vs. High Level Language - C Program Elements, Macros and functions -Use of Pointers - NULL Pointers - Use of Function Calls – Multiple function calls in a Cyclic Order in the Main Function Pointers – Function Queues and Interrupt Service Routines Queues Pointers – Concepts of EMBEDDED PROGRAMMING in C++ -Objected Oriented Programming – Embedded Programming in C++, 'C' Program compilers – Cross compiler – Optimization of memory codes.

# UNIT-IV REAL TIME OPERATING SYSTEMS – PART - 1

OS Services – Interrupt Routines Handling, Task scheduling models - Handling of task scheduling and latency and deadlines as performance metrics - Inter Process Communication and Synchronisation – Shared data problem – Use of Semaphore(s) – Priority Inversion Problem and Deadlock Situations – Inter Process Communications using Signals – Semaphore Flag or mutex as Resource key – Message Queues – Mailboxes – Pipes – Virtual (Logical) Sockets – RPCs.

# UNIT-V REAL TIME OPERATING SYSTEMS – PART - 2

Study of RTOS, VxWorks - Basic Features - Task Management Library at the System - Library Header File - VxWorks System Functions and System Tasks - Inter Process (Task) Communication Functions - Case Study of Coding for Sending Application Layer Byte Streams on a TCP/IP Network Using RTOS Vxworks

**Total : 45hrs** 43

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# **REFERENCE:**

- 1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw Hill, First reprint 2003
- 2. David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	1	3	2	-	1	-	
2	1	3	3	3	-	1	
3	1	3	3	2	2	2	
4	1	2	2	1	2	1	
5	1	3	1	1	1	2	
Avg	1.00	2.80	2.20	1.75	1.50	1.50	

#### **SEMESTER - V - ELECTIVE - IV** LTPC 40 0 4 22250E51AP - CLOUD COMPUTING

# AIM:

To acquire basic knowledge on cloud computing and its applications.

#### **OBJECTIVES:**

- Identify cloud computing models, characteristics, and technologies.
- Get knowledge about the different architectures in cloud.
- Identify the information about service management and cloud securities.

# UNIT-I

Overview of Computing Paradigm- Recent trends in Computing - Evolution of cloud computing - Introduction to Cloud Computing -Cloud Computing (NIST Model)- Properties, Characteristics & Disadvantages - Cloud computing vs. Cluster computing vs. Grid computing - Role of Open Standards

# **UNIT-II**

Cloud Computing Architecture - Cloud computing stack - Service Models (XaaS) -Infrastructure as a Service(IaaS) - Platform as a Service(PaaS) - Software as a Service(SaaS)-**Deployment Models** 

# UNIT-III

Infrastructure as a Service(IaaS) - Introduction to IaaS - Resource Virtualization – Examples. Platform as a Service(PaaS) - Introduction to PaaS - Cloud Platform and Management -Examples - Software as a Service(SaaS) - Introduction to SaaS

# UNIT-IV

Service Management in Cloud Computing - Service Level Agreements(SLAs)- Identity & Access Management - Access Control - Trust, Reputation, Risk - Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations - Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations.

#### UNIT-V

Cloud Security - Infrastructure Security - Network level security - Host level security -Application level security - Data security and Storage - Data privacy and security Issues, Jurisdictional issues raised by Data location -Case Study on Open Source & Commercial Clouds – Eucalyptus - Microsoft Azure - Amazon EC2.

#### Total:45hrs

#### 45

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# **REFERENCE BOOKS:**

- 1. Cloud Computing Bible, BarrieSosinsky, Wiley-India, 2010
- 2. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wile, 2011
- 3. Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012
- 4. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	-	-	-	2	2	1	
2	2	3	1	-	-	1	
3	3	-	3	-	1	3	
4	-	-	-	2	-	3	
5	3	2	-	-	-	-	
Avg	2.6	2.5	2	2	1.5	2	

# AIM: 22250E51BP- SPEECH PROCESSING AND SYNTHESIS

To study about the Speech Processing and Synthesis

# **OBJECTIVES**

- To understand the mathematical foundations needed for speech processing
- To understand the basic concepts and algorithms of speech processing and synthesis to familiarize the students with the various speech signal representation, coding and recognition techniques
- To appreciate the use of speech processing in current technologies and to expose the students to real– world applications of speech processing

# UNITI FUNDAMENTALSOFSPEECHPROCESSING

Introduction – Spoken Language Structure – Phonetics and Phonology – Syllables andWords-SyntaxandSemantics–Probability,StatisticsandInformationTheory– ProbabilityTheory– EstimationTheory–SignificanceTesting–InformationTheory.

# UNITII SPEECHSIGNALREPRESENTATIONSANDCODING

Overview of Digital Signal Processing – Speech Signal Representations – Short time Fourier Analysis – Acoustic Model of Speech Production – Linear Predictive Coding – CepstralProcessing–FormantFrequencies–TheRoleofPitch–SpeechCoding–LPCCoder.

# UNITIII SPEECHRECOGNITION

Hidden Markov Models – Definition – Continuous and Discontinuous HMMs – Practical Issues – Limitations. Acoustic Modeling – Variability in the Speech Signal – Extracting Features – Phonetic Modeling – Adaptive Techniques – Confidence Measures – Other Techniques.

# UNITIV TEXTANALYSIS

Lexicon – Document Structure Detection – Text Normalization – Linguistic Analysis –Homograph Disambiguation–Morphological Analysis–Letter-to-sound Conversion– Prosody–Generationschematic–SpeakingStyle–SymbolicProsody–Duration Assignment–Pitch Generation

# UNITV SPEECHSYNTHESIS

Attributes–FormantSpeechSynthesis–ConcatenativeSpeechSynthesis–Prosodic Modification of Speech–Source-filter Models for Prosody Modification– Evaluation of TTS Systems.

TOTAL: 45 PERIODS

LTPC 4004

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# **REFERENCES:**

- 1. JosephMariani,—LanguageandSpeechProcessing|,Wiley,2009.
- 2. LawrenceRabinerandBiingHwangJuang,—FundamentalsofSpeechRecogni tionl,PrenticeHallSignal ProcessingSeries,1993.
- 3. SadaokiFurui,—DigitalSpeechProcessing:Synthesis,andRecognition,SecondEdition,(Sig nal Processing and Communications)||, Marcel Dekker,2000.
- 4. ThomasF.Quatieri,—Discrete-TimeSpeechSignalProcessing,PearsonEducation,2002.
- 5. Xuedong Huang ,Alex Acero, HsiaoWuenHon,—Spoken Language Processing–A guide to Theory, Algorithm and System Development I,Prentice HallPTR,2001.

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	1	1	3	-	2	3	
2	2	1	-	2	1	3	
3	3	1	2	3	2	3	
4	-	2	2	-	1	3	
5	2	2	-	3	3	3	
Avg	2.00	1.40	2.33	2.67	1.80	3.00	

# 22250E51CP- SOFT COMPUTING

L T P C 40 0 4

## AIM:

To understand the concepts of Artificial Intelligence, ANN, Genetic Algorithms and Fuzzy systems and its applications.

# **OBJECTIVES:**

- To introduce the ideas of Neural networks, fuzzy logic and use of heuristics base on human experience.
- To have a general understanding of soft computing methodologies, including artificial neural networks, fuzzy sets, fuzzy logic, fuzzy clustering techniques and genetic algorithms;
- To Design and development of certain scientific and commercial application using computational neural network models, fuzzy models, fuzzy clustering applications and genetic algorithms in specified 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.

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# UNIT-V APPLICATION OF COMPUTATIONAL INTELLIGENCE

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

# Total: 45 hrs

8

# **TEXTBOOK:**

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

# **REFERENCES:**

 Timothy J. Ross, "Fuzzy Logic with Engineering Application ", McGraw Hill, 1977.
 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.

4. R. Eberhart, P. Simpson and R. Dobbins, "Computational Intelligence PC Tools", AP Professional, Boston, 1996.

СО	POs							
	PO1	PO2	PO3	PO4	PO5	PO6		
1	3	3	1	3	1	3		
2	2	2	2	2	2	2		
3	1	3	1	1	2	2		
4	1	2	2	2	1	1		
5	2		2	1	2	2		
Avg	1.80	2.50	1.60	1.80	1.60	2.00		

# SEMESTER - V - ELECTIVE - V 22250E52AP-ADVANCED DATABASE TECHNOLOGY

L T P C 40 0 4

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## AIM:

To prepare the student to understand, develop, and manage more advanced database applications.

# **OBJECTIVES:**

Be able to

Know the operations of parallel and distributed databases. Understand the structure s and standards of object relational databases. Get familiar with the concepts of XML, Mobile and Multimedia Databases.

# UNIT-I PARALLEL AND DISTRIBUTED DATABASES

Database System Architectures: Centralized and Client-Server Architectures – ServerSystem Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/OParallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism –Distributed Database Concepts - Distributed Data Storage – Distributed Transactions –Commit Protocols – Concurrency Control – Distributed Query Processing – Three TierClient Server Architecture-Case Studies.

## UNIT-II OBJECT AND OBJECT RELATIONAL DATABASES

Concepts for Object Databases: Object Identity – Object structure – TypeConstructors – Encapsulation of Operations – Methods – Persistence – Type and ClassHierarchies – Inheritance – Complex Objects – Object Database Standards, Languagesand Design: ODMG Model – ODL – OQL – Object Relational and Extended – RelationalSystems : Object Relational featuresinSQL/Oracle – Case Studies.

## UNIT-III XML DATABASES

XML Databases: XML Data Model – DTD - XML Schema - XML Querying – WebDatabases – JDBC – Information Retrieval – Data Warehousing – Data Mining

# UNIT-IV MOBILE DATABASES

Mobile Databases: Location and Handoff Management - Effect of Mobility on DataManagement - Location Dependent Data Distribution - Mobile Transaction Models -Concurrency Control - Transaction Commit Protocols- Mobile Database RecoverySchemes.

# UNIT-V MULTIMEDIA DATABASES

Multidimensional Data Structures – Image Databases – Text/Document Databases-Video Databases – Audio Databases – Multimedia Database Design.

Total = 45 hrs

# **REFERENCES:**

1. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education/Addison Wesley, 2007.

2. Thomas Cannolly and Carolyn Begg, "Database Systems, A Practical Approachto Design, Implementation and Management", Third Edition, Pearson Education, 2007.

3. Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database SystemConcepts", Fifth Edition, McGraw Hill, 2006.

4. C.J.Date, A.Kannan and S.Swamynathan,"An Introduction to DatabaseSystems", Eighth Edition, Pearson Education, 2006.

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	PO1	PO2	PO3	PO4	PO5	PO6
1	2	2	1	3	1	2
2	2		-	2		
3	3	1	2	1	-	1
4	3	2	2	1	1	1
5	2	3	1	1	-	1
Avg	2.40	2.00	1.50	1.60	1.00	1.20

# 22250E52BP - RECONFIGURABLE COMPUTING

4004

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# AIM:

To understand about the Reconfigurable Computing.

# **OBJECTIVES:**

- To understand the need for reconfigurable computing
- To expose the students to various device architectures
- To examine the various reconfigurable computing systems
- To understand the different types of compute models for programming reconfigurable
- architectures
- To expose the students to HDL programming and familiarize with the development
- environment
- To expose the students to the various placement and routing protocols
- To develop applications with FPGAs

# UNITI DEVICEARCHITECTURE

GeneralPurposeComputingVsReconfigurableComputingSimpleProgrammableLogic Devices–ComplexProgrammableLogicDevices–FPGAs– Device Architecture-Case Studies.

# UNITII RECONFIGURABLECOMPUTINGARCHITECTURESANDSYSTEMS

Reconfigurable Processing Fabric Architectures– RPF Integration into Traditional Computing Systems– Reconfigurable Computing Systems– Case Studies–Reconfiguration Management.

# UNITIII PROGRAMMINGRECONFIGURABLESYSTEMS 9 Compute Models-Programming FPGA Applications in HDL– CompilingCforSpatialComputing– 9

# OperatingSystemSupportforReconfigurableComputing. UNITIV MAPPINGDESIGNS TORECONFIGURABLEPLATFORMS The Design Flow -Technology Mapping–FPGA Placement and Routing–

ConfigurationBitstreamGeneration–CaseStudieswithAppropriateTools.

# UNITV APPLICATIONDEVELOPMENTWITH FPGAS

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CaseStudies of FPGAA pplications-System on a Programmable Chip (SoPC) Designs.

# **TOTAL:45PERIODS**

# **REFERENCES:**

- 1. ChristopheBobda,—IntroductiontoReconfigurableComputing–Architectures, AlgorithmsandApplicationsI,Springer,2010.
- 2. MayaB.GokhaleandPaulS.Graham,—ReconfigurableComputing:Acce leratingComputationwithField-Programmable GateArraysl,Springer,2005.
- **3.** FPGAFrontiers:NewApplicationsinReconfigurableComputing,2017,NicoleHem soth, Timothy Prickett Morgan, Next Platform.
- 4. Reconfigurable Computing:From FPGAstoHardware/SoftwareCodesign 2011Editionby JoaoCardoso(Editor),Michael Hübne, Springer
- 5. ScottHauckandAndreDehon(Eds.),—ReconfigurableComputing– The Theory and PracticeofFPGA- BasedComputationl, Elsevier/MorganKaufmann,2008.

со	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	2	2	3	1	-	-	
2	-	-	2	3	2	3	
3	1	-	1	-	1	3	
4	3	1	-	-	3	-	
5	1	-	-	2	3	-	
Avg	1.75	1.5	2	2	2.25	3	

# 22250E52CP - GREEN COMPUTING

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# AIM:

To Understand Green Technology and to implement Green computing practices to efficiently use the computers and its resources.

# **OBJECTIVES:**

- Understanding scientific and social environment.
- Minimizing energy consumption from the IT estate.
- Purchasing green energy and using green suppliers.
- Reducing the paper and other consumables used.
- Minimizing equipment disposal requirements.

#### UNIT-I

Origins, Regulations and industry initiatives- Government, Industry.

# UNIT-II

Approaches to green computing- Product longevity, Algorithmic efficiency.

# UNIT-III

Resource allocation, Virtualization.

## **UNIT-IV**

Terminal servers, Power management, Operating system support, Power supply, Storage, Video card, Display.

## UNIT-V

Web, Temporal and Spatial Data Mining Materials recycling, Telecommuting, Middleware support for green computing, Tools for monitoring, HPC computing, Green Mobile, embedded computing and networking, Management Frameworks Standards and metrics for computing green

# **Total: 45hrs**

# **REFERENCES:**

 Green Computing and Green IT Best Practices on Regulations and Industry Initiatives, Virtualization, Power Management, Materials Recycling and Telecommuting by Jason Harris.
 Green IT: Reduce Your Information System's Environmental Impact While Adding to the Bottom Line. By Toby Velte (Author), Anthony Velte (Author), Robert Elsenpeter (Author), MC-Grow Hill

3. The Greening of IT-How Companies Can Make a Difference for the Environment by John Lamb.

СО	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	1	2	3	-	1	-	
2	1	2	3	-	2	-	
3	-	1	3	2	3	2	
4	2	-	2	2	1	3	
5	3	-	1	2	3	3	
Avg	1.75	1.7	2.4	2	2	2.73	

# SEMESTER - V - ELECTIVE - VI 22250E53AP - SOFTWARE QUALITY ASSURANCE

L T P C 40 0 4

# AIM:

To develop the ability to analyze and estimate the quality of the software.

# **OBJECTIVES:**

- To introduce an integrated approach to software development incorporating quality management methodologies.
- To study about the quality improvements in software
- To understand the Software Quality software standards

## UNIT I

**Introduction to software quality** - challenges – objectives – quality factors – components of SQA– contract review – development and quality plans – SQA components in project life cycle –SQA defect removal policies – Reviews

# UNIT II

**Basics of software testing** – test generation from requirements – finite state models – combinatorial designs - test selection, minimization and prioritization for regression testing – test adequacy, assessment and enhancement

# UNIT III

**Testing strategies** – white box and black box approach – integration testing – system and acceptance testing – performance testing – regression testing - internationalization testing – adhoc testing – website testing – usability testing – accessibility testing Test plan – management – execution and reporting – software test automation –automated testing tools

## UNIT IV

**Hierarchical models of software quality** – software quality metrics –function points – Software product quality – software maintenance quality – effect of case tools – software quality infrastructure – procedures – certifications – configuration management – documentation control.

# UNIT V

**Project progress control** – costs – quality management standards – project process standards – management and its role in SQA – SQA unit

Total = 45hrs

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# REFERENCES

1. 1.Daniel Galin, Software quality assurance – from theory to implementation, Pearson education, 2009.

2. Aditya Mathur, Foundations of software testing, Pearson Education, 2008.

3. Srinivasan Desikan and Gopalaswamy Ramesh, Software testing – principles and practices, Pearson education, 2006.

4. Ron Patton, Software Testing, second edition, Pearson education, 2007.

со	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	
1	3	3	3	3	2	3	
2	2	2	2	3	2	3	
3	3	1	1	2	1	3	
4	2	2	2	3	2	1	
5	1	1	1	3	1	2	
Avg	2.20	1.80	1.80	2.80	1.60	2.40	

# 22250E53BP - BIO-INFORMATICS

L T P C 40 0 4

# AIM:

To impart knowledge, on basic techniques of Bioinformatics.

# **OBJECTIVES:**

- Build a solid foundation and acquire the vocabulary you need to supervise or to communicate with others who use these tools.
- To have ability to design drugs.
- To understand Evolutionary Trees and Phylogeny.
- Learn the key methods and tools used in bioinformatics.

# UNIT I FUNDAMENTALS 7

The Central Dogma – Killer Application – Parallel Universes – Watson's Definition – Top Down Vs Bottom Up Approach – Information Flow – Conversance – Communications.

# UNIT II DATABASE AND NETWORKS 9

Definition – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation – Networks Communication Models – Transmission Technology – Protocols – Bandwidth – Topology – Contents – Security – Ownership – Implementation.

# UNIT III SEARCH ENGINES AND DATA VISUALIZATION 10

Search Process – Technologies – Searching and Information Theory – Computational Methods – Knowledge Management – Sequence Visualizations – Structure Visualizations – User Interfaces – Animation Vs Simulation.

# UNIT IV STATISTICS- DATA MINING AND PATTERN MATCHING 11

Statistical Concepts – Micro Arrays – Imperfect Data – Basics – Quantifying – Randomness – Data Analysis – Tools Selection – Alignment – Clustering – Classification – Data Mining Methods – Technology – Infrastructure Pattern Recognition – Discovery – Machine Learning – Text Mining – Pattern Matching Fundamentals – Dot Matrix Analysis – Substitution Matrix – Dynamic Programming – Word Method – Bayesian Method – Multiple Sequence Alignment Tools.

# UNIT V MODELING SIMULATION AND COLLABORATION 8

Drug Discovery Fundamentals – Protein Structure – System Biology Tools – Collaboration and Communication – Standards – Issues – Case Study.

# **Total: 45hrs**

# **TEXT BOOK:**

1. Bryan Bergeron, "Bio Informatics Computing", Prentice Hall, 2003.

# **REFERENCES:**

 T.K. Affward, D.J. Parry Smith, "Introduction to Bio Informatics", Pearson Education, 2001.
 Pierre Baldi, Soren Brunak, "Bio Informatics The Machine Learning Approach", 2nd Edition, First East West Press, 2003.

СО	POs							
	PO1	PO2	PO3	PO4	PO5	PO6		
1	1	1	-	-	-	3		
2	1	1	2	2	1	2		
3	1	2	1	1	3	3		
4	1	2	2	2	2	2		
5	1	2	1	-	2	3		
Avg	1.00	1.60	1.50	1.67	2.00	2.60		

# AIM: 22250E53CP - WIRELESS APPLICATION PROTOCOLS L T P C 40 0 4

To introduction the advanced element in the field of wireless communication.

# **OBJECTIVE:**

- Be able to discuss current and emerging technology in Wireless technology.
- Understand fundamental trends of technological evolution of Wireless technology.
- Have hands-on knowledge in developing simple and comprehensive WAP contents.
- Be able to create simple Wireless applications.

# UNIT-I:

Wireless Concepts - Technologies - An Overview of WAP - WAP Application Environment -

WAP Gateways - WAP Gateway Services and Security.

# **UNIT-II:**

WAP Components - Specification - Standard Execution Environment - Agent Characters - Main Protocols - WTP/WSP/WDP(UDPYWEMP Transportation and WTLS Protocol.

# UNIT-III:

WAP Design and Development - The Development Tools - WML Language - WML Script Language.

# **UNIT-IV:**

Implementing an Enterprise WAP Strategy, Wireless transmission- Spread spectrum - MAC -

SDMA - FDMA - TDMA - CDMA - Cellular Wireless Networks.

# UNIT-V:

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Application Area of WAP: Wireless Operator's Interrelated Services -Mailbox Management -Searching the Phone Directory - Managing Personal Information.

# Total:45hrs

# **TEXT BOOKS:**

1. Steve Mann & Scott Sbihli, - Wireless Application Protocols - Wiley Computer Publishing - 2000

2. S. Ruseyev - WAP Technology & Applications - Earwax Press - 2003.

# **REFERENCE BOOKS:**

1. Sandeep singhal, Jari Alwinen., -The Wireless Application Protocol: Writing Applications for the Mobile Internet - Addison Wesley Publications - 2000.

со	pos						
	po1	po2	ро3	po4	po5	po6	
1	-	-	2	2	3	2	
2	3	2	3	-	-	-	
3	2	-	-	2	3	3	
4	3	3	-	2	3	3	
5	2	3	3	2	3	3	
avg	2.5	2.7	2.7	2	3	2.75	