J.J. College of Arts and Science(Autonomous)

J.J.Nagar, Sivapuram Post, Pudukkottai - 622 422

NAAC REACCREDITED WITH 'A' GRADE

M.Sc. COMPUTER SCIENCE

Course Structure under Autonomous Status

Under Choice Based Credit System

For the candidates admitted from the academic year 2019 - 2020 onwards

Sem.	Course Code	Course Title	Hrs / Week	Credit	Exam Hrs	Internal	External	Total
I	P1R1CSCC1	Mathematical Foundation for Computer Science	6	5	3	25	75	100
	P1R1CSCC2	OOAD and UML	6	5	3	25	75	100
	P1R1CSCC3	Web Design	6	5	3	25	75	100
	P1R1CSCC4P	Web Design Practical	6	5	3	40	60	100
	P1R1CSEC1	Any one from the list	6	3	3	25	75	100
		Total	**30**	**23**				**500**
II	P2R1CSCC5	Distributed Operating System	5	5	3	25	75	100
	P2R1CSCC6	Compiler Design	5	5	3	25	75	100
	P2R1CSCC7	Advanced Java Programming	5	5	3	25	75	100
	P2R1CSCC8P	Advanced Java Practical	5	5	3	40	60	100
	P2R1CSCC9	Design and Analysis of Algorithms	5	5	3	25	75	100
	P2R1CSEC2	Any one from the list	5	3	3	25	75	100
		Total	**30**	**28**				**600**

III	P3R1CSCC10	Digital Image Processing	5	5	3	25	75	100
	P3R1CSCC11	Distributed Technology	5	5	3	25	75	100
	P3R1CSCC12P	Distributed Technology Practical	5	5	3	40	60	100
	P3R1CSCC13	Data mining and Data warehousing	5	5	3	25	75	100
	P3R1CSCC14	Cloud Computing	5	5	3	25	75	100
	P3R1CSEC3	Any one from the list given below	5	3	3	25	75	100
		Total	**30**	**28**				**600**
IV	P4R1CSEC4	EC IV (Anyone from the list)	6	3	3	25	75	100
	P4R1CSCC15PW	Project Work	24	8		20	80	100
		Total	**3 0**	**11**				**200**
		Grand Total	**120**	**90**				**1900**

CC - Core Course
EC - Elective Course

Elective Courses (Any four to be chosen from the list)

1. Mobile Communication
2. Big Data Analytics
3. Network Security
4. Software Quality Assurance and testing
5. Artificial Intelligence and Expert System
6. Pervasive Computing
7. Human Computer Interaction
8. Internet of Things

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Core Course – II

OOAD AND UML

Subject Code	**: P1R1CSCC2**	**CIA**	**: 25**
Semester	**: I**	**EXT**	**: 75**
Instructional Hours	**: 72**	**Total**	**: 100**
Credit	**: 5**		

Objectives:

- To teach the basics of OO analysis and design skills.
- To describe the UML design diagrams.
- To teach mapping design to code.
- To be exposed to the various testing techniques.
- To provide knowledge about various design patterns

Unit – I The Object Model (13 Hours)

The Object Model: The evolution of the object model – Elements of the object model – Applying object model. Classes and Objects: The nature of an object – Relationships among objects.

Unit – II Classes and objects (14 Hours)

Classes and objects: The nature of the class – Relationship among classes – The Interlay of Classes and Objects – On building quality classes and objects. Classification: The importance of proper classification – Identifying proper classes and objects – Key abstraction mechanism.

Unit – III Introduction to UML (14 Hours)

Introduction to UML- Development Process- The Class Diagram: Essentials - Sequence Diagrams- Object Diagrams

Unit – IV UML Diagrams (14 Hours)

Package Diagrams-Deployment Diagrams- Use Cases- State Machine Diagram

Unit – V UML Diagrams (13 Hours)

Activity Diagram- Communication diagram-Component Diagram-Collaborations Interaction Diagram –Timing Diagram

Unit – VI (Latest learnings for CIA only) (4 Hours)

Latest development related to the course during the semester concerned.

Text Books:

1. Grady Booch, "Object Oriented Analysis and Design", Addison Wesley, 1994. [**Unit I – II:** Chapters:2-4]
2. Martin Fowler, Kendall Scott, "UML Distilled", Addison Wesley, 3rd Edition, 2007 [**Unit III – V:** Chapters:1-4, 6-12, 14-17]

Reference Books:

1. James Rumbaugh, Ivar Jacobson, Grady Booch, "The Unified Modeling Language Reference Manual", Addison Wesley, 1999.
2. Erich Gamma, "Design Patterns", Addison Wesley.
3. James Rumbough et al, "Object Oriented Modeling and Design", 1991.
4. Ivar Jacobson, "Object Oriented Software Engineering; A Use Case Driven Approach", Addison Wesley, 1994. 5. Eriksson, "UML Tool Kit", Addison Wesley.

Web References:

1. **https://www.tutorialspoint.com/object_oriented_analysis_design/ooad_object_oriented_model.htm**
2. **https://www.uml-diagrams.org/**
3. **https://www.geeksforgeeks.org/unified-modeling-language-uml-object-diagrams**

Course Outcomes:

At the end of this course, the student would be able to:

- Use the UML analysis and design diagrams.
- Design and implement projects using OO concepts.
- Apply appropriate design patterns.
- Create code from design.
- Compare and contrast various testing techniques.

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Core Course – III

WEB DESIGN

Subject Code	**: P1R1CSCC3**		
Semester	**: I**	**CIA**	**: 25**
Instructional Hours	**: 72**	**EXT**	**: 75**
Credit	**: 5**	**Total**	**: 100**

Objectives:

- To impart knowledge about the web based technologies and their applications.
- To teach the basics of web designing and to use open source tools.
- To provide ample knowledge about the open source PHP
- To provide knowledge about scripting languages.
- To inculcate learning about the design issues

Unit – I Fundamentals (14 Hours)

Introduction to the web - Web- enabling Technologies - Web service Protocol – Web Design concepts - Examining good and bad web design - Page Design Resources. Page design - HTML - Web page style considerations - Page composition - Type faces- Tag parameters – Color and graphics for web pages - WYSIWYG web page editor - Dream weaver.

Unit – II Advance Design Issues (13 Hours)

Advanced Page design - Tables and frames -Preparing graphics and animations forms -Cascading style sheets - User interface design - Page grid - Page templates - Usability testing.

Unit – III Open Source (14 Hours)

PHP: Introduction – language reference – basic syntax – variables- constants – expressions – operators – control structures – functions- classes – objects –exceptions. MYSQL: Introduction – working with mysql – executing sql commands using mysql

Unit – IV Scripting in Design (14 Hours)

Typography and Graphic design for the web - Creating transparent GIF – Lean graphics - Image maps – Palette map - Web programming - Web site Garage - W3C HTML validation services - Net mechanic - DHTML - XML.

Unit – V Tools and Applications (13 Hours)

Online Applications - Developing an on-line shopping application - Data Base design issues - connecting Data Base with tools such as Java, ASP, Cold Fusion- Designing Portals and Vortals.

Unit –VI (Latest learnings for CIA only) (4 Hours)

Latest development related to the course during the semester concerned

Text Book :

1 Deitel and Deitel, Internet and World Wide Web how to program, Prentice Hall, 2000.

Reference Books:

1. Bob Breed Love, Web Programming Unleashed, Sams net Publications, 1996.
2. DHTML `O' Reiley Publications, 2000.
3. Tim Converse, Joyce Park and Clark Morgan,"PHP 5 and MySQL", Wiley india reprint, 2008. 2. Robert Sheldon, Geoff Moes, "Beginning MySQL", Wrox, 2005.
4. Alexis Leon and Mathews Leon, "Database Management Systems", Vikas, 2008.

Course Outcomes:

After completing the course, the students would be able to

- Understand about the web based technologies and their applications.
- Understand to use open source tools.
- Write scripts using PHP.
- Create their own portal in web programming.
- Gain knowledge about web editors

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Core Course – IV

WEB DESIGN PRACTICAL

Subject Code	**: P1R1CSCC4P**		
Semester	**: I**	**CIA**	**: 40**
Instructional Hours	**: 72**	**EXT**	**: 60**
Credit	**: 5**	**Total**	**: 100**

Objectives:

- To make the students work on basic html and create static pages
- To move on them to the other markup XML
- To make them practice coding on client side scripts
- To train them handling php scripts.
- Finally to make them connect web programming with databases

1. Static pages (using only HTML) of an online Book store.
2. Dynamic web page for college portal using HTML.
3. Create and save an XML document at the server, which contains 10 users information. Take User Id as input and returns the user details by taking the user information from the XML document.
4. Using JavaScript sort given array in ascending and descending order.
5. 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.
6. PHP program that adds products that are selected from a web page to a shopping cart.
7. PHP program to access the data stored in a MYSQL table.
8. PHP program interface to create a database and to insert a table into it.
   a. PHP program using classes to create a table.
   b. PHP program to upload a file to the server.
9. PHP program to create a directory, and to read contents from the directory.
10. MySQL table and execute queries to read, add, remove and modify a record from that table.

Course Outcomes:

At the end of this course the students would have learnt

- Designing web pages of their own with markup languages
- Creating embedded scripts
- Styling their web pages with CSS
- Creating scripts with PHP
- Connecting scripts with databases

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CORE COURSE – V

DISTRIBUTED OPERATING SYSTEM

Subject Code	**: P2R1CSCC5**		
Semester	**: II**	**CIA**	**: 25**
Instructional Hours	**: 60**	**EXT**	**: 75**
Credit	**: 5**	**Total**	**: 100**

Objectives:

- To understand the basics of DOS
- To understand the concept of communication in distributed system
- To understand the concept of synchronization in distributed system
- To gain knowledge on processes and processor in Distributed System.
- To learn the mechanisms involved in distributed file system.

Unit – I Introduction to DOS (12 Hours)

What is Distributed System – Goals – Advantages and Disadvantages of DOS – Hardware concepts – Multi computers – Software concept – Network Operating System – Multi - Purpose Time Sharing System – Design Issues – Characteristics.

Unit – II Communication in Distributed System (11 Hours)

Communication in Distributed Systems: Layered Protocols – Asynchronous Transfer Mode (ATM) Networks – ATM Switching – Client/Server Model – Addressing – Group Communications.

Unit – III Synchronization in Distributed System (11 Hours)

Clock Synchronization – Mutual Exclusion – Election Algorithm – Bully Algorithm – Ring Algorithm – Atomic Transactions: Transaction Model – Implementation – Concurrency – Control – Dead Lock In Distributed Systems: Detection and Prevention.

Unit – IV Processes and Processors in Distributed System (12 Hours)

Threads – Introduction – Thread usage – Design issues for thread packages – Implementing a Thread Packages – System Models: The Workstation Model – Using Idle Workstation – The Processor Pool Model – Hybrid Model – Processor Allocation – Fault Tolerance.

Unit – V Distributed File System (11 Hours)

Distributed File System Design: The File Service Interface – Directory Server Interface – Semantics of File Sharing – Distributed File System Implementation – Trends – New Hardware – Scalability – WAN – Mobile Users – Distributed Shared Memory – Introduction – What is Shared Memory.

Unit – VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text Book:

1. "Distributed Operating System" by Andrew S.Tanenbaum, Pearson Education.
   Unit-1 [Chapter 1], Unit-II [Chapters 2.1,2.2,2.3,2.5] , Unit-III [Chapter 3], Unit-IV [Chapter 4] , Unit-V [Chapters 5.1, 5.2, 6.2, 6.3, 6.4]

Reference Book:

1. **"**Distributed Operating System Concept and Design" , Pradeep.K & Singh

Course Outcomes:

At the end of this course, student would be able to

- Understand the different Distributed Systems and the challenges involved in Design of the Distributed Systems.
- Aware about how computing power is created and synchronized in Distributed systems
- Design and Implement Distributed applications using Technologies like RPC, threads.
- Learn how to store data in Distributed File System.
- Understand How Distributed Shared Memory is managed.

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Core Course – VI

COMPILER DESIGN

Subject Code	**: P2R1CSCC6**		
Semester	**: II**	**CIA**	**: 25**
Instructional Hours	**: 60**	**EXT**	**: 75**
Credit	**: 5**	**Total**	**: 100**

Objectives:

- To introduce the major concept areas of language translation and compiler design
- To encourage them to know the compilation of coding
- To enrich the knowledge in various phases of compiler and its use, code optimization techniques, machine code generation, and use of symbol table
- To teach them well about Intermediate code generation
- To extend the knowledge of parser by parsing LL parser and LR parser

Unit – I Introduction to Compiler (12 Hours)

Introduction –Language processors – The structure of a compiler — Lexical Analysis: Role of Lexical Analyzer – Input Buffering – Specification of Tokens-Recognition of Tokens – Finite Automata: NFA – DFA _ Conversion of NFA to DFA

Unit – II Syntax Analysis (12 Hours)

Role of the parser, – Context – Free Grammars – Writing a Grammar - Top Down parsing : Recursive Descent parsing – FIRST and FOLLOW – LL(1) Grammars – Non Recursive Predictive parsing – Bottom – Up parsing : Reductions – Handle Pruning - Shift Reduce Parsing –Introduction to LR parsing : Simple LR.

Unit – III Intermediate Code Generation (11 Hours)

Intermediate Code Generation – Variants of Syntax Trees – Three -Address Code – Back patching - Runtime Environments: Storage Organization – Stack Allocation of space

Unit – IV Code Generation (11 Hours)

Issues in the design of code generator – The target Language — Basic Blocks and Flow Graphs – Optimization of basic Blocks – A simple Code generator – Peephole optimization

Unit – V Code Optimization (11 Hours)

Principal Sources of Optimization –Introduction to Global Data Flow Analysis — Constant Propagation – partial redundancy elimination - Loops in Flow Graphs: Dominator – Depth- First Ordering

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text Book:

1. "Compilers – Principles, Techniques and Tools", Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffy D.Ullman, Pearson India Education Services Pvt. Ltd., 2015.
   [Unit I – Chapter: 1 – 1.1, 1.2: Chapter 3 – 3.1, 3.2, 3.3, 3.4.1 – 3.4.3, 3.6 , 3.7.1; **Unit II** – Chapter: 4.1.1 , 4.2 , 4.3, 4.4.1 – 4.4.4, 4.5.1 – 4.5.3, 4.6.1. – 4.6.4; **Unit III** – Chapter: 6.1, 6.2, 6.7, 7.1, 7.2; **Unit IV** – Chapter: 8.1, 8.3, 8.4, 8.5, 8.6, 8.7; **Unit V** – Chapter: 9.1, 9.2, 9.4, 9.5, 9.6.1, 9.6.2;]

Reference Books:

1. "Practice and Principles of Compiler Building with C", Henk Alblas and Albert Nymeyer, PHI, 2001
2. Kenneth C. Louden,"Compiler Construction : Principles and Practices ", Thompson Learning, 2003.

Course Outcomes:

After completing the course, students would be able to

- Know the various phases of compiler and its use.
- Acquire knowledge about the compilation of coding.
- Understand the steps in Intermediate code generation.
- Understand the various code optimization techniques, machine code generation, and use of symbol table.
- Acquire knowledge of parser by parsing LL parser and LR parser.

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Core Course – VII

ADVANCED JAVA PROGRAMMING

Subject Code	**: P2R1CSCC7**	**CIA**	**: 25**
Semester	**: II**	**EXT**	**: 75**
Instructional Hours	**: 60**	**Total**	**: 100**
Credit	**: 5**		

Objectives:

- To provide knowledge about JDBC and its classes
- To give details about the effective use of Java generic types
- To communicate between processes using network sockets
- To inculcate knowledge about Java beans
- To develop web pages using advance server-side programming through servlets

Unit – I JDBC (12 Hours)

JDBC Overview - Connection Class - Meta Data Function - SQL Exception - SQL warning - Statement - Result Set - Other JDBC Classes.

Unit – II Networking (11 Hours)

Structured - TCP / IP client sockets - TCP / IP server sockets - URL - URL Connection - Datagrams - Client / Server application using RMI.

Unit – III Java Beans (11 Hours)

Bean Development Kit - Jar Files - Introspection - Design Pattern for properties, events and methods - Constrained Properties - Persistence - Customizers.

Unit – IV Servlet (12 Hours)

Life Cycle of Servlet – A simple Servlet – Servlet Package - Reading Servlet Parameters -HTTP Servlet Package - Cookies - Session Tracking.

Unit – V A Tour of Swing (11 Hours)

JApplet – Icons and Labels – Text Fields - Buttons – Combo boxes – Tabbed Panes – Scroll Panes - Trees – Tables.

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text Books

1. Herbert Schildt, "The Complete Reference : Jave 2", Tata McGraw Hill fifth edition.
   [**Unit – II** : Chapters - 18, 24; **Unit – III:** Chapters – 25; **Unit – IV**: Chapters – 27; **Unit – V**: Chapters – 26, Chapter - 21;]
2. C. Muthu - "Programming with Java".
   [**Unit – I**: Chapters – 18]

Reference Books:

1. Deitel & Deitel, "Java How to Program", Prentice Hall, 5th Edition, 2002.
2. "Java Fundamentals – A Comprehensive Introduction" – Herbert Schildt , Dale Skrien, McGraw Hill Education; 1st edition (1 July 2017), ISBN-13: 978-1259006593

Course Outcomes:

After completing the course, the students would be able to

- Acquire understanding about JDBC and its classes.
- Understand the basics of Java JDK tools.
- Write programs in Swing, JDBC, Beans and servlet concepts.
- Work on servlets.
- Develop Java client/server applications.

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Core Course – VIII

ADVANCED JAVA PROGRAMMING PRACTICAL

Subject Code	**: P2R1CSCC8P**	**CIA**	**: 40**
Semester	**: II**	**EXT**	**: 60**
Instructional Hours	**: 60**	**Total**	**: 100**
Credit	**: 5**		

Objectives:

- To train the students to work on applets
- To make practice swing controls
- To train the students create Cookie and its methods
- Servlets are also created and worked on
- To encourage the students to create Java bean

1. Applet which will play two sound notes in a sequence continuously use the play() methods available in the applet class and the methods in the Audio clip interface.
2. JApplet using swing control, which will create the layout shown below and handle necessary events.

   Enter your Name:
   Enter your Age:
   Select your s/w: * Oracle *Visual Basic *Java
   Select your city : *Delhi *Mumbai *Chennai
   OK Cancel
3. Create Table, insert and update data.
4. Client/Server application using RMI.
5. Cookie and set the expiry time of the same.
6. Servlet to count the number of visitors to a web page.
7. Form and validate a password using Servlet.
8. Java Bean to demonstrate the use of the same.
9. Convert an image in RGB to a Gray scale image.
10. Chat Server using Java.

Course Outcomes:

At the end of the course the students would be trained

- To work on applets.
- To make swing controls.
- To create Cookie and its life cycle.
- To create Servlets and work on it.
- To create Java bean.

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Core Course – IX

DESIGN AND ANALYSIS OF ALGORITHMS

Subject Code	**: P2R1CSCC9**	**CIA**	**: 25**
Semester	**: II**	**EXT**	**: 75**
Instructional Hours	**: 60**	**Total**	**: 100**
Credit	**: 5**		

Objectives:

- To teach fundamentals of algorithm
- To teach the technique of Divide and Conquer and the related problems
- To teach the paradigms of decrease and conquer and transform and conquer
- To illustrate efficiency of dynamic programming and its related problems
- To provide understanding about backtracking and branch and bound

Unit – I Introduction and Fundamentals of the analysis of algorithm efficiency (11 Hours)

Introduction: What is Algorithm - Fundamentals of algorithmic problem solving – Important problem types –Fundamental of data structure**s**

Unit – II Fundamentals of the analysis of algorithm efficiency & Divide-and-Conquer (12 Hours)

Analysis Framework- Asymptotic Notations and Basic Efficiency Classes- Mathematical Analysis of Non recursive Algorithms- Mathematical Analysis of Recursive Algorithms- Merge sort – Quick sort – Binary search – Binary tree traversal and Related Properties– Multiplication of large integers – Strassen's matrix multiplication

Unit – III Decreases-and-Conquer and Transform-and-Conquer (11 Hours)

Insertion Sort : Depth-First Search and Breadth-First Search-Topological Sorting- Balanced - Search Trees – Heaps and heap sort- problem Reduction-Hashing- B-Trees

Unit – IV Dynamic Programming (11 Hours)

Dynamic Programming: Computing a Binomial coefficient- Warshall's and Floyd's Algorithms- Optimal Binary Search Trees- The Knapsack Problem and Memory Functions- Prim's Algorithms- Kruskal's Algorithm- Dijkstra's algorithm

Unit – V P, NP, and NP –complete Problems and Backtracking, Branch and bound (12 Hours)

P, NP, and NP –complete Problems **Backtracking**: N-Queens problem – Hamiltonian circuit problem – Subset sum problem – **Branch and bound:** Assignment problem – Knapsack problem – Travelling salesman problem.

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text Book :

1. Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education 2003.

Reference Books:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, "Introduction to Algorithms" Prentice Hall 1990.
2. “Design and Analysis of Algorithms”, S.Sridhar, Oxford University Press December 2014, ISBN-13: 978-0198093695

Course Outcomes:

On successful completion of this course, the students would be able to

- Understand the fundamental of algorithms
- Analyze the performance of algorithms
- Understand the basics of various techniques
- Choose appropriate algorithm design techniques for solving problems
- Analyze the complexities of various problems in different domains

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Core Course – X

DIGITAL IMAGE PROCESSING

Subject Code	**: P3R1CSCC10**		
Semester	**: III**	**CIA**	**: 25**
Instructional Hours	**: 60**	**EXT**	**: 75**
Credit	**: 5**	**Total**	**: 100**

Objectives:

- To explore the algorithms and techniques involved in Digital Image Processing
- To learn advanced image enhancement techniques
- To study the image compression techniques
- To study the technique of image restoration
- To learn the techniques of segmentation

Unit – I Digital Image Fundamentals (12 Hours)

Introduction :Fundamental steps in Digital Image Processing – Components of an Image Processing System – Elements of visual perception-Image Sampling and Quantization : basic concepts in sampling and quantization-Representing digital images-spatial and gray level resolution – Basic relationships between Pixels –1D DFT – 2D DFT.

Unit – II Image Enhancement (11 Hours)

Basic Gray Level transformation: Image negatives-Log transformations-Power-Law transformations-Piecewise-linear transformations functions – Histogram Processing : histogram equalization-histogram matching-Enhancement using arithmetic/logic operations: Image subtractions-image averaging-Color Image Processing: color fundamentals-color models.

Unit – III Image Restoration (11 Hours)

A Model of the image degradation/restoration process – Noise Models : spatial and frequency properties of noise – some important noise probability density functions-periodic noise-estimation of noise parameters- Restoration in the presence of Noise only –spatial filtering: Mean filters –order statistics filters – adaptive filters - periodic noise reduction by frequency domain filtering: band reject filters- band pass filters.

Unit – IV Image Data Compression (11 Hours)

Error free compression: variable length coding – LZW coding – Bit plane coding – Lossless predictive coding – Lossy compression: Lossy predictive coding – transform coding – wavelet coding – Image compression standards: Binary image compressions standards – continuous tone still image compressions standards – video compressions standards.

Unit – V Segmentation (12 Hours)

Detection of discontinuities: point detection – line detection - edge detection –Edge linking and boundary detection :local processing – global processing via the though transform –global processing via graph-theoretic techniques – thresholding : foundation-the role of illumination-basic global thresholding-basic adaptive thresh holding-optimal global and adaptive thresholding - use of boundary characteristics for histogram improvement and local thresholding-thresholds based on several variables.

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text Book:

1. Gonzalaz R. and Wintz P., "Digital Image Processing", Addison Wesley, 2nd Ed, 1987.
   [**Unit I:** Chapter 1- 1.4, 1.5, Chapter 2 – 2.1,2.4.1,2.4.2,2.4.3, 2.5,Chapter 4:4.2.1,4.2.2; **Unit II:** Chapter 3– 3.2 ,3.3.1,3.3.2, 3.4, Chapter 6-6.1,6.2; **Unit III:** Chapter: 5.1,5.2,5.3,5.4.1,5.4.2; **Unit IV:** Chapter 8 – 8.4 -8.6, Chapter 10- 10.1,10.4; **Unit V:** Chapter 10- 10.1- 10.3;]

Reference Books:

1. Anil K. Jain, "Fundamentals of Digital Image Processing", PHI, 1995.
2. Sid Ahmed M.A., "Image Processing", McGraw Hill Inc, 1995.

Course Outcomes:

After completing the course, the students would be able to

- Have an understanding on Image processing
- Evaluate the techniques for image enhancement
- Understand image restoration.
- Categorize various compression techniques.
- Interpret image segmentation and representation techniques.

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Core Course – XI

DISTRIBUTED TECHNOLOGY

Subject Code	**: P3R1CSCC11**		
Semester	**: III**	**CIA**	**: 25**
Instructional Hours	**: 60**	**EXT**	**: 75**
Credit	**: 5**	**Total**	**: 100**

Objectives:

- To have an understanding about server controls
- To acquire knowledge about page code page controls, and components
- To gain knowledge about validation controls of dot net
- To understand Display dynamic data from a data source by using ADO.NET and data binding and Debug .NET Active Server Page

Unit – I Understanding and starting ASP.Net (12 Hours)

Understanding the .Net framework: Benefits of .net framework – Elements of the .net framework. Getting started with ASP.NET: Introducing the .net Framework – Introducing ASP.net – Setting up the development environment – Creating an ASP.net application.

Unit – II Web controls and Rich Web controls (11 Hours)

Introducing ASP.Net web forms – Creating web forms application projects – Using web controls. Using Rich web controls: Using the AdRotator control – Using the Calendar control.

Unit – III Validation controls (12 Hours)

Validating user Input: Understanding validation controls – Using the RequiredFieldValidator control - Using the CompareValidator control - Using the RangeValidator control - Using the RegularExpressionValidator control - Using the CustomValidator control - Using the ValidationSummary control.

Unit – IV ADO.NET (11 Hours)

Introducing ADO.NET: ADO.NET basics - ADO.NET object model – Changes from ADO – Communicating with OLEDB data sources using ADO.NET.

Unit – V XML and ASP.NET security (11 Hours)

Advanced data binding and XML: Introduction to xml – An overview of xml related specifications – Support for xml in ASP.Net. ASP.NET security: Introduction to ASP.NET security – Form based authentication – Integrating security methods – Role based security.

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text Book:

1. ASP.NET Bible by Mridula Parihar et al. ,WILEY dreamtech India Pvt. Ltd., Reprint 2002.
   [**Unit I** –Chapters 1,2; **Unit II** – Chapters 3,4; **Unit III** –Chapters 6; **Unit IV** – Chapters 8; **Unit V** –Chapters 13,19]

Reference books:

1. Programming with C#.Net by J.G.R.Sathiaseelan and N. Sasikala Devi, PHI, 2009.
2. The Complete Reference ASP.Net by Matthew MacDonald, McGraw Hill Education Pvt. Ltd. ,Indian Edition,2002
3. Build your own ASP.Net website using VB and C# by Christian Darie ,Wyatt Barnett and Tim Posey, 4th Edition.

Course Outcomes:

After studying this course the students would be able to

- Get a clear understanding about .net framework.
- Gain knowledge about all the controls used in.net.
- Understand the validation controls of .net
- Acquire knowledge about the security features of .net framework.
- Know the data base support of .net.

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Core Course – XII

DISTRIBUTED TECHNOLOGY PRACTICAL

Subject Code	**: P3R1CSCC12P**		
Semester	**: III**	**CIA**	**: 40**
Instructional Hours	**: 60**	**EXT**	**: 60**
Credit	**: 5**	**Total**	**: 100**

Objectives:

- To practice the web server controls of .net
- To design static web pages using dot net
- To gain knowledge about database connectivity
- To practice the disconnected data access of .net
- To program on the various data controls of .net

1. Design a web page that makes uses of Ad Rotator Control.
2. Design a web page involving List View or Wizard Control.
3. Make use of Image Control involving two hot spots in a web page.
4. Design a simple web site that makes use of Master Pages.
5. Establish the security features in a simple web site with five pages.
6. Develop a web service to fetch a data from a table and send it across to the client.
7. Create table and insert a few records using Disconnected Access.
8. Develop a project to update and delete few records using Disconnected Access.
9. Develop a project to view the records using Grid View, Details View, Form View Controls.
10. Develop a project to generate a crystal report from an existing database.

Course Outcomes:

At the end of this course the student would have gained knowledge about

- The web server controls of .net.
- Designing static web pages using dot net.
- Database connectivity in .net.
- The disconnected data access of .net.
- The various data controls of .net.

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Core Course – XIII

DATA MINING AND DATA WAREHOUSING

Subject Code	**: P3R1CSCC13**		
Semester	**: III**	**CIA**	**: 25**
Instructional Hours	**: 60**	**EXT**	**: 75**
Credit	**: 5**	**Total**	**: 100**

Objectives:

- To introduce the concept of data mining as important tool of enterprise.
- To interpret the contribution of data warehousing and data mining to the decision support level of organizations.
- To make students well versed in all mining algorithms, methods of evaluations
- To impart knowledge of tools used for data mining and how to gather and analyze large set of data to gain useful business
- To Evaluate different models used for OLAP and data pre-processing;

Unit – I Introduction (12 Hours)

Introduction to data mining : Definition – Need – process – applications – Techniques – Data Mining software - **Association Rule Mining**: Basics – The task and a naïve algorithm – The Apriori algorithm – Approaches to improve the Apriori algorithm :Apriori TID – DHP – DIC – Frequent Pattern growth – software for association rule mining.

Unit – II Classification (12 Hours)

Classification - Introduction – Decision Tree – Building a Decision Tree – Split algorithm based on information theory - Overfitting and Pruning –Naïve Bayes Method – classification software - **Cluster analysis**: Introduction – features – types of data- computing distance – Type of cluster analysis methods - cluster analysis software.

Unit – III Web Data Mining (11 Hours)

Web Mining: Definition – Terminology and characteristics – Hierarchy in the web – Categories: Web content mining – Web usage mining – Web structure mining; Web mining software – **Search engines:** Introduction – Characteristics – functionality – Architecture – Ranking of web page – search engine software.

Unit – IV Data Warehousing (11 Hours)

Data warehousing: Introduction – Operational Data Stores(ODS) – Extraction and Transformation and Loading(ETL) – Data Warehouses – Meta Data – Software for ZLE, ODS, ETL and Data warehousing

Unit – V OLAP (11 Hours)

Online analytical processing: Definition – Characteristics – motivation – Multidimensional view and data cube – data cube implementations – operations – guidelines and software. **Information Privacy**: Definition - Basic principles to protect information privacy – uses and misuses of data mining – pitfalls of data mining – current privacy principles ineffective for data mining.

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text Book:

1. **G.K.Gupta**, Introduction to Data Mining with case studies, Prentice Hall India, 2006 (ISBN 81-203-3053-6)
   [**Unit-1** : (Chapters 1,2); **Unit-2** : (Chapters 3,4); **Unit-3** (Chapters 5,6); **Unit-4** (Chapter 7); **Unit-5** (Chapters 8,9)].

Reference Books:

1. Arun K.Pujari, "Data Mining Techniques", 3rd Edition 2013, reprinted 2015, ISBN: 978-81-7371-884-7, Universities Press India(P) Ltd.
2. K.P.Soman and Shyam Diwakar and V.Ajay, Insight to Data Mining Theory and Practice, Prentice Hall of India, 2006. (ISBN-81-203-2897-3).
3. Nagabhushana, S," Data Warehousing OLAP and Data Mining.", New Delhi: New Age International, 2016. ISBN: 978-81-224-1764-7
4. "Data Warehousing and Data Mining ", S Poonkuzhali and C Saravanakumar, Chennai: Charulatha Publications, 2010. ISBN: 978-81-904915-0-1.
5. " Data Warehousing, Data Mining and OLAP" ,Alex Berson and Stephen J.Smith, New Delhi: McGraw-Hill, 2010.

Course Outcomes:

After completing the course, the students would be able to

- Describe and demonstrate basic data mining algorithms, methods, and tools.
- Demonstrate an understanding of the importance of data mining and the principles of business intelligence.
- Organize and prepare the data needed for data mining techniques.
- Perform exploratory analysis of the data to be used for mining.
- Define and apply metrics to measure the performance of various data mining algorithms and evaluate different models used for OLAP and data pre-processing

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Core Course – XIV

CLOUD COMPUTING

Subject Code	**: P3R1CSCC14**		
Semester	**: III**	**CIA**	**: 25**
Instructional Hours	**: 60**	**EXT**	**: 75**
Credit	**: 5**	**Total**	**: 100**

Objectives:

- To learn the basics of cloud computing
- To implement the key concept of virtualization.
- To inculcate the knowledge of different cloud computing services and security.
- To apply Map-Reduce concept of applications
- To know the key components of Amazon web services
- To understand how to migrate the applications in cloud

Unit – I Cloud Computing -An Overview (12 Hours)

Introduction-History of Cloud Computing – Characteristics of Cloud – Cloud Computing Model – Issues and Challenges for Cloud Computing – Advantages and disadvantages of Cloud Computing – Security Privacy and Trust – Virtualization – Threats to Cloud Computing – Next Generation of Cloud computing - Cloud Computing Architecture**:** Cloud Architecture – Cloud Computing Models – Comparisons of Models – Deployment Models – Identity as a Service.

Unit – II Virtualization in Cloud (12 Hours)

Virtualization – Implementation of virtualization – Virtualization Support at The OS Level – Middleware Support For Virtualization – Advantages of Virtualization – Virtualization Implementation Techniques – Hardware Virtualization - Types of Virtualization – Load Balancing in Cloud Computing – Logical Cloud Computing Model – Virtualization for Data-Centre .

Unit – III Security Management (11 Hours)

Security Reference Architecture – Security Issues in Cloud Computing – Classification of Security issues - Types of Attacks – Security Risks in Cloud Computing – Security Threats against Cloud Computing - Emerging trends in Security and Privacy.

Unit – IV Web Services (11 Hours)

Amazon Web Services – Microsoft Azure - Google App Engine – Data Security - Privacy – Service Oriented Architecture Components – Design Principle of SOA – SOA Requirements – Benefits of SOA – Web Services .

Unit– V Migration (11 Hours)

Motivations for Migration – Issues in Migrating the Applications to the Cloud – Types of Migration - Planning for Migrating the application to Cloud – Migration RoadMap.

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text Book:

1. "Cloud Computing" – V.K. Pachghare PHI Delhi Learning Private Limited, 2016. ISBN: 978-81-203-5213-1
   [Unit– I: Chapter 1,2; **Unit– II:** Chapter 3**; Unit – III:** Chapter 5; **Unit – IV:** Chapter 7,9; **Unit – V:** Chapter 10;]

Reference Books:

1. Sharma, Rishabh," Cloud Computing Fundamentals, Industry Approach and Trends",New Delhi: John Wiley, 2017, ISBN: 978-81-265-5306-8
2. Chitra, D,"Grid and Cloud Computing ", D. Chitra and A. Kaliappan, Jodhpur: Scientific Publishers(india), 2016, ISBN: 978-93-85983-05-4

Course Outcomes:

After completing the course, the students would be able to

- Define cloud computing and memorize the different cloud service and deployment models.
- Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms.
- Use and examine different cloud computing services.
- Design different workflows according to requirements and apply Map-Reduce programming model.
- Analyze the components of open stack& Google cloud platform
- Understand mobile cloud computing and migrating strategies for cloud applications

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ELECTIVE COURSES

1. MOBILE COMMUNICATION

Instructional Hours : 60		**CIA**	**: 25**
Credit	**: 3**	**EXT**	**: 75**
		Total	**: 100**

Objectives:

- To understand the basic principles of mobile communication systems
- To understand the operation of mobile communications systems and their generations
- To understand the basic principles of modern mobile and wireless communication system
- To understanding the concepts of mobile IP.
- To test mobile communication equipment for the technical functionality.

Unit– I Introduction (12 Hours)

Introduction: Applications-Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmission – Multiplexing – Spread Spectrum and cellular systems – Medium Access Control – Comparisons

Unit– II Telecommunications System (11 Hours)

Telecommunications System: Telecommunication System– GSM – Architecture – Protocols – Hand over - Security – UMTS and IMT 2000 – UMTS System Architecture-UTRAN-Core Network-Handover- Satellite
System

Unit– III Wireless LAN (12 Hours)

Wireless LAN : IEEE S02.11 –System Architecture- Protocol Architecture- Medium Access Control Layer-MAC Frame-MAC Management—Roaming- Bluetooth: Architecture-Link Manager Protocol- Security -and Link Management.

Unit– IV Mobile IP (11 Hours)

Mobile IP: Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies

Unit– V Wireless Application Protocol (11 Hours)

Wireless Application Protocol: Wireless Application Protocol (WAP) – Architecture – XML – WML Script – Applications

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text Books:

1. J. Schiller, Mobile Communication, Addison Wesley, 2000.

References Books:

1. William C.Y. Lee, Mobile Communication Design Fundamentals, John Wiley, 1993.
2. William Stallings, Wireless Communication and Networks, Pearson Education, 2003.
3. Singhal, WAP-Wireless Application Protocol, Pearson Education, 2003.
4. "The Wireless Application Protocol: Writing Application for the mobile Internet"-Sandeep, Singhal 2007. Pearson Publication.
5. "Mobile Communication"-Behera.B.K., Sai Tech Publication 2009.

Course Outcomes:

After completing the course, the students would be able to

- Analyse the basic principles of mobile communication systems.
- Understand the basic principles of modern mobile and wireless communication system.
- Test mobile communication equipment for the technical functionality.
- Describe the development and implementation of mobile communication systems.
- Explain the basic physical and technical setting functioning of mobile communication systems.

2. BIG DATA ANALYTICS

Instructional Hours	**: 60**	**CIA**	**: 25**
Credit	**: 3**	**EXT**	**: 75**
		Total	**: 100**

Objectives:

- To learn to analyze the big data using intelligent techniques
- To understand the various search methods visualization techniques
- To learn to use various techniques for mining data stream
- To learn and understand MapReduce and its implementation
- To learn about data warehousing management

Unit – I Getting an Overview of Big Data (12 Hours)

What is Big Data- Evaluation of Big Data- Structuring Big Data- Elements of Big Data-Big Data Analytics-Careers in Big Data-Future of Big Data- Use of Big Data in social networking- Use of Big Data in preventing fraudulent activities-Use of Big Data in deducting fraudulent activities in insurance sector-use of Big Data in retail industry**.**

Unit – II Introducing technologies for handling Big Data (12 Hours)

Distributed and parallel computing for Big Data – Introducing Hadoop – cloud computing and big data – in-memory computing technology for big data- Hadoop Ecosystem – Hadoop distributed file system – MapReduce- Hadoop YARN – introducing HBase-combining HBase and HDFS – HIVE –pig and pig latin – Sqoop – Zookeeper – Flume – Oozie.

Unit – III Understanding MapReduce fundamentals and HBase (11 Hours)

The map reduce Framework – techniques to Optimize MapReduce jobs – Uses of MapReduce – role of HBase in Big Data processing – Exploring the big data stack – virtualization and big data – virtualization approaches

Unit – IV Storing data in Database and Data warehouses (11 Hours)

RDBMS and Big Data – Non-Relational Database – polyglot persistence – Integrating Big Data with traditional Data warehouses – Big data analysis and data warehouse – Changing deployment models in big data – recollecting the concept of map reduce framework-developing simple map reduce application – points to consider while designing map reduce

Unit – V Customizing Map Reduce Execution and Implementing Map Reduce Program (11 Hours)

Controlling map reduce execution with input format – reading data with custom RecordReader-organizing output data with output format - customizing data with RecordWriter – optimizing map reduce execution with combiner – controlling reducer execution with partitioners –customizing the map reduce execution in terms of YARN – implementing a map reduce program for sorting text data –Debugging |Hadoop map reduce locally – performing unit testing for map reduce application – performing local application

testing with eclipse – logging for Hadoop testing – Application Log processing - Defensive programming in map reduce

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text Book:

1. "Big Data Black Book" by DT. Editorial Services, Dream Tech Press, Reprint 2017

Reference Books:

1. "BIG DATA " by Judith S. Hurwitz , Alan Nugent, Dr.Fern Halper and Marcia, Kaulfman, Wiley Publication ,2014
2. "BIG DATA Imperactives : Enterprice Big data Ware house, BI Implementations and Analytics '' by soumentra Mohanty, Madhu Jagadeesh and Harsha Srivatsa, Apress Media,Springer science + Business Media Newyork, 2013

Course Outcomes:

After completing the course, the students would be able to

- Analyze the big data using intelligent techniques.
- Understand the various search methods visualization techniques.
- Use various techniques for mining data stream.
- To implement MapReduce
- To implement data warehousing management

3. NETWORK SECURITY

Instructional Hours : 60 **CIA : 25**
Credits : 3 **EXT : 75**
Total : 100

Objectives:

- To incorporate approaches to secure networks.
- To understand principles of web security.
- To learn about cryptographic techniques
- To effectively understand about web security
- To identify and describe the common types of security threats aimed at computer networks and explain the typical techniques.

Unit – I Introduction and Classical Encryption Techniques (12 Hours)

The OSI Security Architecture – Security Attacks – Security Services-Security Mechanisms-A Model For Network Security – Classical Encryption Techniques: Symmetric Ciphers Model- Substitution Techniques – Transposition Techniques – Rotor Machines – Steganography.

Unit – II Public Key Cryptography (12 Hours)

Principles Of Public - Key Crypto Systems – Public key cryptosystems – Applications for public key cryptosystems – Requirements for public key cryptography - Public key cryptanalysis - **RSA Algorithm** – Description of the algorithm – The security of RSA.

Unit – III Network Security Applications (11 Hours)

Electronic Mail Security: Pretty Good Privacy – PGP Services – Cryptographic Keys and Key Rings – General format of PGP message – PGP Message Generation – PGP Message Reception – RFC 822 – **MIME** – MIME content types – MIME transfer encodings - **S\MIME** Functionality – S\MIME content types – cryptographic algorithms – S/MIME certificate processing.

Unit – IV Web Security (11 Hours)

Web Security Considerations – Web Security threats - **Secure Socket Layer** – SSL Architecture – SSL Record Protocol – Change cipher spec protocol – Alert protocol - handshake protocol - **Transport Layer Security - Secure Electronic Transaction** – overview – Key features – SET participants – Dual signature – payment processing – purchase request – payment authentication – payment capture.

Unit – V System Security (11 Hours)

Intruders: Classification of intruders – Intrusion techniques - Intrusion Detection-statistical anomaly detection – rule based detection – Audit record – The Base Rate Fallacy – Distributed Intrusion Detection – Honeypots – Intrusion detection exchange format -

Password Management – Password selection strategies - **Malicious Software:** Viruses And Related Threats - Virus Counter Measures – Distributed Denial Of Service Attacks .

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text Book:

1. William Stallings, "Cryptography and Network Security – Principles and Practices", Prentice-Hall, Third edition, 2007
   [Unit 1: Chapter 1,2**; Unit 2:** Chapter 9**; Unit 3:** Chapter 15**; Unit 4:** Chapter 17**; Unit 5:** Chapter 18,19;**]**

Reference Books:

1. Johannes A. Buchaman, "Introduction to Cryptography", Springer – Verlag
2. "Cryptography and Network Security ". Atul Kahate. --2nd ed. New York: Tata Mcgraw-Hill, 2007. ISBN: 0-07-064823-9
3. Forouzan, Behrouz A," Cryptography and Network Security." New York: Tata Mcgraw-Hill, 2007. ISBN: 0-07-066046-8
4. Bragg, Roberta,"The Complete Refernce Network Security / Roberta Bragg, Mark Rhodes Ousey and Keith Strassberg. New York: Tata Mcgraw-Hill, 2007. ISBN: 10:-0-07-058671-3
5. Easttom, Chuck, "Computer Security Fundaments. Chennai: Person Publications, 2011. ISBN: 978-81-317-6067-3

Course Outcomes:

After completing the course, the students would be able to

- Incorporate approaches to secure networks.
- Understand principles of web security.
- Identify and describe the common types of security threats aimed at computer networks and explain the typical techniques.
- Understand classification of encryption
- Incorporate public key cryptography

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4. SOFTWARE QUALITY ASSURANCE AND TESTING

Instructional Hours: 60		**CIA**	**: 25**
Credits	**: 3**	**EXT**	**: 75**
		Total	**: 100**

Objectives:

- To understand the fundamental concepts and theory of Software testing
- To incorporate the concepts of Software Quality Management
- To Implement process that ensures the Software is developed with good quality standards
- To study the quality management methods
- To learn successful development of the Software product.

Unit – I Introduction (12 Hours)

Principles of Testing - Software Development Life Cycle Models.

Unit – II Types of Testing (12 Hours)

White Box Testing - Integration Testing - System and acceptance testing.

Unit – III Testing Fundamentals - 2 & Specialized Testing (11 Hours)

Testing Performance Testing - regression testing - Testing of Object Oriented Systems - Usability and Accessibility Testing.

Unit – IV Test Management (11 Hours)

Testing Planning, Management, Execution and Reporting.

Unit – V Test Automation (11 Hours)

Software Test Automation - Test Metrics and Measurements

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text Book:

1. "Software Testing" - Srinivasan Desikan, Gopalaswamy Ramesh, Pearson Education, 2006. **[Unit-1 (Chapters - 1, 2); Unit-2 (Chapters – 3, 5, 6); Unit-3 (Chapters – 7, 8, 11, 12);Unit-4 (Chapters – 15); Unit-5 (Chapters – 16, 17)]**

Reference Books:

1. Introducing Software testing - Louis Tamres, Addison Wesley Publications, First Edition

2. Software testing, Ron Patten, SAMS Techmedia, Indian Edition, 2001.
3. Software Quality - Producing Practical, Consistent Software - Mordechai Ben-Menachem, Gray S Marliss, Thomson Learning, 2003.

Course Outcomes:

After completing the course, the students would be able to

- Understand the fundamental concepts and theory of Software testing and Software Quality Management
- Implement process that ensures the Software is developed with good quality standards
- Quality management methods to effectively organize staff and lead a successful development of the Software product.
- Analyse the quality management methods
- Perform successful development of software product.

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5. ARTIFICIAL INTELLIGENCE AD EXPERT SYSTEM

Instructional Hours : 60
Credit : 3

CIA : 25
EXT : 75
Total : 100

Objectives:

- To understand what is AI
- To understand about symbolic reasoning
- To learn about heuristic search techniques
- To learn to apply AI in various Search techniques
- To use AI in real time applications

Unit – I Introduction (12 Hours)

Introduction: What is Artificial Intelligence – AI Technique – Level of the model – Problems, Problem spaces and search – Production systems – Problem characteristics – Production system characteristics.

Unit – II Heuristic search techniques (12 Hours)

Heuristic search techniques – Hill climbing – Best first search – Problem reduction – Means end analysis – Knowledge representation issues – Representations and mappings – Approaches – Issues in knowledge representation.

Unit – III Using predicate logic (11 Hours)

Using predicate logic – Representing simple facts, Instance – Computable functions and predicates – Representing knowledge using rules – Procedural versus Declarative – Logic programming – Control knowledge.

Unit – IV Symbolic reasoning (11 Hours)

Symbolic reasoning – Non monotonic reasoning – Implementation issues – Breadth first search – Depth first searching – Statistical reasoning – Bayes' theorem – Bayesian network – Fuzzy logic.

Unit – V Game playing (11 Hours)

Game playing – Minimax search procedure – Alpha beta cutoffs – additional refinements – Planning – Components of planning – Goal stack planning – Hierarchical planning.

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text Books:

1. Elaine rich, Kevin knight, "Artificial Intelligence", Second edition, Tata McGraw Hill Edition, 1991.
2. R.B.Mishra "Artificial Intelligence",PHI,2011.

Reference Books:

1. Stuart Russell, Peter Norvi"Artificial Intelligence", Second edition, 2003.
2. Dan W. Patterson, "Artificial Intelligence and Expert Systems", 1990.
3. Eugene Charniak, Drew McDermott, "Introduction to Artificial Intelligence", Addison Wesley.

Course outcomes:

After completing the course, the students would be able to

- Understand AI and its applications
- Understand about symbolic reasoning
- Incorporate heuristic search techniques
- Apply AI in various Search techniques
- Use AI in real time applications

6. PERVASIVE COMPUTING

Instructional Hours : 60 **CIA : 25**
Credit : 3 **EXT : 75**
Total : 100

Course Objectives:

- To familiarize students with various application scenarios of Pervasive Computing
- To create awareness about the architecture and functioning of Pervasive Systems.
- To identify critical technologies and acquire knowledge about connectivity and information access via pervasive devices
- To gain knowledge about Device connectivity
- To learn the concepts of WAP and PDA

Unit – I Introduction to Pervasive Computing (12 Hours)

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 (12 Hours)

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

Unit – III Device Connectivity (11 Hours)

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

Unit – IV WAP and Beyond (11 Hours)

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 (11 Hours)

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.

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

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

Course Outcomes:

After completing the course, the students would be able to

- Understand the application scenarios of Pervasive Computing
- Design pervasive computing system and sub systems
- Use and evaluate appropriate tools and techniques
- Understand about Device connectivity
- Understand about WAP and PDA

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7. HUMAN COMPUTER INTERACTION

Instructional Hours : 60 **CIA : 25**
Credit : 3 **EXT : 75**
Total : 100

Objectives:

- To impart knowledge related to the various concepts , methods of Human Computer
- Interaction techniques with design basics, design rules and evaluation techniques.
- Describe and discuss current research in the field of HCI.
- Implement simple graphical user interfaces using the Java Swing toolkit.
- Identify the various tools and techniques for interface analysis, design, and evaluation.
- Identify the importance of working in teams and the role of each member within an interface development phase.

Unit – I The Interaction and Paradigms (12 Hours)

The Interaction: Introduction – Models of interaction – Frameworks and HCI Ergonomics – Interaction styles – Elements of the WIMP interface – Interactivity – The context of the interactions. **Paradigms:** Introduction – Paradigms for interaction.

Unit – II Interaction, Design basics & HCL in the software process (12 Hours)

Interaction, Design basics: Introduction – What is design? – User focus – Scenarios – Navigation design – Screen design and layout – Interaction and prototyping. **HCL in the software process:** Introduction – The software lifecycle – Usability engineering – interactive design and prototyping – Design rationate.

Unit – III Universal Design and Implementation Support (11 Hours)

Design rules: Introduction – Principles to support usability – Standards – Guidelines – Golden rules and heuristics – HCI patterns. **Implementation Support :** Introduction – Elements of windowing systems – Programming the application Using toolkits – User interface management systems.

Unit – IV Evaluation techniques and Universal Design (11 Hours)

Evaluation techniques: What is evaluation – Goals of evaluation – Evaluation through expert analysis – Evaluation through user participation – Choosing an evaluation method. **Universal Design:** Introduction – Universal design principles – Multi-modal interaction – Designing for diversity – summary. Introduction – Requirements of user support – Approaches to user support Adaptive help systems – Designing user support systems.

Unit – V User support (11 Hours)

User support: Introduction Requirements of user support – Approaches to; user support – Adaptive help systems designing designing user support systems.

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text Book:

1. Human Computer Interaction, Third Edition, "Alan Dix, Janet Finlay, Gregory D. Abowd and Russell Beale", Pearson Education, 2004.

Reference Books:

1. Handbook of Human Computer Interaction, M.G. Helander, Elsevier, 2014.
2. Dix, Alan,"Human Computer Interaction / Alan Dix, Janet Finlay and Gregory D Abowd. - 3rd edition, Delhi: Pearson Education, 2005.
3. Mackenzie, I Scott, "Human-Computer Interaction an Empirical Research Perspective", New Delhi: Morgam Kaufmann Publishers an Imprint of Elevier, 2013. ISBN: 978-93-5107-033-7
4. Carroll, John M, " Human-Computer Interaction in the New Millennium. Chennai: Person Publications, 2007. ISBN: 81-317-0896-9

Course Outcomes:

At the end of this course, students would be able to

- Understand what interaction design is and how it relates to human computer interaction and other fields.
- Explain the importance of iteration, evaluation and prototyping in interaction design
- Know about the conceptual, practical, and ethical issues involved in evaluation.
- Understand the principles of a user-centered approach.
- Understand the various approach of user support system.

8. INTERNET OF THINGS

Instructional Hours : 60 **CIA : 25**
Credit : 3 **EXT : 75**
Total : 100

Objectives:

- To assess the vision and introduction of IoT
- To understand IoT Market perspective
- To implement data and knowledge management and use of Devices in IoT Technology
- To apply Map-Reduce concept of applications and classify Real World IoT Design Constraints, Industrial Automation in IoT
- To introduce the basics of Python programming

Unit – I Introduction (12 Hours)

Definition and Characteristics of IoT – Physical Design of IoT – Logical Design of IoT – IoT Enabling Technologies – Levels and Deployment Templates.

Unit – II Home Automations (12 Hours)

Home automations – Cities – Environment – Agriculture – Industry - Health & Lifestyle. IoT and M2M: M2M - Difference between IoT and M2M – SDN and NFV for IoT

Unit – III IoT Management (11 Hours)

Need for IoT Systems Management – Simple Network Management Protocol(SNMP) – Network Operator Requirements – NET CONF – YANG – IoT Systems Management with NETCONF – YANG.

Unit – IV Data Analytics (11 Hours)

Data Analytics for IoT – Introduction - Apache Hadoop – Using Hadoop Map reduce for batch data analysis – Apache oozie – Apache Spark – Apache storm.

Unit – V Logical Design of IoT Systems (11 Hours)

IoT Systems – Logical Design using Python: Introduction – Installing Python – Data types and Data Structure – Control Flow – Functions – Models – Packages – File Handling.

Unit –VI (Latest learnings for CIA only) (3 Hours)

Latest development related to the course during the semester concerned

Text book :

1. Internet of Things - A Hands - on Approach – Arshdeep Bahga ad Vijay Madisetti, Universities Press (INDIA) Pvt, Ltd.
   Unit I - (chapter 1) Unit II- (Chapter 2, 3) Unit III-(Chapter 4) Unit IV- (Chapter 10) Unit V- (Chapter 6)

References Books:

1. "Internet of Things (IoT): Technologies, Applications, Challenges and Solutions" , BK. Tripathy, J,Anuradha , CRC Press; 1 edition (18 October 2017), ISBN-13: 978-1138035003.
2. "IOT (Internet of Things) Programming: A Simple and Fast Way of Learning IOT", David Etter, Kindle Edition

Course Outcomes:

After completion of the course, the students would be able to

- Implement state of the Art architecture in IoT.
- Determine the market perspective of IoT.
- Gain knowledge about the use of Devices, Gateways and Data management in IoT.
- Interpret the vision of IoT from a global context.
- Knowledge of programming in Python.