HINDUSTHAN COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)
COIMBATORE - 641 028
M.Sc. COMPUTER SCIENCE

SCHEME OF EXAMINATIONS - CBCS PATTERN

(For the students admitted from the Academic year 2016-2017 and onwards)

CODE NO.	SUBJECT	LECTURE HRS / WEEK	EXAM DURATION (Hrs)	MAX.MARKS			CREDIT POINTS
				IE	EE	TOTAL	
First Semester							
16CEP01	Data Mining & Warehousing	5	3	25	75	100	4
16CEP02	Analysis & Design of Algorithms	5	3	25	75	100	4
16CEP03	Advanced Java Programming	5	3	25	75	100	4
16CEP04	Advanced Software Engineering	5	3	25	75	100	4
16CEP05	Artificial Intelligence & Robotics	5	3	25	75	100	4
16CEP06	Practical I : Programming Lab-Java	5	3	40	60	100	4
Second Semester							
16CEP07	Advanced Operating System	5	3	25	75	100	4
16CEP08	Advanced RDBMS	5	3	25	75	100	4
16CEP09	Tier Architecture using .NET Framework	6	3	25	75	100	4
16CEP10	Practical II : Programming Lab – RDBMS	6	3	40	60	100	4
16CEP11	Practical III : Programming Lab - .NET	6	3	40	60	100	4
16GSP01	**Skill Based :** Cyber Security	2	-	100	-	100	2
Third Semester							
16CEP12	Digital Image Processing	5	3	25	75	100	4
16CEP13	Mobile Computing	5	3	25	75	100	4
16CEP14	Advanced Network & Security	5	3	25	75	100	4
16CEP15	Cloud Computing	5	3	25	75	100	4
16CEP16	Practical IV : Programming Lab –Data mining using MATLAB	5	3	40	60	100	4
16CEP17	**Elective - I** A) Multimedia & its Applications (OR) B) Web Technology	5	3	25	75	100	4
Fourth Semester							
16CEP18	Advanced Web Programming in PHP & MySQL	5	3	25	75	100	4
16CEP19	Business Intelligence	5	3	25	75	100	4
16CEP20	Practical V : Programming Lab -PHP	5	3	40	60	100	4
16CEP21	**Elective - II** A) Embedded Systems (OR) B) Wireless Communication and Technology	5	3	25	75	100	4
16CEP22	Project Work	-	-	50	150	200	4
							90

REGULATIONS

1. Breakup Marks for IE (Theory papers)

One Test - 5 Marks

Model Exam - 10 Marks

Assignments - 5 Marks

Seminar - 5 Marks

Total - 25 Marks

Question Paper Pattern for IE test I

(for 50 Marks) (2 hours)

Section-A (18 Marks) **3 x 6=18 Marks**

Answer **ALL** Questions

Either or Type

ALL questions carry EQUAL Marks

Section-B (32 Marks) **2 x 16=32 Marks**

Answer any **TWO** Questions out of three questions.

ALL questions carry EQUAL Marks

Total 50 Marks

Question Paper Pattern for IE Model Exam

(for 75 Marks) (3 hours)

Section-A (30 Marks) **5 x 6=30 Marks**

Answer **ALL** Questions

One Question from each unit with **Either or Type**

ALL questions carry EQUAL Marks

Section-B (45 Marks) **3 x 15=45 Marks**

Answer any **THREE** Questions out of five questions.

ALL questions carry EQUAL Marks

Total 75 Marks

---

2 a) Components for Practical I. E.

Components	**Marks**
Test –I	20
Test - II	20
Total	**40**

2 b) Components for Practical E. E.

Components	**Marks**
Completion of Experiments	50
Record	5
Viva	5
Total	**60**

3. Institutional/ Industrial Training, Mini and Major Project Work

Institutional / Industrial Training		**Mini Project**	**Project Work**		
Components	**Marks**		**Components**		**Marks**
I.E			***I. E***		
Work Diary	25	-	a) Attendance Marks	20	
Report	50	50	b) Review Marks	30	50
Viva –voce	25	50			
Examination					
Total	**100**	**100**			
			E.E* [1]		
			a) Final Report Marks	120	
			b) Viva-voce Marks	30	150
				Total	**200**

***[1]**Evaluation of report and conduct of viva voce will be done jointly by Internal and External Examiners

4. Components for Cyber Security Paper

Components	**Marks**
Two Tests (2 x 40)	80
Two assignments (2 x 10)	20
Total	----- **100** =====

The question paper pattern is as follows:

a) Test I – 2 hours [4 out of 7 essay type questions] 4 x 10 = 40Marks
b) Test II – 2 hours [4 out of 7 essay type questions] 4 x 10 = 40 Marks

---

Total = 80 Marks

- The passing minimum for Cyber Security is 50
- In case the candidate fails to secure 50 marks which is the passing minimum, he/she may have to reappear for the same in the subsequent semesters.

5. Question Paper Pattern for EE Theory

(for 75 Marks) (3 hours)

Section-A (30 Marks) **5 x 6=30 Marks**

Answer **ALL** Questions

One Question from each unit with **Either or Type**

ALL questions carry EQUAL Marks

Section-B (45 Marks) **3 x15=45 Marks**

Answer any **THREE** Questions out of five questions.

ALL questions carry EQUAL Marks

Total 75 Marks

Code No.	Subject	Semester No.
16CEP01	DATA MINING & WAREHOUSING	I
Objective:	To impart knowledge of Data Mining and its applications using Classification, Association rules, Clustering and Data warehousing.	

Unit No.	Topics	Hours
Unit I	**Introduction:** What Motivated Data Mining? Why it is important-What is Data mining-Data Mining- on What Kind of Data- Data?-Data Mining Task Primitives-Major Issues in Data Mining. Data Preprocessing: Why Preprocess the Data?-Descriptive Data Summarization- Data Cleaning-Data Integration and Transformation-Data Reduction.	10
Unit II	**Classification & Prediction:** What is Classification? What is prediction?-Issues Regarding Classification & Prediction-Classification by Decision Tree Induction-Bayesian Classification-Classification by Back propagation. Prediction: Accuracy and Error Measures-Evaluating the Accuracy of a Classifier or Predictor-Ensemble methods-Increasing Accuracy-Model Selection.	12
Unit III	**Cluster Analysis:** What is Cluster Analysis- Types of Cluster analysis-Partitioning Cluster-Hierarchical Methods-Grid Based Methods-Model Based Clustering Methods. Applications and Trends in Data Mining -Data Mining Applications-Additional Themes on Data Mining-Social Impacts of Data Mining. Association Rules: Introduction-basic Algorithms-parallel distributed algorithms-advanced association rules and techniques-measuring the quality rules.	13
Unit IV	**Data Warehousing Components:** Overall Architecture- Data Warehouse Database-Sourcing, .Acquisition, Cleanup and Transformation Tools-Metadata-Access tools-Data Marts-Data Warehouse Administration& management –Information Delivery System. On-Line Analytical Processing(OLAP): Need for OLAP-Multidimensional Data model-OLAP guidelines-Multidimensional Versus Multi-relational OLAP- Categorization of OLAP tools-State of the Market-OLAP tools and the Internet	15
Unit V	**Building a Data Warehouse:** **Business Considerations**: Return on investment-Design Considerations-Technical Considerations –Implementation Considerations-Integrated Solutions-Benefits Data Warehousing-DBMS Schemas for Decision Support- Metadata	10

Text Books:

1. *Jiawei Han and Micheline kamber, "DataMining Concepts and Techniques",Morgan Kaufmann Publishers An imprint of Elsevier .* (UNIT I – Chapter 1 & 2,UNIT II –Chapter 6,UNIT III – Chapter 7)
2. *Alex Berson, Stephen J. Smith , "Data Warehousing ,Data mining and OLAP", Tata MC Graw Hill Education Private Limited New Delhi.(UNIT IV – Chapter 6&13,UNIT V – Chapter 7)*
3. *Margaret H.Dunham, "Data mining introductory and advanced topics", Pearson education 2003. (UNIT III – Chapter 6)*

Reference Books:

1. *Arun k Pujari, "Datamining Techniques", Universites Press Private Limited.*
2. *Prabhu C S R , "Data Warehousing Concepts,Techniques,Products and applications", Prentice-hall off india pvt ltd.*
3. *Sama U, Fayyad.M,Gregory,Piatesky,"Advances in Knowledge Discovery and Data Mining" MIT Press.*

Head of the Department
Dept of Computer Science,
Hindusthan College of Arts & Scienc
Coimbatore – 641 028.

Code No.	Subject	Semester No.
16CEP02	ANALYSIS & DESIGN OF ALGORITHMS	I
Objective:	To understand the various design and analysis of the algorithms for a successful completion of course	

Unit No.	Topics	Hours
Unit I	**Design of Efficient Algorithms:** Data Structures: lists, queues, and stacks-set representation-graphs-trees-recursion-Divide and Conquer-Balancing-Dynamic programming-Epilogue Data Structure for Set manipulation Problems: Fundamental operations on sets-Hashing-Binary Search-Binary Search trees-Optimal binary trees-A simple Disjoint –Set union algorithm-Balanced Tree schemes-Partitioning.	15
Unit II	**Elementary Data Structures:** Stacks and Queues – Trees – Binary Trees – Binary Search Trees –Iterative and Recursive Search of BST – Graphs – Konigsberg Bridge Problem – Graph Representations - Graph Traversals **Greedy Methods-** Knapsack Problem, Minimum Cost Spanning Trees, Optimal Storage on Tapes and Single Source Shortest Path Problem.	15
Unit III	**Dynamic Programming:** General method – multistage graphs – all pair shortest path – optimal binary search trees – 0/1 Knapsack – traveling salesman problem – flow shop scheduling	10
Unit IV	**Backtracking:** General method – 8-Queens problem – sum of subsets – graph coloring – Hamiltonian cycles – knapsack problem – Branch and bound:-The method – 0/1 Knapsack Problem – traveling salesperson.	10
Unit V	**Branch and Bound:** **The Method-** Least Cost Search. Bounding: FIFO Branch and Bound and LC Branch and Bound-0/1 Knapsack Problem-Travelling Salesman Problem-Efficiency Considerations.	10

Text Books:

1. *Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and analysis of Computer Algorithms", Pearson Education, .(UNIT I – Chapter 2 & 4)*
2. *Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithm", Galgotia Publications, 2007.(UNIT II –Chapter 2& 4, UNIT III – Chapter 5, UNIT IV –Chapter 7, UNIT V – Chapter 8)*

Reference Books:

1. *Goodman and S. T. Hedetniem, "Introduction to the Design and Analysis of Algorithms" , MGH .*
2. *Aho A.V, John E.Hopcroft Jeffrey D. Ullman , "The Design and Analysis of Computer Algorithms" , Pearson Education.*
3. *Lakshmivarahan S, Sudarshan K Dhall. "Analysis and Design of Parallel Algorithms", Mcgraw Hill.*

Head of the Department
Dept. of Compute Science,
Hindusthan College of Arts & Scie
Coimbatore - 641 028

Code No.	Subject	Semester No.
16CEP03	ADVANCED JAVA PROGRAMMING	I
Objective:	To enrich knowledge of advanced key concepts used in java language which help to create database connectivity, networking and java beans capability.	
Unit No.	Topics	Hours
Unit I	**Overview:** Object Oriented Programming - Simple Program - Second short program - Two control statements. Introducing Classes - class fundamentals - Declaring objects - assigning object reference variables - introducing methods - constructors.	12
Unit II	**Multithreaded Programming:** The Java Thread Model - Main Thread - creating a Thread - Creating Multiple Threads - using is Alive () and join() - Thread Priorities - Synchronization - Inter thread communication - Suspending ,resuming and stopping Threads.	12
Unit III	**Networking:** Networking basics - java and the Net - InetAddress - Inet4Address and Inet6Address - TCP/IP Client Sockets - URL - URL Connection - TCP/IP Server Sockets - Datagrams - URL Class.	12
Unit IV	**Swing:** Japplet - JFrame and JComponent - Icons and Labels - Handling Threading Issues - Text Fields - Buttons - Jbutton Class - Checkboxes - Radiobuttons - ComboBoxes - Tabbed Panes - Scroll Panes - Trees.	12
Unit V	**Java beans:** Introduction - Advantage of java bean - Introspection - Bound and constrained properties - Persistence - Customizers - Java Bean API - Bean Example.	12

Text Book :

1. Herbert Schildt - "The complete Reference Java ",Tata McGraw - Hill,5th edition,2005.

Reference Books:

1. Deitel & Deitel, "Java How to Program", Prentice Hall, 5th Edition ,2002.
2. Peter Haggar, "Practical Java: Programming Language Guide", Addison - Wesley Pub Co, 1st Edition, 2000.
3. Xavier C,"Programming with JAVA 2", SciTech Publications (India) Pvt. Ltd.

Head of the Department
Dept.of Computer Science,
Hindusthan College of Arts & Science,
Coimbatore - 641 028.

Code No.	Subject	Semester No.
16CEP04	ADVANCED SOFTWARE ENGINEERING	I
Objective:	To enable the students to learn the basic functions, principles and concepts of Software Engineering.	

Unit No.	Topics	Hours
Unit I	**The Product and The Process:** The Evolving role of Software – Process methods and tools – Software process models – Linear sequential model – Prototyping model – Real model – Evolutionary software process model – Formal methods model – Fourth generation techniques – Project management concepts – Software process and project metric.	12
Unit II	**Software Project Planning:** Software Project Planning – Observation on estimating software Scope, Resources, Project estimation, Decomposition techniques, Empirical estimation models – The Make Busy divisions – Risk management – Software risk identification – Risk projection, Risk mitigation – Monitoring and management.	12
Unit III	**Project Scheduling and Tracking:** Project Scheduling and Tracking – Basic concepts – Defining a task set for the software project – Scheduling plan – Software quality assurance – Quality concepts and assurance – Software reliability – ISO 9000 Quality standards – Software configuration management – Software reviews – Formal technical reviews – Statistical quality assurance.	12
Unit IV	**Conventional Methods For Software Engineering:** System Engineering: System engineering hierarchy – Analysis concepts and principles – Requirements analysis – Communication techniques – Analysis, principles – Software prototyping – Specification modeling and information flow – Behavioral modeling – Mechanics of structured analysis – Design concepts and principles – Design process – Principles – Concepts – Effective modular design. Architectural design – Data design – Transform mapping – Transaction Mapping – User Interface Design.	12
Unit V	**Software Testing Methods:** Fundamentals – Test case design – White box testing – Basis path testing – Control structure testing – Black box testing – Testing for specialized environment – Testing strategies – Unit testing – Integration – Validation – System testing – Art of debugging. Object Oriented Software Engineering-Concept and Principles, Design. Reengineering-Business Process Re-engineering, Software Re-engineering.	12

Text Book :

1. Roger S Pressman, "Software Engineering: A Practitioner"s Approach", McGraw Hill (2000).

Reference Books:

1. Richard Fairley," Software Engineering Concepts", McGraw-Hill 2004 .

2. Aggarwal K K, Yogesh Singh, "Software Engineering", New age International Publishers, Third Edition.

3. Pankaj Jalote, "An Integrated Approach to Software Engineering", Narosa Publishing House, Delhi, 3rd Edition.

Code No.	Subject	Semester No.
16CEP05	ARTIFICIAL INTELLIGENCE & ROBOTICS	I

Objective:	To understand the concept of AI like Heuristic, Hill Climbing , Planning , etc., To gain knowledge about robotics and their applications.

Unit No.	Topics	Hours
Unit I	**The AI Problems**: AI technique – Criteria for success – Define the Problem as a state space search – Production System – Characteristics – Problem Characteristics.	10
Unit II	**Heuristic Search Techniques**: Generate and Test – Hill climbing –Best First Search – Problem Reduction – Constraints Satisfactions – Means End Analysis.	10
Unit III	**Knowledge Representation Issues**: Approaches to knowledge Representation – The Frame Problem – Computable Functions & Predicates – Resolution – Procedural versus Declarative Knowledge.	15
Unit IV	**Fundamentals of Robotics:** Introduction, classification of Robots, History of Robots, Advantages and Disadvantages of Robot, Robot components, Robot degree of freedom, Robot joints and coordinates, Robot workspace, Robot reach, Robot languages	10
Unit V	**Sensors:** Introduction to internal and external sensors of the robot, Position sensors, Velocity sensors, Acceleration sensors, SONAR and IR sensors, Touch and tactile sensors. **Applications of Robots:** Applications of robots, selection of robots, economic factors and justification for robotic application; safety requirements.	15

Text Books:

1. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill, Second Edition .

2 . Craig J J, "Introduction to Robotics, Mechanics and Control", Pearson Education, New Delhi, 2004.

Reference Books:

1. Saeed B Niku," Introduction to robotics", Pearson Education, New Delhi 2003

2. George F Luger, "Artificial Intelligence", Pearson Edition Publication , 4th Edition, 2002

3. Sudha Sadasivam, "Artificial Intelligence", Charulatha Publications, 2013

Head of the Department
Dept.of Compute Science,
Hindusthan College of Arts & Science,
Coimbatore – 641 028.

Code No.	Subject	Semester No.
16CEP06	**PRACTICAL I : PROGRAMMING LAB - JAVA**	I
Objective:	Construction of networking and java bean applications, Implementation of swings, tabbed panes and animations.	
Ex. No.	**Program List**	
1.	Write a java Program to implement REMOTE METHOD INVOCATION.	
2.	Write a java program to execute EVENT HANDLING.	
3.	Write a java program to implement SOCKET PROGRAMMING concept.	
4.	Write a java program to display IPADDRESS OF HOST MACHINE.	
5.	Write a java program to perform GENERIC SERVLET MESSAGE.	
6.	Write a java program to implement GUI WITH BORDER LAYOUT.	
7.	Write a java program to implement SWING CONCEPTS.	
8.	Write a java program to display different countries DATE AND TIME format.	
9.	Write a java program to perform TABBED PANES.	
10.	Write a java program to implement JAVA BEANS applications.	
11.	Write a java program to execute NETWORKING concept.	
12.	Write a java program to perform ANIMATION of different shapes.	

Head of the Department
Dept.of Compute. Science,
Hindusthan College of Arts & Science,
Coimbatore - 641 028.

Code No.	Subject	Semester No.
16CEP07	ADVANCED OPERATING SYSTEM	II
Objective:	On successful completion of the course the students should have the knowledge of: Processes, Concurrency, File management etc.,	
Unit No.	**Topics**	**Hours**
Unit I	**Operating system Overview:** Operating system Objectives and Functions-Evolution of Operating systems.Processess-What is Process?-Process states-Process Description-Process Control-Security Issues-Processes and Threads-Symmetric multiprocessing (SMP).	12
Unit II	**Concurrency:** Principles of Concurrency-Mutual Exclusion-Semaphores-Monitors-Message Passing-Readers/Writers Problem -Principles of Deadlock-Deadlock Prevention-DeadLock Avoidance-DeadLock Detection-An Integrated DeadLock Strategy-Dinning Philosophers Problem.	12
Unit III	**Memory Management:** Memory Management Requirements-Memory Partitioning-Paging-Segmentation- Security Issues-Virtual memory- Hardware and control structures-Operating System Software.	10
Unit IV	**Scheduling:** Uniprocessor Schedulig-Types of scheduling-Scheduling Algorithms-Multiprocessor Scheduling-Real-Time Scheduling-Computer Security threats-Computer Security Concepts-Threats, Attacks and Assets-Intruders-Malicious software overview-Viruses-worms and bots-Root kits-Computer Security Techniques.	13
Unit V	**Input/output and File Management:** I/O Management and Disk Scheduling-I/O devices-organization of the I/O function-Operating System design Issues-I/O Buffering-Disk scheduling-RAID- Disk Cache- File Management-File organization and Access- File directories-File Sharing-Record Blocking-Secondary Storage Management-File system security.	13

Text Book :

1. *William Stallings, "Operating systems", Pearson , Prentice Hall, 6th edition.*

Reference Books:

1. *Pramod Chandra P. Bhatt, "An Introduction to Operating Systems", Prentice Hall of India, 2003.*
2. *Andrew S. Tanenbaum, "Modern Operating System", Prentice Hall of India, Second 2001.*
3. *Achyut s.Godbole,"Operating Systems", Tata Mc Graw-Hill Publishing Company Ltd.2003.*

Head of the Department
Dept. of Compute Science,
Kingstonian College of Arts & Science,
Coimbatore - 641 028.

Code No.	Subject	Semester No.
16CEP08	ADVANCED RDBMS	II
Objective:	On successful completion of the course the students should have the knowledge of : Database design, SQL Queries, Object Data bases etc.,	

Unit No.	Topics	Hours
Unit I	**Introduction to Database Design:** Database Design and ER Diagrams-Entities, Attributes and Entity Sets-Relationships and Relationship Sets-Additional Features of the ER Model-Conceptual Design With the ER Model -Relational Model- Integrity constraints over relations – Enforcing integrity constraints –Querying relational data – Logical database design - ER to Relational –Introduction to Views –Destroying/Altering Tables and Views.	12
Unit II	**SQL: Queries, Programming, Triggers:** The form of a basic SQL Query – UNION,INTERSECT and EXCEPT – Nested Queries – Aggregate operators – Null values –Complex integrity constraints in SQL - Triggers & Active data bases- Designing Active Databases.	12
Unit III	**Overview of Transaction Management:** The ACID Properties - Transactions and Schedules – Concurrent execution of Transactions – Lock-based concurrency control – Performance of Locking –Transaction support in SQL-Introduction to Crash Recovery-Concurrency Control- Introduction to Lock Management-Lock Conversions-Dealing With DeadLocks-Specialized Locking Techniques- Concurrency control without locking.	12
Unit IV	**Schema Refinement and Normal forms:** Introduction to Schema refinement – Functional dependencies – Reasoning about functional dependencies – Normal forms –Properties of Decompositions – Normalization – Schema Refinement in data base design – other kinds of dependencies. Security And Authorization - Introduction to Database security -Access control – Discretionary Access control – Mandatory Access control – Additional issues to security.	12
Unit V	**Object-Database Systems:** Structured Data Types-Operations on Structured Data-Encapsulation and ADTs-Inheritance-Objects-OIDs and Reference Types-Database Design for an ORDBMS-ORDBMS Implementation Challenges-OODBMS-Comparing RDBMS, OODBMS and ORDBMS.	12

Text Book :

1. Raghu Ramakrishnan, Johannes Gehrke –"Database Management Systems", McGraw-Hill Higher Education, Third Edition, 2003.

Reference Books:

1. Elmasri, Navathe, "Fundamentals of Database Systems ", Pearson Education Asia, Third Edition, 2004.
2. Khandare S S , "Database Management and Oracle Programming", S.Chand and Company Ltd. First Edition,2004,
3. Nilesh Shah, "Database Systems using Oracle", Prentice Hall of India 2002.

Head of the Department
Dept.of Computer Science,
Hindusthan College of Arts & Science,
Coimbatore - 641 028.

Code No.	Subject	Semester No.
16CEP09	TIER ARCHITECTURE USING .NET FRAMEWORK	II
Objective:	To impart knowledge on various aspects of tier architecture in .net framework	

Unit No.	Topics	Hours
Unit I	Software Architecture: Introduction to Software Architecture, Anyway- Applying Architectural Principles to Software - UML at a Glance - Motivation for and History of Modeling Languages - UML Modes and Usage - UML Diagrams - Use-Case Diagrams - Class Diagrams. Introduction to .Net framework.	14
Unit II	**OOPS Development :** Object-Oriented Design - Basic OOD Principles - Advanced Principles - From Principles to Patterns- What"s a Pattern? - Patterns vs. idioms - Dependency injection - Applying Requirements by Design – Testability Security - From Objects to Aspects - Aspect-Oriented Programming.	15
Unit III	**Logic Layer:** Introduction to Business Logic Layer - Dissecting the Business Layer Where Would You Fit the BLL?- Business and Other Layers - Patterns for Creating the Business Layer - The Transaction Script Pattern - Generalities of the Ts Pattern - The Pattern in Action - The Table Module Pattern - Generalities of the TM Pattern - The TM Pattern in Action .	15
Unit IV	**Service Layer**: Introduction to Service Layer - Services in the Service Layer The Service Layer Pattern in Action - Generalities of the Service Layer Pattern - The Services Layer Pattern in Action - Related Patterns The Remote Façade Pattern - The Data Transfer Object Pattern The Adapter Pattern - DTO vs. Assembly - Service-Oriented Architecture.	14
Unit V	**Data Access Layer:** What"s the Data Access Layer Anyway - Functional Requirements of the Data Access Layer - Responsibilities of the Data Access Layer - The Data Access Layer and Other Layers -Designing Your Own Data Access Layer- User Interface and Presentation Logic - Responsibilities of the Presentation Layer- Responsibilities of the User Interface - Common Pitfalls of a Presentation Layer.	14

Text Book:

1. Andrea Saltarello, "Microsoft .NET - Architecting Applications for the Enterprise", Developer Reference

Reference Books:

1. Dino Esposito "Microsoft .NET - Architecting Applications for the Enterprise", Developer Reference, 2nd Edition
2. Gary McLean Hal "Adaptive Code via C#: Agile coding with design patterns and SOLID principles", Developer Reference.
3.Ben Watson , "Writing High-Performance .NET Code",2014 .

Code No.	Subject	Semester No.
16CEP10	**PRACTICAL II : PROGRAMMING LAB - RDBMS**	II
Objective:	Study features of commercial RDBMS packages such as Oracle and Developer 2000 laboratory exercise should include defining scheme of applications, creation of a database, writing SQL queries to retrieve information from database.	
Ex. No.	**Program List**	
1.	Design a Database to create College admission system. (both, UG and PG)	
2.	Write a SQL query to create a Department Database.	
3.	Write a SQL query for Bus Pass Booking and Renewal.	
4.	Write a SQL query to implement Personal Information.	
5.	Write a SQL query for News Paper Vendor Management System.	
6.	Write a SQL query for Student Mark Statement Processing System.	
7.	Design a Database to create for Hostel Management.	
8.	Write SQL queries for Stock Maintenance.	

Head of the Department
Dept.of Computer Science,
Hindusthan College of Arts & Science,
Coimbatore - 641 028.

Code No.	Subject	Semester No.
16CEP11	**PRACTICAL III : PROGRAMMING LAB - .NET**	II
Objective:	To focus on tier architectural skills using .net framework.	
Ex. No.	**Program List**	
1.	Write a .net program using Tier architecture for Working with Page and forms using ASP .Net.	
2.	Write a .net program using Tier architecture Data Sources access through ADO.Net.	
3.	Write a .net program using Tier architecture Sending Mail and SMTP Mail and C#.	
4.	Write a .net program using Tier architecture using the System .Net Web Client to retrieve or Upload Data with C#.	
5.	Write a .net program using Tier architecture Simple Web creation using ASP.NET.	
6.	Develop a form in VB.NET using Tier architecture to pick a date from Calendar control and display the day, month, and year details in separate text boxes.	
7.	Develop a VB.Net application using Tier architecture to perform timer based quiz of 10 questions.	
8.	Develop a VB.Net application using Tier architecture for File and Directory controls to implement a common dialog box.	
9.	Develop a menu based VB.Net application using Tier architecture to implement a text editor with cut, copy, paste, save and close operations.	
10.	Create an application for Accessing a SQL Database by Using ADO.NET by connecting to the SQL Server database and call a stored procedure. You then display the data in a Repeater control.	

Head of the Department
Dept.of Comput. Science,
Hindusthan College of Arts & Science,
Coimbatore - 641 028.

Code No.	Subject	Semester No.
16CEP12	DIGITAL IMAGE PROCESSING	III
Objective:	To impart Knowledge in various aspects of Digital image processing techniques	

Unit No.	Topics	Hours
Unit I	**Introduction**: What is Digital image processing? – the origin of DIP – Examples fields of DIP-Fundamentals steps in DIP – Components of an image processing system. Digital Image Fundamentals: Element of visual perception, Image Sampling and Quantization, some basic relationships between pixel.-Histogram Processing-Fundamentals of spatial Filtering.	10
Unit II	**Introduction to spatial and Filtering Methods:** Smoothing spatial filters, sharpening spatial filters.-Sampling and the Fourier Transform of Sampled Functions-Discrete Fourier Transform (DFT).-Selective Filtering-Erosion and Dilation-The Hit –or-Miss Transformations.	15
Unit III	**Image Restoration and Reconstruction:** Noise Models-Restoration in the presence of Noise only-Spatial Filtering –Periodic Noise Reduction by Frequency Domain Filtering-Inverse filtering. Color Image Processing: Color Models- Color Transformations-Smoothing and Sharpening-Noise in Color images.	15
Unit IV	**Image Compression**: Fundamentals – Image compression models – Elements of Information Theory –Some Basic Image compression Methods.-Error free compression & Lossy Compression.	10
Unit V	**Image Segmentation**: Point,Line,Edge detection – Thresholding – Region-Based segmentation – Segmentation by Morphological watersheds-the Use of Motion in Segmentation-Introduction to Neural Network.	10

Text Book:

1. Rafael C. Gonzalez and Richard E.Woods, "Digital Image Processing", Prentice–Hall of India, 2002.

Reference Books:

1. Annadurai S and Shanmugalakshmi R, "Fundamentals of Digital Image Processing",Pearson Education, 2007.
2. Joshi M A, "Digital Image Processing, An Algorithmic Approach", Prentice-Hall of India, 2006.
3. Chandra B and Majumder D D, "Digital Image Processing and Analysis", Prentice-Hall of India, 2007.

Head of the Department
Dept.of Computer Science,
Hindusthan College of Arts & Science,
Coimbatore – 641 028.

Code No.	Subject	Semester No.
16CEP13	MOBILE COMPUTING	III
Objective:	To understand mobile computing phenomenon in terms of key technologies, relevant standards and applications, Critically analyze security issues of mobile and wireless computing systems.	

Unit No.	Topics	Hours
Unit I	**Introduction:** History of Mobile Communication, Simplified Reference Model, Wireless Transmission Frequencies for radio transmission, Signals, Antennas, Signal Propagation, Multiplexing, Modulation, Spread Spectrum, Cellular Systems. Medium Access Control: SDMA, FDMA, TDMA, and CDMA, Comparison of S/F/T/CDMA.	10
Unit II	**Telecommunication Systems:** GSM, DECT, TETRA, UMTS and IMT-2000. Satellite Systems: Applications, Basics: GEO, LEO, MEO, Routing, Localization, Handover, Examples.	12
Unit III	**Broadcast Systems:** Overview, Cyclical repetition of data, Digital audio broadcasting, Digital video broadcasting, Convergence of broadcasting and mobile communications. Wireless LAN: Infrared Vs radio transmission, Infrastructure and ad hoc networks, IEEE802.11, HIPERLAN, and Bluetooth.	13
Unit IV	**Wireless ATM:** Motivation, Working group, WATM services, Reference model, Functions, Radio access layer, Handover, Location management, Addressing, Quality of service, Access point control protocol. Mobile network layer: Mobile IP, Dynamic host configuration protocol, Ad-hoc networks.	15
Unit V	**Mobile transport layer:** Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmission/ fast recovery, Selective retransmission, Transaction oriented TCP. Support for mobility: Wireless application protocol, mode, SyncML, WAP2.0.	10

Text Book:

1. Jochen Schiller," Mobile Communication", , Pearson Education India, 2nd Edition 2000.

Reference Books:

1. Yi-Bing Lin and Imrich Chlamtac," Wireless and Mobile Network Architecture", John Wiley and Sons, Second Edition, 2001. ISBN: 0-471-39492-0.

2. Wei - Meng Lee,"Beginning ANDROID Tablet Application Development", Wiley publications, First Edition,2013.

3. Palanivelu T G, Nakkeeran R, "Wireless and Mobile Communication" PHI Ltd., 2009

Head of the Department
Dept. of Comput. Science,
Hindusthan College of Arts & Science,
Coimbatore - 641 028

Code No.	Subject	Semester No.
16CEP14	**ADVANCED NETWORK & SECURITY**	III
Objective:	Understand the principles of cryptography and Network Security. Understand Email security, IP security, web security, firewalls and Mobile Network Security.	
Unit No.	**Topics**	**Hours**
Unit I	**Introduction :** Security Trends - The OSI Security Architecture - Security Attacks - Security Services - A model for Internetwork Security. Classical Encryption Techniques: Symmetric Cipher Model - Substitution Techniques -Transposition Techniques - Steganography.	12
Unit II	**Block Ciphers and the DES :** Block cipher Principles - The DES - The Strength of DES - Differential and Linear Crypt Analysis - Block Cipher Design Principles. Advanced Encryption Standard: Evaluation Criteria for AES - The AES Cipher. Public key cryptography and RSA: Principles of Public – Key Cryptosystems – The RSA Algorithm	12
Unit III	**Keys Management :** Key Cryptosystems: Diffie-Hellman Key exchange – Elliptic Curve Arithmetic - Elliptic Curve Cryptography. Message Authentication and Hash Functions: Authentication Requirements - Authentication Functions - Security of Hash Functions and MACs	12
Unit IV	**Digital Signatures and Authentication Protocols:** Digital Signatures -Authentication Protocols - Digital Signature Standard. Authentication Applications: Kerberos - X.509 Authentication Service, Public-Key Infrastructure. Email Security: Pretty Good Privacy - S/MIME.	12
Unit V	**IP Security :** IP Security Overview - IP Security Architecture - Authentication Header -Encapsulating Security Payload. Web Security: Security Considerations-SSL and TLS-SET. System Security: Intruders - Intrusion Detection – Password Management. Malicious Software: Viruses and Related Threats. Firewalls: Design Principles - Trusted systems.	12

Text Book:

1. William Stallings, "Cryptography and Network Security", Principles and Practices Prentice Hall of India, New Delhi 5th edition 2010.

Reference Books:

1. Atul Kahate., "Cryptography and Network Security", Tata McGraw-Hill, New Delhi, New Delhi.
2. Bragg, roberta., "Network Security", Mcgraw-Hill/osborne, New Delhi.
3. Charles P Fleege, Sharilawrence P Fleege., "Security in Computing", Pearson Education, New Delhi.

Head of the Department
Dept. of Compute Science,
Hindusthan College of Arts & Science,
Coimbatore - 641 028.

Code No.	Subject	Semester No.
16CEP15	CLOUD COMPUTING	III
Objective:	To explore basic knowledge about cloud and to understand cloud application concepts, architectural designs, virtual usage of cloud.	
Unit No.	Topics	Hours
Unit I	**Cloud Basics:** Cloud computing basics: Overview-Application-Intranet and the cloud-First moves in the cloud-Benefits-Limitations-Security concern. Hardware and infrastructure: Clients-Security-Network-Services.	10
Unit II	**Accessing Cloud:** Accessing the cloud: Platforms-Web Applications-Web APIs-Web browsers. Cloud storage: Overview-Storage providers. Standards: Application-Client-Infrastructure-Service.	15
Unit III	**Technology and Development:** Cloud technologies: Web services- AJAX- Mashups. Multitenant software: Multi entity- Schema- Multi tenancy-Data access control. Cloud development: Relational database- Cloud file system-Big Table, H base, Dynamo-Cloud data stores.	15
Unit IV	**Cloud Migration:** Local cloud: Virtualization-HyperV-VMware-Storage virtualization-Grid-Other cloud related technology.	10
Unit V	**Cloud Security:** Cloud security: Physical- Virtual-Risk Management-Security Design patterns-Security Standards. Managing the cloud: Iaa S - PaaS- SaaS. Other future trends: SNIA- DMTF- VIST-IEEE-DGF-End user programming-Open Scirus.	10

Text Book:

1. Anthony T. Velte, Toby J. Velte , Robert Elsenpeter , "Cloud Computing -A Practical Approach", Tata Mc Graw Hill publications

Reference Books :

1. Gautam Shroff , "Enterprise Cloud Computing", Cambridge University Press.
2. DinkarSitaram, Geetha Manjunath, "Moving To The Cloud" , Syngress publications.
3. Micheal Miller, "Cloud Computing", Pearson Edition, New Delhi, 2009

Head of the Department
Dept. of Computer Science,
Hindusthan College of Arts & Science,
Coimbatore - 641 028.

Code No.	Subject	Semester No.
16CEP16	PRACTICAL IV: PROGRAMMING LAB – DATA MINING USING MATLAB	III
Objective:	To improve the simulation skills and data research using Matlab.	
Ex. No.	Program List	
1.	Write a Matlab Program for Creating Database.	
2.	Write a Matlab Program for importing an external data set.	
3.	Write a Matlab Program for Basic Clustering.	
4.	Write a Matlab Program for K- Means Clustering.	
5.	Write a Matlab Program for Hierarchal Clustering.	
6.	Write a Matlab Program for Find nearest neighbors using exhaustive search or *kd*-tree search.	
7.	Write a Matlab Program for Markov models for data generation.	
8.	Write a Matlab Program for Support vector machines for binary or multiclass classification.	
9.	Write a Matlab Program for Binary decision trees for multiclass learning.	
10.	Write a Matlab Program Acquisition Using the Image Acquisition tool.	

Head of the Department
Dept.of Computer Science,
Hindusthan College of Arts & Science,
Coimbatore – 641 028.

Code No.	Subject	Semester No.
16CEP17	ELECTIVE - I : MULTIMEDIA & ITS APPLICATIONS	III
Objective:	To impart knowledge on various aspects of multimedia tools and its platforms.	

Unit No.	Topics	Hours
Unit I	**Introduction to Multimedia:** Multimedia Applications -The Stages of making multimedia project-Macintosh and Windows Production platforms – Basic Software tools: Text Editing and Word processing Tools-OCR Software-Painting and Drawing Tools-3-D Modeling and Animation Tools-Image Editing Tools-Sound Editing Tools-Animation, Video and Digital Movie Tools.	12
Unit II	**Multimedia authoring tools:** Making Instant Multimedia –Types of Authoring Tools – Card and Page Based Authoring tools- Icon and Object based Authoring Tools-Time Based Authoring tools-Cross-Platform Authoring Notes. Multimedia building blocks: Text: About Font and Faces- using Text in Multimedia-Computers and Text-Font editing and Design Tools-Hypermedia and Hypertext.	15
Unit III	**Sound:** The Power of Sound- Multimedia System Sounds-Digital Audio-Audio File Formats-Making MIDI Audio-MIDI versus Digital Audio-Adding Sound to your Multimedia project. Images: Making Still Images-Color-Image File Formats. Animation: Principles of Animation – Making Animation That Work. Video: Broadcast Video Standards-Analog Video-Digital Video-Video Recording and Tape Formats-shooting And editing Videos.	12
Unit IV	**Multimedia and the Internet:** The Internet and how it works – Tools for World Wide Web: Web Servers-Web Browsers- Web Page Makers and Site Builders- Plugs-in and Delivery Vehicles. Designing for the World Wide Web: working on the Web- Text for the Web-Images for the Web-Sound for the Web-Animation for the Web	12
Unit V	**Planning and Costing**: The Process of Making Multimedia- Scheduling-Estimating-REPs and Bid Proposals. Content and Talent: Acquiring Content- Using Content Created by Others-Using Talent. Delivering: Testing Preparing For Delivery-Delivering on CD-ROM- Delivering on the World Wide Web.	09

Text Book:

1. Tay Vaughan, "Multimedia making it work", Tata McGraw Hill, Fifth Edition.

Reference Books:

1. Judith Jeffloate, "Multimedia in Practice (Technology and Applications)", PHI, 2003.
2.John F.Koegel Bufford, "Multimedia Systems",pearson Education.
3.Ranjan parekh,"Principles of Multimedia", TMH ,2007.

Dept.of Compute Science,
Hindusthan College of Arts & Science,
Coimbatore - 641 028.

Code No.	Subject	Semester No.
16CEP17	**ELECTIVE - I : WEB TECHNOLOGY**	III
Objective:	To impart knowledge on various aspects of web based technologies.	

Unit No.	Topics	Hours
Unit I	**Introduction to Internet & HTML**: Introduction – History of the Internet – Services and Accessibility – Uses – Protocols – Internet Standards – HTML – Introduction – HTML Document – Head Section – Body Section – HTML Forms – Java Script – Introduction – Language Elements – Objects of Java Script – Other Objects – Arrays.	12
Unit II	**HTML Features**: Dynamic HTML - CSS – Document Object Model – Event Handling – Filters and Transitions – Data Binding	12
Unit III	**Web Servers:** Web Servers and Servlets - Tomcat web server, Introduction to Servelets: Lifecycle of a Servelet, JSDK, The Servelet API, The javax servelet Package, Reading Servelet parameters, Reading Initialization parameters. The javax servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues	12
Unit IV	**JSP Servelet:** Introduction to JSP - The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat	12
Unit V	**JSP Application:** JSP Application Development - Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations	12

Text Books:

1. Gopalan N P, Akilandeswari J, "Web Technology – A Developers Perspective", Prentice Hall of India Pvt. Ltd., New Delhi, 2008 (Units I and II).

2. Marty Hall and Larry Brown Pearson, "Core Servlets and Java Server Pages", volume 1: core technologies, Pearson Education India (Units III, IV and V).

Reference Books:

1. *Jaworkski J, "Mastering Java script", BPB Publications, 1999.*
2. *RajKamal, "Internet And Web Technologies", TMH.*
3. *Behrouz A.Forouzan, TMH, 3rd edition.*

Head of the Department
Dept.of Compute: Science,
Hindusthan College of Arts & Science,
Coimbatore - 641 028.

Code No.	Subject	Semester No.
16CEP18	**ADVANCED WEB PROGRAMMING IN PHP & MySQL**	IV
Objective:	Understand the programming concepts of PHP Scripting Language, Construct simple and complex queries using MySQL and PHP	
Unit No.	**Topics**	**Hours**
Unit I	**Introduction :** Server-Side Web Scripting - Syntax and Variables-Control and Functions. Passing Information between Pages: GET Arguments - POST Arguments - Formatting Form Variables - PHP Super global Arrays	12
Unit II	**Data Manipulations: Strings** in PHP - String Functions-Arrays and Array Functions: Creating Arrays - Retrieving Values - Multidimensional Arrays - Inspecting Arrays - Deleting from Arrays - Iteration. Advanced Array Functions: Transformation of Arrays. Number Handling: Numerical Types - Mathematical Operators - Simple Mathematical Functions - Randomness.	12
Unit III	**Session and Cookies :** Regular Expressions: Tokenizing and parsing Functions - Regular Expressions - Perl - Compatible Regular Expressions - Advanced String Functions. Working with the File system: PHP File Permissions - File Reading and Writing Functions - File system and Directory Functions - Network Functions - Date and time Functions - Calendar Conversion Functions. Working with Sessions and Cookies: Sessions work in PHP - Session Functions - Configuration Issues - Cookies - Sending HTTP Headers	12
Unit IV	**Structured Query Language (SQL):** Relational Database and SQL-SQL standards-The Workhorses of SQL-Database Design-Privileges and Security. PHP and MySQL: Connecting to MySQL - Making MySQL Queries - Fetching Data Sets - Multiple Connections - Error Checking - Creating MySQL Databases with PHP - MySQL Functions.	12
Unit V	**Performing Database Queries :** HTML Tables and Database Tables - Complex mapping -Creating the sample Tables. Integrating Web Forms and Databases: HTML Forms - Basic Form Submission to a Database - Self Submission - Editing Data with an HTML Form.	12

Text Book :

1. *Steve Suehring Tim Converse and Joyce Park , "PHP6 and MySQL Bible", Wiley-India.New Delhi 2009*

Reference Books:

1. Dacie Cristian, "Pack Pub AJAX and PHP" - 2006

2. Scouarnec Yann, Stolz Jeremy Jeremy and Glass Michael , "Beginning PHP5, APACHE, MySQL Web Development" , Wiley-India. New Delhi, 2005

3. Steven Holzner, "The Complete Reference" , Tata McGraw Hill Edition, NewDelhi, 2009

Head of the Department
Dept. of Computer Science,
Hindusthan College of Arts & Science,
Coimbatore - 641 028.

Code No.	Subject	Semester No.
16CEP19	**BUSINESS INTELLIGENCE**	IV

Objective:	To enable the students to help in justifying the knowledge management and business Intelligence investments and explains Knowledge Creation and Business Intelligence, Knowledge, Portal Technologies in knowledge management

Unit No.	Topics	Hours
Unit I	**Introduction:** Basics - What is Knowledge Management? - Key Challenges - KM Life Cycle - Understanding Knowledge – Definitions - Cognition and Knowledge Management - Data, Information, and Knowledge - Types of Knowledge - Expert Knowledge.	12
Unit II	**Knowledge Management System Life Cycle:** Knowledge Management System Life Cycle - Challenges in Building KM Systems - Conventional Versus KM System Life Cycle - KM System Life Cycle - System Justification – Role of Rapid Prototyping - Role of Knowledge Developer – User Training.	12
Unit III	**Knowledge Creation:** Knowledge Creation – Nonaka's Model of Knowledge Creation and Transformation - Knowledge Architecture - Capturing Tacit Knowledge – Evaluating the Expert – Developing a relationship with Expert – Interview as a tool – Brainstorming – Repertory Grid - Nominal- Group Techniques(NGT) – Delphi method – Concept mapping Knowledge Codification – Codification Tools and Procedures - Knowledge Developers Skill Set - Knowledge Transfer - Transfer Methods - Portals Basics - Business Challenge - Knowledge Portal Technologies - Ethical and Legal Issues - Knowledge Owners - Legal Issues.	12
Unit IV	**Changing Business Environments:** Changing Business Environments and Computerized Decision Support - A Framework for Business Intelligence - Intelligence Creation and Use and BI Governance – Transaction Processing versus Analytic Processing - Successful BI Implementation - Major Tools and Techniques of Business Intelligence.	12
Unit V	**Implementing BI:** Implementing BI: An Overview - BI and Integration Implementation - Connecting BI Systems to Databases and Other Enterprise Systems - On-Demand BI - Issues of Legality, Privacy, and Ethics -Emerging Topics in BI: An Overview - The Web 2.0 Revolution - Online Social Networking: Basics and Examples - Virtual Worlds - Social Networks and BI: Collaborative Decision Making - RFID and New BI Application Opportunities - Reality Mining.	12

Text Books:

1. Elias M.Awad, Hassan M.Ghaziri,"Knowledge Management", Pearson Education, 2004, (Units I, II and III).
2.Efraim Turban, Ramesh Sharda, Dursun Delen and David King, "Business Intelligence"2nd Edition, 2010. (Unit IV – Chapter 1, Unit – V -Chapter 6).

Reference Books:

1. Efraim Turban, Ramesh Sharda, Bursun Delen, David King," Business Intelligence: A Managerial Approach", Pearson, 2nd Edition.
2. "Planning for Big Data", O"Reilley Radar Team, 2012.
3. Chris Eatun, Dirk Daroos, Tom Deutsh, George Lapis, Paul Zikopoulos, "Understanding Big data Analytics for Enterprise class Hadoop and stereaming Data", Tata Mc Graw Hill, 2012.

Head of the Department
Dept. of Computer Science,
Sri Ramakrishna College of Arts & Science
Coimbatore - 641 028.

Code No.	Subject	Semester No.
16CEP20	PRACTICAL V : PROGRAMMING LAB - PHP	IV
Objective:	Construct simple and complex queries using MySQL and PHP, Implement the basics of MySQL database tables by Adding and Editing Data.	
Ex. No.	Program List	
1.	Create a program for implementing Inheritance.	
2.	Write a program to send an HTML formatted Email with attachment in PHP.	
3.	Write a program for login authentication using PHP and MySQL.	
4.	Creating Crud Grid For A Student Database Using PHP and MySQL.	
5.	Write a program to upload a file in PHP.	
6.	Write a program to create a RSS feed using PHP and MySQL.	
7.	Create a Pay slip for an employee using PHP and MySQL.	
8.	Download a small project module and convert into our Requirement.	
9.	Create a web program to access the data from user groups by setting Privileges.	
10.	Create an Admin panel to control User data in client side.	

Head of the Department
Dept.of Compute Science,
Hindusthan College of Arts & Science,
Coimbatore - 641 028.

Code No.	Subject	Semester No.
16CEP21	ELECTIVE - II : EMBEDDED SYSTEMS	IV
Objective:	To enable the students to learn about software tools in the embedded systems.	

Unit No.	Topics	Hours
Unit I	**Introduction to Embedded Systems:** Embedded System –Processor in the system –Other hardware units – software embedded into a system – Exemplary Embedded systems –On chip and in VLSI Circuit. Advanced Processor Architecture and Memory Organization for Embedded systems.	12
Unit II	**Devices and Communication Buses for Device Network:** I/O Types & Examples – Serial Communication Devices- Parallel Communication Devices-Wireless Devices – Timer & Counting Devices-Watchdog Timer-Real Time Clock – Network Embedded System – Serial Bus Communication Protocol – Parallel bus Device protocol – Internet Enabled protocol – Wireless & Mobile system protocol. Programming Concept & Embedded programming, Program Modeling Concept.	12
Unit III	**Real Time Operating System:** OS Services – Process Management – Memory Management – Devices, File & I/O subsystem Management – Interrupt Routines, RTOS , Basic Design Units – RTOS Task Scheduling Model – Interrupt Latency & Response of task- Basic Function & Types , RTOS mcos-II,VX Works, OSEK, Linux 2.6.x & RTLinux.	12
Unit IV	**Software Tools:** Embedded software Development Tools: Hosts and Target Machines-Linker/Locators for Embedded software-getting Embedded software into the Target systems. Debugging Techniques: Testing on your Host machine-Simulators- - Using laboratory tools.	12
Unit V	**Case Studies & Design Samples :** Digital Camera, Hardware & Software Architecture, Embedded System Design& Coding for an ACUM, Smart Card and ACC.	12

Text Book :

1. Raj Kamal, "Embedded Systems – Architecture, programming and design", McGraw –Hill Education, Second Edition, 2008.

Reference Books:

1. David E. Simon, "An Embedded Software primer" Pearson Education Asia, 2003.
2. Kenneth J Ayala,"The 8051 Microcontroller and Architecture Programming and Application", Penram Interanational, 2nd Edition.
3. Daniel Tabak, "Microprocessors and Microcontrollers", Pearson Education.

Head of the Department
Dept.of Computer Science,
Hindusthan College of Arts & Science
Coimbatore - 641 028.

Code No.	Subject	Semester No.
16CEP21	**ELECTIVE - II : WIRELESS COMMUNICATION AND TECHNOLOGY**	IV
Objective:	To enable the students to learn the wireless application protocol and wireless telephone applications.	
Unit No.	**Topics**	**Hours**
Unit I	**Introducing the Mobile Internet:** Introduction –Market Convergence – Enabling Convergence –Key Services for the Mobile Internet – Business Opportunities. Making the Internet "Mobile ": Challenges and Pitfalls – The Origins of WAP –WAP Architecture –Components of the WAP Standard –Network Infrastructure services Supporting WAP Clients – WAP Architecture Design Principles –Relationship to other Standards	12
Unit II	**Implementing WAP Services:** The Wireless Markup Language: Overview –The WML Document Model –WML Authoring –URLs Identify Content -Markup Basics –WML Basics -Basic Content –Events , Tasks and Bindings –Variables –Controls –Miscellaneous Markup –ending Information –Application Security -Document Type Declaration –Errors and Browser Limitations .	12
Unit III	**User Interface design: Making Wireless Application -**Web Site Design: Computer Terminals versus Mobile Terminals –Designing a usable WAP Site –Structured Usability Methods –User Interface Design Guidelines –Design Guidelines for Selected WML Elements.	12
Unit IV	**Advanced WAP:** Tailoring Content to the Client –Push Messaging: Overview of WAP Push –Push Access Protocol – WAP Push Addressing – Push Message – MIME media types for Push Messages - Push Proxy Gateway –Push Over – the Air Protocol – Push Initiator Authentication and Trusted Content.	12
Unit V	**Wireless Telephony Applications:** Overview of the WTA Architecture – The WTA Client Framework - The WTA Server and Security – Design Considerations - Application Creation Tool Box –Future WTA Enhancements –Mapping the Deployment Chain to the Business value chain – Security Domains – Linking WAP and the Internet –WAP Service Design –The Mobile Internet Future .	12

Text Book:

1. SandeepSinghal, Thomas Bridgman, LalithaSuryanarayana, Daniel Mauney ,JariAluimenand Others, "The Wireless Application Protocol,Writing Applications for the Mobile Internet", Pearson Education,2006.

Reference Books:

1. Charless Arehare ,Nirmal Chidambaram and others , "Professional WAP", Wrox press Ltd ., Shroff pub . And Dist –Pvt. Ltd., 2001.

2.Wei - Meng Lee ,‖Beginning ANDROID Tablet Application Development‖, Wiley publications, First Edition,2013.

3. Wallace Jackson, —Android Apps for Absolute Beginners, APRESS, 2nd edition, 2012.

Head of the Department
Dept.of Computer Science,
Hindusthan College of Arts & Science
Coimbatore – 641 028.

Code No.	Subject	Semester No.
16CEP22	PROJECT WORK	IV
Objective:	To Provide Students with the opportunity to apply Computer related concepts, To Provide Students with educational opportunities and experiences through direct participation in Information Technology related research.	

Institutional / Industrial Training		Mini Project	Project Work		
Components	Marks		Components		Marks
I.E			*I. E*		
Work Diary	25	-	a) Attendance Marks	20	
Report	50	50	b) Review Marks	30	50
Viva –voce	25	50			
Examination					
Total	**100**	**100**			
			*E.E**[1]		
			a) Final Report Marks	120	
			b) Viva-voce Marks	30	150
				Total	**200**

*[1]Evaluation of report and conduct of viva voce will be done jointly by Internal and External xaminers.

Head of the Department
Dept. of Computer Science,
Hindusthan College of Arts & Science,
Coimbatore-641 028.