

Veer Narmad South Gujarat University
Surat

Master of Science (Information Technology)
[Five Year Integrated Course]

Semester :9

Syllabus

Effective from June 2012

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
M.Sc. (I.T.) [Five Year Integrated Course]
M.Sc. (Information Technology)
Semester IX
Teaching and Evaluation Scheme

Paper Sr. No.	Paper Title	Teaching Schedule (Hours/Week)		University Exam Theory / Practical Duration Marks		Internal Exam Theory / Practical Duration Marks		Total Theory / Practical	Credit
		Lect	Prac	Hrs.	Marks	Hrs.	Marks		
901	Smart Device Computing	4	-	3	70	2	30	100	4
902	Artificial Intelligence	4	-	3	70	2	30	100	4
903	Cloud Computing	4	-	3	70	2	30	100	4
904	Data Warehousing and Data mining	4	-	3	70	2	30	100	4
905	Embedded Systems	4	-	3	70	2	30	100	4
906	Project	-	10	-	140	-	60	200	10
Total		30		490		210		700	30

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Paper No : 901

: 4 Hrs

Paper Title: Smart Device Computing

1. Introduction to Smart Devices

Definition, Evolution of Smart Devices, Pervasive computing, Categories and Features of Smart Devices , Comparison of various smart devices like mobile phones, PDAs.

2. Smart Device Operating Systems

introduction of RTOS, Architecture and working of Symbian OS, Android, iOS

3. Mobile Application Development in Java

Introduction to JavaME, JavaME Specifications, The Connected Limited Device Configuration, The CLDC Java Virtual Machine, and CLDC Class Libraries, MIDP Overview, The MIDP Java Platform, MIDlets and MIDlet Suites, MIDlet Execution Environment and Lifecycle, User Interface Overview, The High-Level User Interface API, The Low-Level MIDlet User Interface API, Networking and Persistent Storage, Recordsets, Sockets, Datagrams, HTTP Connections, Wireless Messaging, Bluetooth API

4. Mobile Application Development in Android

Introducing Android, Widgets and Containers, Using Selection Widgets, Employing Fancy Widgets and Container, Embedded Browsers, Menus and Messages, Dealing with Threads, Lifecycle Events, Preferences and Files, Working with Resources, Managing Local Databases, Communicating via the Internet: HTTP, Communicating via the Internet, Intents and Activities, Activity Introspection, Using a Content Provider, Building a Content Provider, Database-Backed Content Providers, Services and Permissions, Service AIDL, Service Behavior, Invoking a Service, Location-Based Services, Displaying Maps, Playing Media, Other Advanced APIs.

5. Mobile Application Development for iPhone iOS

Overview of iOS, iOS Layers, MVC, Objective-C, Xcode 4, Views, Protocols and Gestures, View Controllers, iPad, View Controller Lifecycle & Scroll View, Web View, Image View, Table View, Blocks, Multithreading, Categories, Core Location & Map Kit, Final Project Overview / Persistence, Documents and Core Data, Core Data and Table Views, Modal View Controllers, Text, Animation, Action Sheets, Image Picker, Core Motion, iCloud

6. Mobile Application Development with Nokia Web Run Time

Creating ready to run web widgets for Nokia Phones using Aptana Studio

7. Introduction to QT mobile application development Environment

Developing QT applications for mobile phones, QT Basics, Class Hierarchy, Event Model of QT, QT Simulators. Deploying and Testing QT Applications on Mobile

Main Readings:

1. J2ME: The Complete Reference by James Edward Keogh Osborne Publication 2009
2. Professional Android 2 Application Development by Reto Meier WROX Publication 2009
3. The Accredited Symbian Developer Primer: Fundamentals of Symbian OS, Jo Stichbury, Mark Jacobs, Wiley , ISBN 978-0-470-05827-5 , 2006
4. Inside Microsoft Windows CE, John Murray, Microsoft Press 2007
5. The Definitive Guide to Mobile Qt Symbian Development Platform, Daniel Zucker , Johan Thelin , Ray Rischpater 2007
6. Programming Windows Mobile Devices, Douglas Boling, Publisher: Microsoft Press 2008

Supplimentary readings :

1. Beginning Java ME Platform (Beginning from Novice to Professional) 3rd Edition by Ray Rischpater Apress Publication 2008
2. The Symbian OS Architecture Sourcebook: Design and Evolution of a Mobile Phone OS , Ben Morris, Wiley Publications, ISBN 978-0-470-01846-0, 2007
3. Android Essentials, Chris Haseman, Apress Publication, 2009
4. Foundations of Qt Development, Johan Thelin, Apress Publication, 2010
5. Professional Microsoft Smartphone Programming, Baijian Yang, Pei Zheng, Lionel M. Ni Publisher: Wrox, 2009

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Paper No : 902

: 4 Hrs

Paper Title: Artificial Intelligence

1. Artificial Intelligence:

Introduction to AI, History of AI, Emergence Of Intelligent Agents

2. Intelligent Agents:

PEAS Representation for an Agent, Agent Environments, Concept of Rational Agent, Structure of Intelligent agents, Types of Agents.

3. Problem Solving:

Solving problems by searching, Problem Formulation, Uninformed Search Techniques- DFS, BFS, Iterative Deepening, Comparing Different Techniques, Informed search methods – heuristic Functions, Hill Climbing, Simulated Annealing, A*, Performance Evaluation.

4. Constrained Satisfaction Problems:

Constraint Satisfaction Problems like, map Coloring, Crypt Arithmetic, Backtracking for CSP, Local Search.

5. Adversarial Search: Games, Minimax Algorithm, Alpha Beta pruning.

6. Knowledge and Reasoning:

A knowledge Based Agent, Introduction To Logic, Propositional Logic, Reasoning in Propositional logic, First Order Logic: Syntax and Semantics, Extensions and Notational Variation, Inference in First Order Logic, Unification, Forward and backward chaining, Resolution. Knowledge Engineering: Ontology, Categories and Objects, Mental Events and Objects.

7. Planning: Planning problem, Planning with State Space Search, Partial Order Planning, Hierarchical Planning, Conditional Planning.

8. Uncertain Knowledge and Reasoning: Uncertainty, Representing knowledge in an Uncertain Domain, Overview of Probability Concepts, Belief Networks, Simple Inference in Belief Networks

9. Learning: Learning from Observations, General Model of Learning Agents, Inductive learning, learning Decision Trees, Introduction to neural networks, Perceptrons, Multilayer feed forward network, Application of ANN, Reinforcement learning: Passive & Active Reinforcement learning.

10. Agent Communication: Communication as action, Types of communicating agents, A formal grammar for a subset of English

11. Expert Systems: Characteristics of Expert Systems, Design of Expert Systems, Stages in Expert systems development, Expert System Software Engineering, Expert System Life Cycle

12. Introduction to Natural Language Processing and Neural Networks

13. AI Programming (Any One)

6.1 PROLOG

6.2 LISP

Main Readings:

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 2nd Edition, Pearson Publication.

Recommended Readings:

1. George Luger, "AI-Structures and Strategies for Complex Problem Solving", 4/e, 2002, Pearson Education

2. Dan W. Patterson, Introduction to Artificial Intelligence and Expert System, PHI.

3. Elaine Rich, Kevin Knight, Artificial Intelligence, Tata McGraw Hill, 1999.

4. David W. Rolston, Principles of Artificial Intelligence and Expert System Development, McGraw Hill, 1988.

5. Lloyd, J. - Foundation of Logic Programming - Springer-Verlag

6. Clocksin, W. F. and Mellish, C. S. - Programming in Prolog Narosa Publ. House.

7. Carl Townsend - Introduction to Turbo Prolog B. P. B. Publication

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Paper No : 903

: 4 Hrs

Paper Title: Cloud Computing

CLOUD COMPUTING

- 1. Introduction to Cloud Computing**
 - 1.1 Evolution of Cloud Computing
 - 1.2 Virtualization
 - 1.3 Introduction to Grid technology
 - 1.4 Introduction to Distributed Computing
 - 1.5 Web Services and REST
 - 1.6 Browser as a platform
 - 1.7 Introduction to Web 2.0 and Web 3.0
 - 1.8 Introduction to Autonomic Systems
 - 1.9 Service Level Agreements

- 2. Cloud Service Models**
 - 2.1 Infrastructure as a Service
 - 2.1.1. Server virtualization
 - 2.1.2. Storage virtualization
 - 2.1.3. Network virtualization
 - 2.2 Platform as a Service (PaaS)
 - 2.2.1. Azure
 - 2.2.2. Goole AppEng
 - 2.2.3. Hadoop
 - 2.2.4. SalesForce
 - 2.3 Software as a Service (SaaS)
 - 2.3.1. Cloud services
 - 2.3.2. Web portal
 - 2.3.3. Web OS**

- 3. Cloud Computing Essentials**
 - 3.1 Cloud Computing Architectural Framework
 - 3.2 Cloud Deployment Models
 - 3.3 Virtualization in Cloud Computing
 - 3.4 Parallelization in Cloud Computing
 - 3.5 Security for Cloud Computing

SERVICE ORIENTED ARCHITECTURE

- 4. SOA Fundamentals :**
 - 4.1 Defining , Evolution , characteristics of SOA
 - 4.2 Basic SOA architecture, infrastructure services,
 - 4.3 SOA Enterprise Software models.

5. SOA Planning and Analysis

- 5.1 Stages of the SOA lifecycle
- 5.2 service-oriented analysis, Capture and assess business and IT issues and drivers
- 5.3 determining non-functional requirements
- 5.4 business centric SOA and its benefits,
- 5.5 Basic modeling building blocks

6. SOA Design and implementation

- 6.1 Service-oriented design process, design activities
- 6.2 Determine services
- 6.3 Tasks based on business process model
- 6.4 Orchestration of business processes using Business Process Execution Language BPEL.
- 6.5 Service integration environment with Enterprise Service Bus (ESB) .
- 6.6 Business Integration Tools.
- 6.7 Implementing SOA
- 6.8 SOA security implementation

7. SOA Governance

- 7.1 Factors of SOA Governance
- 7.2 SOA Governance Life Cycle
- 7.3 SOA Dashboard

Practical sessions and Case Studies on SOA and Cloud**Main Readings :**

1. "Cloud Computing: Principles and Paradigms," R. Buyya et al. (eds.), Wiley, 2010.
2. "Cloud Computing: Principles, Systems and Applications," L. Gillam et al. (eds.) Springer, 2010.
3. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Prentice Hall Publication, 2005.
4. Norbert Bieberstein, Sanjay Bose, Marc Fiammante, Keith Jones, Rawn Shah, "Service-Oriented Architecture Compass: Business Value, Planning, and Enterprise Roadmap", IBM Press Publication, 2005. 3. Sandy Carter, "The New Language of Business: SOA & Web 2.0", IBM Press, 2007.

Recommended Readings :

1. Thomas Erl, "Service-Oriented Architecture: A Field Guide to Integrating XML and Web Services", Prentice Hall Publication, 2004
2. Dave Chappell, "Enterprise Service Bus", O'Reilly Publications, 2004
3. Sanjiva Weerawarana, Francisco Curbera, Frank Leymann, Tony Storey, Donald F. Ferguson,
4. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Addison Wesley Publication, 2004

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Paper No : 904

L: 4 Hrs

Paper Title : Data Warehousing and Data Mining

1. Introduction

- 1.1 Need of Strategic Information
- 1.2 Failures of past decision support systems
- 1.3 Operational System and decision support systems
- 1.4 The Data Warehouse
- 1.5 Objectives
- 1.6 Difference between OLTP and Data Warehouse

2. Data warehouse Building blocks

- 2.1 Defining features
 - 2.1.1 Subject oriented, time variant, integrated, non-volatile
- 2.2 Data marts
- 2.3 Top-down, bottom-up, Practical approach
- 2.4 Overview Of components
 - 2.4.1 Source Data
 - 2.4.2 Data Staging
 - 2.4.3 Data Storage
 - 2.4.4 Information Delivery
 - 2.4.5 Metadata
 - 2.4.6 Management and control

3. Project Planning and Management

- 3.1 Planning with key issues
- 3.2 Life-Cycle
- 3.3 Organizing team
- 3.4 Roles and responsibility

4. Data warehouse Requirement and Design

- 4.1 Dimensional nature of data
- 4.2 Dimensional Modeling Basics
 - 4.2.1 Information Packages
- 4.3 E-R modeling Vs Dimensional Modeling
- 4.4 Star Schema
 - 4.4.1 Dimension table
 - 4.4.2 Fact table
 - 4.4.3 Fact less Fact table
 - 4.4.4 Data Granularity
 - 4.4.5 Star Schema Keys: primary, foreign and surrogate
 - 4.4.6 Star join and index

5. Advanced Dimensional Modeling

- 5.1 Updates to dimensions: slowly changing dimensions
- 5.2 Miscellaneous Dimensions
 - 5.2.1 Large Dimensions

5.2.2 Rapidly changing dimensions

5.2.3 Junk dimensions

5.3 Snowflake Schema

5.4 Need for aggregates

5.5 Aggregate fact tables

5.6 Family of stars

5.7 Conformed Dimensions

6. ETL

6.1 ETL overview

6.2 Data Extraction

6.3 Data Transformation

6.4 Data loading

6.5 Role and Types of Metadata

7. Online Analytical Processing

7.1 Need for multidimensional analysis

7.2 OLAP features and functions

7.3 Hyper cubes

7.4 OLAP Models

7.5 Implementation considerations

8. Data Mining Basics

8.1 Introduction to data mining

8.2 OLAP Vs Data mining

8.3 Major Data mining techniques

8.3.1 Cluster Detection

8.3.2 Classification Techniques

8.3.3 Decision trees

8.3.4 Association Rule

8.3.5 Link analysis

8.3.6 Neural Networks

8.3.7 K-Nearest Algorithm

8.3.8 Regression Techniques

8.3.9 Time Series Analysis

8.4 Applications of data mining

9. Hardware architecture

9.1 Server Hardware

9.1.1 SMP

9.1.2 Clusters

9.1.3 MPP

9.1.4 ccNuma

9.2 Parallel Processing Options

10. Physical Design

10.1 Physical design process

10.2 From logical to physical model

10.3 RAID technology

10.4 Indexing

10.4.1 B-tree

10.4.2 Bitmap

Tools: 1. SQL Analysis Server for warehouse development and mining
2. Weka for data mining

References:

1. S. Anahory & D. Murray: Data Warehousing in the real world – Addison Wesley
2. R. Kinball: Data Warehouse Toolkit – John Wiley & Sons
3. R. Kinball, L.Reeves : The Data Warehouse Lifecycle Toolkit – John Wiley & Sons
4. Efrem G. Mallach : Decision Support and Data Warehouse Systems – TMH
5. Paulraj Pulliah : Data Warehousing Fundamentals – Wiley

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Paper No : 905

L: 4 Hrs

Paper Title : Embedded Systems

1. Introduction to Embedded Systems Design

Trends in Embedded Systems, Challenges and Design Issues in Embedded Systems

Introduction to Applications of embedded system

2. Embedded system development process

The development process model(water fall model)

requirement of engineering

design requirement(h/w requirement, S/W requirement)

3. 8-bit Microcontrollers and Interfacing

Introduction to 8-bit 8051 core Microcontroller

Overview of Embedded Memory, input / Output Port, interrupt handling, Timers / Counters,

Keyboard interrupt, UART, SPI, PWM, WDT

4. 32-bit Microcontroller and Interfacing

Introduction of ARM Architecture and Organization

Overview of ARM peripherals: JTAG, ADC, DAC, ARM/THUMB Programming Model

Introduction of, I2C, CAN, bus ARM/THUMB Instruction Set

Overview of OMAP architecture

5. Programming Concepts for Embedded system

Overview of ANSI-C & NES C

Basic concept of C-language, memory pointer, Bit wise operator

Basic programming concept for 8-bit microcontroller using c-language.

Introduction to RTOS

6. Embedded system in Wireless Technologies

Introduction of wireless sensor network, Bluetooth, Overview of RFID and its applications

Introduction to mobile Communication architectures

Introduction of Mobile Development Platforms

7. Embedded software

Design goal for embedded software, Overview of development Tools for embedded system, overview of Embedded In-Circuit Emulators,

Main Readings:

- 1) "ARM assembly language", HOHI vilium, Publishor: CRC
- 2) "the 8051 Microcontroller and embedded system using assembly and c" Muhammad ali mazidi, Janice gillipie mazidi, rolin D. Mckinlay, publishor: pearson printice hall
- 3) "Embedded / Real -time system: concepts, design & programming -Black Book", Dr. K.V.K.K.Prasad, Publishor: dreamtech press
- 4) The 8051 microcontroller architechture ,programming ,and applications, Kenneth j ayala, west publishing company

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Semester :10

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Semester X

Paper No : 1001
Paper Title : Project

The students are required to carry out project work for full time during the semester (Preferably in industry)