# THIRUVALLUVAR UNIVERSITY

## MASTER OF SCIENCE

### DEGREE COURSE

#### M.Sc. COMPUTER SCIENCE

**UNDER CBCS**

(with effect from 2012-2013)

The Course of Study and the Scheme of Examinations

<table>
<thead>
<tr>
<th>S.NO.</th>
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### M.Sc. Computer Science: Syllabus (CBCS)

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THIRUVALLUVAR UNIVERSITY

M.Sc. COMPUTER SCIENCE
SYLLABUS
UNDER CBCS
(With effect from 2012-2013)

SEMESTER I
PAPER - 1
ADVANCED JAVA PROGRAMMING

UNIT-I

UNIT-II
JDBC: JDBC Architecture - Installing the ODBC Driver - Connecting to a Database - Structured Query language. JDBC programming concept: Database URL - Executing the action commands - Query with JDBC - Populating a Database - Executing Queries - Metadata - Scrollable and Updatable Result Sets.

UNIT-III
Servlets: A simple Servlets - The servlet API - Servlet Package - Handling HTTP Request and Response. JSP : Evolution of the Web Application - Overview of the HTTP - Introduction to Servlets - JSP Overview - JSP syntax and semantics - Expressions, scriptlets and Declarations

UNIT-IV
Request Dispatching - Session and Thread Management - Application Event Listeners Database Access with JDBC.
UNIT-V


TEXT BOOKS


REFERENCE

3. Deitel & Deitel,”Java How to program”, 8th ed., PHI.
PAPER-2

COMPUTER ARCHITECTURE AND PARALLEL PROCESSING

UNIT-I

UNIT-II

UNIT-III
SIMD Array Processors - SIMD Interconnection Networks - Associative Array Processing.

UNIT-IV

UNIT-V

TEXT Book
Kai Hwang, Faye A. Briggs, Computer Architecture And Parallel Processing, McGraw-Hill.

REFERENCE
2. Sasikumar, “Introduction to Parallel Processing”, PHI.
PAPER-3

ADVANCE RELATIONAL DATABASE MANAGEMENT SYSTEMS

UNIT-I
File System Vs. DBMS - Database System Applications - View of Data-Database language - Database design - ER Model _ Relational Model - Network Data Model - Hierarchial Data Model - Data Storage & Querying - Data Architecture.

UNIT-II

UNIT-III
Functional Dependencies - Features of Relational designs - Decomposition and Normalisation using Functional Dependencies and Multivalued Dependencies - Join dependencies- Domain key Normal form.

UNIT- IV
Overview of Physical Storage Media - Magnetic disks - RAID - Teritary Storage - File Organisation - Organisation of records in Files - Indexing and Hashing - Ordered Indices - B+ -Tree Index Files - B-Tree Index Files - multiple Key Access - Static and Dynamic Hashing - Query Processing - Transaction Management - Transactions - Concurrency.

UNIT-V
Distributed Databases - Homogeneous and Heterogeneous Databases - Distributed Data Storage - Distributed Transactions - Commit Protocols - Concurrency Control - Object Based Databases - Complex Data types - Structured Types and Inheritance in SQL - Object

**TEXT Book**


**REFERENCES**


ELECTIVE

PAPER-1

(to choose 1 out of 3)

A. DISTRIBUTED OPERATING SYSTEM

UNIT-I

UNIT-II

UNIT-III

UNIT-IV
UNIT-V

TEXT BOOK
Andrew S. Tanenbaum - Modern Operating System - Prentice Hall of India Pvt Limited, 2001

REFERENCES
PAPER-1

B. OBJECT ORIENTED ANALYSIS AND DESIGN

UNIT-I
System Development - Object Basis - Development life cycle - Methodologies - Patterns - Frameworks - Unified Approach - UML.

UNIT-II
Use-Case Models - Object Analysis - Object relations - Attributes - Methods - Class and object responsibilities - Case Studies.

UNIT-III
Design Process - Design Axioms - Class Design - Object storage - Object Interpretability - Case Studies.

UNIT-IV
User interface design - View layer classed - Micro-level processes - View Layer Interface - Case Studies.

UNIT-V

Text book

Reference

PAPER-1

C. PRINCIPLES OF PROGRAMMING LANGUAGES

UNIT-I
Language design Issues: Reasons for studying concepts of programming language language evaluation criteria- influences on language design- structure and operation of computer virtual computers and binding times- language paradigms.

UNIT-II
Data types: Properties of types and objects-elementary data types- structured data types.
Abstraction: Abstract data types- encapsulation by subprograms-type definition- storage management.

UNIT-III
Sequence Control: Implicit and explicit sequence control- sequencing with arithmetic and non-arithmetic expressions-sequence control between statements. Subprograms control: subprogram sequence control- attributes of data control shared data in subprograms.

UNIT-IV

UNIT-V
Advances in language design: variations on subprogram control- language constructors for parallel processing language semantics-software architecture.

TEXT BOOK

REFERENCES
MAIN PRACTICAL

PAPER-1

ADVANCED JAVA PROGRAMMING LAB

1. Multithreading Using Priorities
2. File & String Manipulations
3. Write an Applet Program to use various Controls and perform Font Animation.
4. Create a menu with submenu, popup menu, short cut keys, check box items and separator.
5. Implement calculator using Java AWT controls.
6. Create a Student mark statement using JDBC control and display the information using Table.
7. Program to implement Client/Server technology.
8. Write a Java program to create an Employee pay bill calculation using various swing controls.
MAIN PRACTICAL

PAPER-2

ADVANCED RELATIONAL DATABASE MANAGEMENT SYSTEMS LAB

1. Creating database tables and using data types.
   • Create table, • Modify table, • Drop table
2. Practical Based on Data Manipulation.
   • Adding data with Insert, • Modify data with Update,
   • Deleting records with Delete
3. Practical Based on Implementing the Constraints.
   • NULL and NOT NULL, • Primary Key and Foreign Key Constraint
   • Unique, Check and Default Constraint
4. Practical for Retrieving Data Using following clauses.
   • Simple select clause, • Accessing specific data with Where, Ordered By,
   Distinct and Group By
5. Practical Based on Aggregate Functions.
   • AVG, • COUNT, • MAX, • MIN, • SUM, • CUBE
6. Practical Based on implementing all String functions.
7. Practical Based on implementing Date and Time Functions.
8. Practical Based on implementing use of union, intersection, set difference.
9. Implement Nested Queries & JOIN operation.
10. Practical Based on performing different operations on a view.
11. Practical Based on implementing use of triggers, cursors & procedures.
12. Make a Database connectivity with front end tools like – VB, VC++
MAIN PRACTICAL
PAPER-3
WINDOWS PROGRAMMING LAB

1. Write a VC++ application using MFC that creates a new Window and new Fonts.
2. Write a VC++ Win32 application that displays a Greetings Message.
3. Write a VC++ application that allows the user to draw pictures using the mouse button. Use MFC method.
4. Write a VC++ program to create a List Box and add the capital cities of various states in our country.
5. Write a VC++ program using MFC that displays line, rectangle, rounded rectangle, ellipse and polygon filled with colours.
6. Write a VC++ program using MFC that fills the background of the client area with a bitmap.
7. Write a VC++ program using MFC that displays a menu. Choose the menu items using keyboard accelerator keys and display appropriate messages for the selected menu item using message boxes.
8. Write a VC++ program using MFC that displays the status of ALT, CTRL, SHIFT, NUM LOCK and SCROLL LOCK keys.
SEMESTER II
PAPER - 4
ASP. NET PROGRAMMING

UNIT-I
Introduction to .NET and ASP.NET:
The DOS Paradigm - The GUI Paradigm - The .Net Paradigm - .Net framework - Types, Objects and Namespaces - Setting up ASP.Net and IIS.

UNIT-II
ASP.NET Controls: Overview of dynamic web page-introduction & features of ASP.NET-understanding ASP.NET controls-applications-web servers, installation of IIS. Web form, web forms Controls - server-controls-client controls-adding controls to web Form-buttons-text box-labels-checkbox-radio buttons-list box. Adding controls a runtime-Running a web application- creating a multiform web project- Form validation: client side and server side validation- Validation controls: required field comparison range- Calendar control- Ad rotator control- Internet Explorer control.

UNIT-III
ADO.NET: Overview of ADO.NET- from ADO to ADO.NET- ADO.NET Architecture- Accessing data using data adapters and datasets- using command and data Reader- binding data to data bind controls- displaying data in data grid.

UNIT-IV
XML In .NET: XML Basics- Attributes- Fundamentals of XML Classes:
Document- Text Writer- Text Reader- XML Validations- XML In ADO.NET- Data Document
UNIT-V


TEXT BOOKS

2. Professional ASP.NET - Wrox publication PVT Ltd.

REFERENCES

1. VB.NET Programming Black Book - Steven Holzner (Dreamtech pub.)
2. Introduction to .NET framework - Wrox publication.
3. ASP.NET Unleashed - BPB Publication.
PAPER-5
UNIX NETWORKING PROGRAMMING

UNIT-I
INTRODUCTION & FILE SYSTEM

UNIT-II
PROCESSES

UNIT-III
INTERPROCESS COMMUNICATION
Introduction - Message passing (SVR4) - pipes - FIFO - message queues - Synchronization (SVR4) - Mutexes - condition variables - read - write locks – file locking - record locking - semaphores - Shared memory(SVR4).

UNIT-IV
SOCKETS
Introduction - transport layer - socket introduction - TCP sockets - UDP sockets - raw sockets - Socket options - I/O multiplexing - Name and address conversions.

UNIT-V
APPLICATIONS - Debugging techniques - TCP echo client server - UDP echo client server - Ping - Trace route - Client server applications like file transfer and chat.
TEXT BOOKS
1. W. Richard Stevens, Advanced programming in the UNIX environment, Addison Wesley, 999. (Unit 1, 2 & 3)

REFERENCE
2. Stevens, "Unix network programming: INterprocess Communications", Vol2, 2nd ed., PHI
PAPER-6

ADVANCED DATA STRUCTURES AND ALGORITHMS

UNIT-I: Complexity Analysis & Elementary Data Structures

UNIT-II: HEAP STRUCTURES
Min-max heaps - Deaps - Leftist heaps - Binomial heaps - Fibonacci heaps - Skew heaps - Lazy-binomial heaps.

UNIT-III: SEARCH STRUCTURES

UNIT-IV: MULTIMEDIA STRUCTURES
Segment trees - k-d trees - Point Quad trees - MX-Quad trees - R-trees - TV-trees.

UNIT-V: APPLICATIONS
Huffman coding - Garbage collection and compaction - Topological sort - Mincut maxflow algorithm - Activity networks - Set representation - Set union and find operations - Counting binary trees.

TEXT BOOKS
ELECTIVE
PAPER - 2
(to choose 1 out of 3)

A. MOBILE COMMUNICATIONS

UNIT-I

UNIT-II
Medium access control: Motivation for a specialized MAC-SDMA-FDMA-TDMA-CDMA

UNIT-III

UNIT-IV

UNIT-V
IEE 802.11: System architecture-Protocol architecture-Physical layer-medium access control layer-MAC management-802.11b.251-802.11a.254-HIPERLAN-Bluetooth.
TEXT BOOK

Mobile Communications - Jochen H. Schiller - Second Edition - Pearson Education Ltd.
UNIT-I
Introduction: Overview of dedicated and automated systems - their specific requirements - robust design - environmental issues - temporal constraints - technological constraints - software systems - product design cycle.

UNIT-II
Development of a System Specification: Evaluation - justification of the available levels of system integration (custom chip design through turnkey - systems) - technological choice.

UNIT-III
Software Issues: Development environment compilers - linkers - debuggers - emulators - real time operating systems - kernels - Designing and implementing code for dedicated systems.

UNIT-IV

UNIT-V
Transducers: Sensors for measuring physical phenomena - output devices such as power actuators - motors. Data transformation - signal conditioning - data conversion. The impact of EMC regulations on design practice.

TEXT Book
REFERENCES

PAPER – 2
C. MULTIMEDIA AND ANIMATION

UNIT-I

UNIT-II

UNIT-III
Data and File Formats-RTF,TIFF,RIFF,MIDI,JPEG,AVI Video File Formats-MPEG standards-TWAIN Architecture-Digital Audio and Video as Multimedia I/O Technology-Animation.

UNIT-IV

UNIT-V

TEXT BOOKS
MAIN PRACTICAL

PAPER-1

ASP. NET PROGRAMMING LAB

1. Create web page for Course Registration
2. Create web pages for Banking
3. Create web pages for Shopping Cart
4. Create web pages for Airline reservation
5. Create web pages for Job portal
6. Create web pages for On-Line Telephone Billing System
7. Create web pages for On-Line Quiz.
8. Create web pages for Hospital Management System.
MAIN PRACTICAL
PAPER-2
UNIX PROGRAMMING LAB

1. Write a shell script to copy, rename and print multiple files using choice menus.
2. Write a shell script to display logged in users who are using high CPU percentage.
3. Write a shell script to list processes based on CPU percentage and memory usage.
4. Write a shell script to display total used and free memory space.
5. Write a shell script that takes as command-line input a number n and a word. The program should then print the word n times, one word per line.
6. Write a shell scripts using the following statements.
   a) While-loop
   b) For-loop
   c) If-then-else
   d) Switch
7. Write a shell script using grep statement.
8. Write a shell script that can search all immediate sub-directories of the current-directory for a given file and then quit if it finds one.
MAIN PRACTICAL

PAPER-3

PHP PROGRAMMING LAB

1. Write a PHP Program to demonstrate the techniques of Exception Handling and Error Handling.
2. Write a PHP program to process the marks obtained by students and embed it in HTML. Use the Multi-Dimensional array concept.
3. Write a PHP program using Looping and Control Structures.
4. Write a PHP program to demonstrate the concept of user-defined Functions.
5. Write a PHP program to demonstrate constructors and destructors.
6. Write a PHP program for database management.
7. Write a PHP program for cookies and sessions.
8. Write a PHP program to read a file from an HTTP server and save it into a compressed file.
SEMESTER III

PAPER-7

JSP AND SERVLET PROGRAMMING

UNIT-I
JavaScript: Introduction to JavaScript, Operator, Conditional Structure & Looping, Structure Dialog Boxes, Arrays, User Define Function, Built-in Functions, String: charAt, concat, indexOf, lastIndexOf, replace, search, substr, substring, toLowerCase, toUpperCase, Math: abs, ceil, floor, pow, random round, max, min, Date: date, getFullYear, getMonth, getYear, getMilliseconds, getMinutes, getSeconds, setMilliseconds, setMonth, setYear, setFullYear, setHours, setMinutes, setSeconds, Array: Join, reverse, pop, push, shift, sort, User Define Object Document Object History Object Navigator Object Form Object & Elements Events: onclick, ondblclick, onblur, onfocus, onchange, onkeypress, onkeydown, onkeyup, onMousemove, onmouseout, onsubmit, onreset, onselect, onload, onunload, timer event.

UNIT-II
Database programming with JDBC:
Introduction and Need for JDBC, Database Drivers, JDBC APIs for database, Connectivity (Java.sql Package) Connection, Statement, Prepared statement, Callable statement, ResultSet, Other JDBC APIs, Database Meta Data, ResultSet Meta Data, Distributed Computing Using RMI: Introduction to RMI, RMI Architecture, Stubs and Skeleton.

UNIT-III
JSP Programming:
UNIT-IV
Servlet Programming:
Introduction to Servlets ,Servlets Implementation ,The servlet interface ,The Generic
Servlet class ,The single thread Model interface ,The Http Servlet class ,Service( ) doGet( )
doPost( ) doDelete( ) ,doOption( ) ,doPut( ) ,doTrace( ) ,Servlet Exceptions ,The Servlet
Exception class The unavailable Exception class ,Servlet Lifecycle ,Servlet Request and
Response ,The Http Servlet Request interface ,GetAttribute( ) ,setAttribute( ) ,getAttributeNames( )
getparameters( ) ,getParameterNames( ) ,getParameterValues( ) ,getRemoteHost( ) ,getRemoteAddr( )
cookies( ) ,getHeaders( ) ,getContentType( ) ,getSession( ) ,The Http servlet Response Interface
,writer( ) ,addCookie( ) ,encodeURL( ) ,sendRedirect( ) ,setHeader( ) ,setStatus( )
,Session Tracking Approaches ,URL Rewriting ,Hidden Form Fields Cookies ,Session API
,Session Tracking with Servlet API ,The Http Session interface,getAttribute( ) ,getAttributeNames( )
,GetCreationTime( ) ,GetId( ) ,GetlastAccessedTime( ) ,isNew( )
,RemoveAttribute( ) ,setAttribute( ) ,setMaxInactiveInterval( ) ,invalidate( ) ,Servlet
Collaboration ,Request Dispatching with Request ,Dispatcher interface Forward( )
,Include( ) ,Servlet Context ,The servlet Context interface ,getContext( )
getRequestDispatcher( ) ,getServerInfo( ) ,getInitParameter( ) ,getInitParameterNames( )
getAttribute( ) ,removeAttribute( ) ,

UNIT-V
Introduction to Struts:
A Web Application Framework - struts-config.xml; Understanding MVC architecture;
ActionServlet,ActionForm,ActionMapping,Actionclasses.

JSP Expression Language:
EL Introduction,EL Implicit Objects ,EL Operators ,EL Functions ,JSP Standard Tag Library
:JSTL Introduction ,core tags ,xml tags ,sql tags ,fmt tags ,Core tags ,<c : out>
<c : set> ,<c : if> ,SQL tags ,<sql : query> ,<sql : update> ,fmt tags ,<fmt : formatNumber>
<fmt : formatDate> .
TEXT BOOKS

1. Core Java Volume-I, Horstman and Cornell, Pearson Education
2. Core Java Volume-II, Horstman and Cornell, Pearson Education
3. Inside Servlets - Dustin R. Callway- Pearson Education
6. Programming world wide web- Sebesta, Pearson
7. Murach’s beginning JAVA JDK 5, Murach, SPD
PAPER-8

INTERNET PROGRAMMING

UNIT-I

UNIT-II
Dynamic HTML: Dynamic HTML Object Model and Collections, Event Model, Filters and Transitions, Data Binding with Tabular Data Control, Dynamic HTML-Structured Graphics ActiveX Controls-Dynamic HTML-Path, Sequencer and Sprite ActiveX Controls.

UNIT-III
JavaScript: JavaScript, Introduction to Scripting, Control Statements, Functions, Arrays, Objects.

UNIT-IV
XML: Creating Markup with XML-Parses and Well-formed XML Documents-Parsing an XML Document with msxmi-Document Type Definition(DTD)-Document Type Declaration-Element Type Declarations- Attribute Declarations-Document Object Model-DOM Implementations-DOM Components-Path-XSL: Extensible Stylesheet Language Transformations(XSLT)

UNIT-V
PERL, CGI, PHI and PERL-String Processing and Regular Expressions-Form Processing and Business Logic-Server Side Includes-Verifying Username and Password-Using DBI to Connect to a Database-PHP-Form Processing and Business Logic-Connecting to a Database-Dynamic Content in PHP.
TEXT BOOKS

REFERENCES
PAPER-9
DATA WAREHOUSING AND MINING

UNIT-I

UNIT-II
Developing A Data WAREHOUSE:Why And How To Build A Data Warehouse Architectual Strategies And Organization Issues-Design Consideration- Data Content-Metadata Distribution Of Data-Tools For Data Warehousing-Performance Consideration-Crucial Decision In Designing A Data Warehouse - Applications Of Data Warehousing And Data Mining In Government:Indroduction-National Data Warehousing And Data Mining

UNIT-III
Basic Data Mining Tasks - Data Mining Versus Knowledge Discovery In Databases – Data Mining Issues - Data Mining Metrices - Social Implications Of Data Mining - Data Mining From A Database Perspective. Data Mining Techniques: Introduction - A Statistical Perspective On Data Mining - Similarity Measures - Decision Trees - Neural Networks - Genetic Algorithms.

UNIT-IV
Classification: Introduction - Statistical - Based Algorithms- Distance - Based Algorithms - Decision Tree - Based Algorithms- Neural Network - Based Algorithms - Rule-Based Algorithms - Combining Techniques.

UNIT-V
Clustering: Introduction - Similarity And Distance Measures - Outliers - Hierarchical Algorithms - Partitional Algorithms. Association Rules:Introduction-Large Item Sets -

TEXT BOOKS
2. Jiawei Han And Micheline Kamber - Data Mining Concepts And Techniques - Elsevier , Fifth Edition - 2009

REFERENCES
PAPER-10

SOFTWARE TESTING AND QUALITY ASSURANCE

UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V
TEXT BOOKS


ELECTIVE

PAPER - 3

(to choose 1 out of 3)

A. Open CL PROGRAMMING

UNIT-I
Overview of Pipelining and Instruction Level Parallelism. Introduction to Multi-processors, Shared memory architecture, Multi-threading, Interconnection networks and clusters. Architecture of recent CPUs and GPUs: Intel Dual and Quad core processors, NVDIA Fermi and AMD Fusion processors.

UNIT-II
Programming with MPI: Introduction, collective communication, programming model and GPU programming.

UNIT-III
OpenCL programming on CPU/GPU/APU: Software and hardware overview. OpenCL for GPU/APU processor, memory access and architecture, communication between Host and GPU, device scheduling, terminology, programming model, and example programs.

UNIT-IV
Building and running OpenCL programs on GPU/APU: compiling, running calling conventions, predefined macros, debugging, setting the environment and breakpoint, and sample GDP session.

UNIT-V
TEXT BOOK

REFERENCES
PAPER – 3

B. PRINCIPLES OF COMPILER DESIGN

UNIT-I

UNIT-II
Syntax Analysis Role of a Parser - Context Free Grammars - Top-Down Parsing - Bottom-Up Parsing - LEX and YACC.

UNIT-III

UNIT-IV

UNIT-V

TEXT BOOKS
REFERENCES

3. Chattopadhyay, ”Compiler Design”, PHI.
4. Dasaradh, ”Introduction to Automata and Compiler Design”, PHI.
PAPER – 3

C. NETWORK SECURITY

UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V

TEXT BOOKS
1. Create a web page with all types of Cascading style sheets.
2. Client Side Scripts for Validating Web Form Controls using DHTML
3. Write programs in Java to create applets incorporating the following features:
   i) Create a color palette with matrix of buttons
   ii) Set background and foreground of the control text area by selecting a color from
       color palette.
   iii) In order to select Foreground or background use check box control as radio
       buttons
   iv) To set background images
4. Write programs in Java using Servlets:
   i) To invoke servlets from HTML forms
   ii) To invoke servlets from Applets
5. Write programs in Java to create three-tier applications using JSP and Databases
   i) for conducting on-line examination.
   ii) for displaying student mark list. Assume that student information is available in
       a
database which has been stored in a database server.
6. Programs using AJAX.
7. Consider a case where we have two web Services- an airline service and a travel
   agent and the travel agent is searching for an airline. Implement this scenario using
   Web Services and database
MAIN PRACTICAL

PAPER-5

INTERNET PROGRAMMING LAB

1. Create a Web Page with cascading style sheets and Embedded style sheets.
2. Design a Web Page to perform screen saver animations using Java Script.
3. Design a HTML Editor using Java Script.
4. Design Web Pages for Library Management System using Java Applet and JDBC,
5. Write a Java RMI program to copy a text file from server to client.
6. Design Web Pages to conduct an On-Line Quiz using Java Script.
MAIN PRACTICAL

PAPER-6

C# PROGRAMMING LAB

1. Creating a C# project within Visual Studio
2. Basic Programs to demonstrate the working of basic data types.
3. Programs to implement the use of Objects.
4. Programs to implement multithreading
5. Programs to implement String handling
6. Programs to implement file handling
7. Using ADO.Net to handle data, connecting to a database, firing queries to display data
8. Using XML Libraries to export data from a database to an XML file
9. Developing windows forms
10. Using various controls on Windows forms.