

# THIRUVALLUVAR UNIVERSITY

## MASTER OF SCIENCE DEGREE COURSE

### M.Sc. COMPUTER SCIENCE

UNDER CBCS

(With effect from 2017-2018)

The Course of Study and the Scheme of Examinations

S.NO.	Study Components		Ins. Hrs. /week	Credit	Title of the Paper	Maximum Marks		
	Course Title					CIA	Uni. Exam	Total
<b>SEMESTER I</b>								
1	MAIN	Paper-1	5	5	Formal Languages and Automata Theory	25	75	100
2	MAIN	Paper-2	4	3	Advanced Java Programming	25	75	100
3	MAIN	Paper-3	4	3	Web Application using C#	25	75	100
4	MAIN	Paper-4	4	3	Data Base Management Systems	25	75	100
5	MAIN PRACTICAL	Paper-1	3	2	Advanced Java Programming Lab	25	75	100
6	MAIN PRACTICAL	Paper-2	3	2	Web Application using C# Lab	25	75	100
7	MAIN PRACTICAL	Paper-3	3	2	Data Base Management Systems Lab	25	75	100
8	ELECTIVE	Paper-1	4	3	(to choose either A or B or C) A. Object Oriented Analysis and Design B. Cloud Computing C. Principles of Programming	25	75	100
			<b>30</b>	<b>23</b>				<b>800</b>
<b>SEMESTER II</b>								
9	MAIN	Paper-5	4	4	Compiler Design	25	75	100
10	MAIN	Paper-6	4	3	Enterprise Java Programming	25	75	100
11	MAIN	Paper-7	4	3	Enterprise Applications using C#	25	75	100
12	MAIN	Paper-8	4	3	Unix Network Programming	25	75	100
13	MAIN PRACTICAL	Paper-4	3	2	Enterprise Java Programming Lab.	25	75	100
14	MAIN PRACTICAL	Paper-5	3	2	Enterprise Applications using C# Lab	25	75	100
15	MAIN PRACTICAL	Paper-6	2	2	Unix Programming Lab	25	75	100
16	<b>Compulsory Paper</b>		2	2	<b>Human Rights</b>	25	75	100

## M.Sc.Computer Science:Syllabus (CBCS)

17	ELECTIVE	Paper-2	4	3	(to choose either A or B or C) A. Software Testing B. Web Services C. Cryptography and Network Security	25	75	100
			<b>30</b>	<b>24</b>				<b>800</b>
<b>SEMESTE III</b>						<b>CIA</b>	<b>Uni. Exam</b>	<b>Total</b>
18	MAIN	Paper-9	5	5	Distributed Operating Systems	25	75	100
19	MAIN	Paper-10	4	3	Software Project Management	25	75	100
20	MAIN	Paper-11	4	3	Mobile Computing	25	75	100
21	MAIN	Paper-12	4	3	Design and Analysis of Algorithms	25	75	100
22	MAIN PRACTICAL	Paper-7	3	2	Mobile Computing Lab	25	75	100
23	MAIN PRACTICAL	Paper-8	3	2	Design and Analysis of Algorithms Lab	25	75	100
24	MAIN PRACTICAL	Paper-9	3	2	Mini Project	25	75	100
25	ELECTIVE	Paper-3	4	3	(to choose either A or B or C) A. Software Quality Assurance B. Big Data C. Soft Computing	25	75	100
			<b>30</b>	<b>23</b>				<b>800</b>
<b>SEMESTER IV</b>						<b>CIA</b>	<b>Uni. Exam</b>	<b>Total</b>
26		Paper-11	30	20	Project Work	80	120	200
			<b>30</b>	<b>20</b>		<b>80</b>	<b>120</b>	<b>200</b>

Subject	Papers	Credit	Total Credits	Marks	Total marks
MAIN	12	3-5	41	100	1200
ELECTIVE	3	3	9	100	300
MAIN PRACTICAL	8	2	16	100	800
MINI PROJECT	1	2	2	100	100
MAIN PROJECT	1	20	20	200	200
COMPULSORY PAPER	1	2	2	100	100
<b>Total</b>	<b>26</b>	<b>-</b>	<b>90</b>	<b>-</b>	<b>2700</b>

**Structure of the Course and Evaluation Pattern:**

The duration of University examination for theory and practical subjects shall be 3 hours. The maximum mark for each theory is 100 with 25 for Continuous Internal Assessment (CIA) and 75 for University Examination.

<b>CIA Theory Exam</b>		
I	Two tests	15 Marks
II	Assignment /Seminar	5 Marks
III	Attendance	5 Marks
<b>Total</b>		<b>25 Marks</b>

The maximum marks for each practical is 100 with 25 for Internal Assessment and 75 for University Examination.

<b>CIA Practical Exam</b>		
I	One Test	20 Marks
II	Record	5 Marks
<b>Total</b>		<b>25 Marks</b>

<b>Semester Practical Exam</b>		
1.	Experiment 1	25 Marks
2.	Experiment 1	25 Marks
3.	Viva – Voce	15 Marks
4.	Record	10 Marks
<b>Total</b>		<b>75 Marks</b>

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**THIRUVALLUVARUNIVERSITY**

**M.Sc. COMPUTERSCIENCE  
SYLLABUS**

UNDERCBCS

(With effect from 2017-2018)

**SEMESTER –I**

**MAIN PAPER-1**

**5H/5C**

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**FORMAL LANGUAGES AND AUTOMATA THEORY**

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**UNIT-I**

Fundamentals - String, Alphabets, Operations, Finite State Machine – Definitions, Divisibility by Three Tester - Set Theory – Relations – Functions- Counting Techniques – Logic-Methods of Proof

**UNIT-II**

Finite Automata –Deterministic and Nondeterministic Finite Automata – Equivalence of NFA and DFA – Finite Automata with Outputs –Finite Automata with Null Moves – Finite Automata and Sequential Circuits

**UNIT-III**

Chomsky classification of grammars -Regular Expression – Relation between Regular languages and Finite Automata- Closure Properties – Automata for Union, Intersection and Difference of Languages – Context free grammars – Normal forms for Context Free Grammar – Parse Trees – Ambiguity Grammars – Removing Ambiguity from Grammars

**UNIT-IV**

Basic Structure – Types of Acceptance by PDA – Correspondence between PDA and CFL – Parsing and PDA -Languages of PDA – Equivalence of PDA and CFG – Deterministic PDA

**UNIT-V**

Basic structure of TM – Instantaneous Description of Turing Machine – Language of TM – Turing Machine as Computer for Positive Integer- Universal Turing Machine – Turing Machine for 1's Complement, 2's Complement- TM for Well Formed Parenthesis – TM for Unary addition and Multiplication – TM for Palindrome Recognition – TM for GCD – TM for  $0^n1^n$

### **TEXT BOOKS**

1. C.K. Nag pal“ Formal Languages and Automata Theory” , Oxford University Press, Fourth Edition, 2013
2. Hopcroft and Ullman, “Introduction to Automata Theory, Languages and Computation”, Narosa Publishing House, Delhi, 2002
3. E.V. Krishnamurthy “Theory of Computer Science” East West Press Pvt. Ltd.

### **REFERENCES**

1. Juraj Hromkovic, “Theoretical Computer Science”, Springer Indian Reprint, 2010
2. John E. Hopcroft, “Introduction to Automata Theory, Languages and Computation”, Paperback, 2008.
3. K.V.N. Sunitha, “Formal Languages and Automata Theory”, Paperback, 2015.
4. A Puntambekar, “Formal Languages and Automata Theory for JNTU”, Paperback, 2015.

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**ADVANCED JAVA PROGRAMMING**

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**UNIT-I**

Design Patterns: Introduction to Design patterns - Catalogue for Design Pattern - Factory Method Pattern, Prototype Pattern, Singleton Pattern- Adapter Pattern- Proxy Pattern-Decorator Pattern-Command Pattern- Template Pattern- Mediator Pattern-Collection Framework – Array List class – Linked List class – Array List vs. Linked List - List Iterator interface - Hash Set class- Linked Hash Set class-Tree Set class Priority Queue class - Map interface-Hash Map class- Linked Hash Map class –Tree Map class - Comparable interface -Comparator interface-Comparable vs. Comparator

**UNIT-II**

Applet Fundamentals- Applet Class - Applet lifecycle- Steps for Developing Applet Programs- Passing Values through Parameters- Graphics in Applets- GUI Application - Dialog Boxes - Creating Windows - Layout Managers – AWT Component classes – Swing component classes- Borders – Event handling with AWT components - AWT Graphics classes - File Choosers - Color Choosers – Tree – Table – Tabbed panels–Progressive bar - Sliders.

**UNIT-III**

JDBC -Introduction - JDBC Architecture - JDBC Classes and Interfaces – Database Access with MySQL -Steps in Developing JDBC application - Creating a New Database and Table with JDBC - Working with Database Metadata; Java Networking Basics of Networking - Networking in Java- Socket Program using TCP/IP - Socket Program using UDP- URL and In et address classes.

**UNIT-IV**

Servlet: Advantages over Applets - Servlet Alternatives - Servlet Strengths - Servlet Architecture - Servlet Life Cycle – Generic Servlet, Http Servlet - First Servlet - Invoking Servlet - Passing Parameters to Servlets - Retrieving Parameters - Server-Side Include – Cookies- JSP Engines - Working with JSP - JSP and Servlet - Anatomy of a JSP Page.

**UNIT-V**

Client-Side Programming: Client-side programming technologies - Form design using HTML, XHTML and DHTML and CSS - Client side validation Using Java Script - Content Structuring using XML - Adding Interactivity with AJAX - Query Framework- Server-side Programming- Web Servers - Handling request and response - Handling Form data - Session management - Database Access.

**TEXT BOOK**

1. S.Sagayaraj, R.Denis, P.Karthik & D.Gajalakshmi, “Java Programming“, Universities Press, 2017.

**REFERENCES**

1. Patrick Naughton& Herbert Schildt, “The Complete Reference: Java 2”, Tata McGraw Hill, 1999
2. Bruce W.Perry, “Java Servlet and JSP Cook Book”, O'Reilly, 2004.

**WEB APPLICATION USING C#**

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**UNIT – I**

Introduction to ASP.NET: Evolution of .NET – Benefits of .NET – Overview of .NET - ASP.NET overview: Exploring new features of ASP.NET - ASP.NET Technologies- Exploring an ASP.NET 4.0 Web Application – Creating an ASP.NET website.

**UNIT – II**

Developing a Web Application: Specifying a location for a web application – File types in ASP.NET - Exploring ASP.NET Web pages - ASP.NET Coding Models – Application Structure and State: Structure of an application- The Global. Sax Application file – States.

**UNIT – III**

ASP.NET Controls: Standard Controls: The Control Class – The Web Control class- The Label Control- the Button Control – The Text Box Control - The Image Control - The List Box Control – Navigation Controls: The Tree View Control - Creating Static Menus - Validation Controls: Using the Required Field Validator Control- Using the Range Validator Control – HTML Controls: HTML Server Controls – HTML Form Class.

**UNIT - IV**

Accessing Data in ASP.NET : Working with Database Controls: The Grid View Control The Data list control-The Details view control- LINQ Queries: Introducing LINQ Queries-Data Structures in LINQ – Deffered Query Execution and Immediate Execution LINQ and Generic Types – ADO.NET Entity Framework: Exploring ADO.NET Entity Framework – Exploring the features of Entity Framework – Working with Files and Streams: Introducing the System.IO Namespace – Working with Drives and Directories- Exploring the Directory class.

**UNIT – V**

ASP.NET Web Services: Introduction – Infrastructures of ASP.NET web services – Web Service Properties – Security in ASP.NET: Working with Login Controls – Working with User Profiles – Crystal Reports: Understanding Crystal Reports.

**TEXT BOOK**

1. KOGENT Learning Solutions, “ASP.NET 4.0 (Covers C# 2010 and VB 2010 codes) Black Book”, Dream-Tech Press

**REFERENCES**

1. Pankaj Agarwal “Principles of .NET Framework”, Vayu Education of India.
2. Mathew MacDonald, Adam Freeman and Mario Szpuszta, “Pro ASP.NET 4 in C# 2010”, Fourth Edition. Press.
3. Scott Millett, “Professional ASP.NET Design Patterns”, Paperback, 2011.
4. Shivprasad Koriala and Rajesh Pillai, “C# and ASP.NET Projects”, Paperback, 2007.



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**DATABASE MANAGEMENT SYSTEMS**

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**UNIT-I**

File System vs. DBMS- Database System Applications- View of Data- Data base language- Database design-ER Mode 1\_ Relational Model-Network Data Model-Hierarchical Data Model-Data Storage & Querying- Data Architecture.

**UNIT-II**

Relational Model-Structure of Relational Databases - Relational Algebra and Calculus- SQL - Basic Structure- Set Operations- Aggregate Functions- Null Values- Nested Queries-Complex Queries-Views - Modification of the Database - Advanced SQL- Triggers.

**UNIT-III**

Functional Dependencies – Features of Relational designs-Decomposition and Normalisation using Functional Dependencies and Multi valued Dependencies-Join dependencies-Domain key Normal form.

**UNIT-IV**

Overview of Physical Storage Media- Magnetic disks-RAID- Tertiary Storage-File Organization – Organization of records in Files- Indexing and Hashing-Ordered Indices- B+ -Tree Index Files - B-Tree Index Files – multiple Key Access - Static and Dynamic Hashing- QueryProcessing-TransactionManagement-Transactions-Concurrency.

**UNIT-V**

Distributed Databases - Homogeneous and Heterogeneous Databases-Distributed Data Storage - Distributed Transactions-Commit Protocols - Concurrency Control - Object BasedDatabases-ComplexDatatypes-StructuredTypesandInheritanceinSQL–Object identity and Reference-Types in SQL-XML-structure of XML data- XML Document - Schema - Querying and Transformation - Data Mining and Data Ware housing.

**TEXTBOOK**

1. Abraham Silberschatz, Henry F.Korth and S.Sudarshan-“Database System Concepts”, Fifth Edition, McGraw-Hill, 2006.

## REFERENCES

1. Raghu Ramakrishnan and Johannes Gehrke, “Database Management Systems”, Tata McGraw-Hill Publishing Company, 2003.
2. Ramez Elmasri and Shamkant B. Navathe, “Fundamental Database Systems”, Third Edition, Pearson Education, 2003.
3. Hector Garcia–Molina, Jeffrey D.Ullmanand Jennifer Widom- “Database System Implementation”-PearsonEducation-2000.
4. Narang,”DatabaseManagementSystems”, 2nd ed., PHI.

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ADVANCED JAVA PROGRAMMING LAB

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1. Collections using Set, List and Map interfaces
2. Applet programs
3. AWT Controls
4. CRUD operation Using JDBC
5. Displaying Query Results in a Table
6. TCP Socket
7. UDP Socket
8. Web application using Servlet and JDBC
9. Cookies and Session tracking
10. Web application using JSP and JDBC

1. Web Configuration File
2. HTML Control Classes, Control Events, Container and Input Control Classes,
3. HTTP Request Classes & Response Classes
4. Web Control Classes & Control Tags
5. Validation Controls
6. Rich Controls
7. Data Access
8. Components
9. Custom Controls
10. User Controls

**DATABASE MANAGEMENT SYSTEMS LAB**

1. Creating data base 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 and Date and Time Functions, union, intersection, set difference.
7. Implement Nested Queries & JOIN operation.
8. Practical Based on performing different operations on a view.
9. Practical Based on implementing use of triggers, cursors & procedures.
10. Make Database connectivity with front end tools MS-Visual Studio with C# programming.

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A. OBJECT ORIENTED ANALYSIS AND DESIGN

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**UNIT - I**

System Development - Object Basis-Development life cycle - Methodologies-Patterns - Frame works-Unified Approach-UML.

**UNIT - II**

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

**UNIT - III**

DesignProcess-DesignAxioms-ClassDesign-Objectstorage-ObjectInterpretability-Case Studies.

**UNIT - IV**

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

**UNIT - V**

Quality Assurance Tests - Testing strategies - Object Oriented on Testing - Test Cases - Test Plans - Continuous Testing – Debugging Principles – System usability – Measuring user satisfaction-Case Studies.

**TEXTBOOK**

1. Ali Bahrami, “Object Oriented Systems Development”, McGraw Hill International Edition, 1999

**REFERENCES**

1. Grady Booch, “Object Oriented Analysis and Design”, Pearson Education-2<sup>nd</sup> Edition
2. -Oriented Analysis and Design using UML”, PHI.
3. Carol Britton and Jill Doake, “Object – Oriented System Development: A Gentle Introduction”, Paperback, 2012.
4. David West and Brett McLaughlin, “Head First Object-Oriented Analysis and Design”, Kindle Edition, 2011.

**SEMESTER –I**

**ELECTIVE PAPER- 1**

**4H/3C**

*(To choose either A or B or C)*

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**B. CLOUD COMPUTING**

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**UNIT - I**

Fundamentals – Cloud computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why cloud computing Matters – Advantages of Cloud computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

**UNIT- II**

Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services –On-Demand computing –Discovering Cloud Services Development Services and Tools – Amazon Ec2- Google App Engine – IBM Clouds.

**UNIT -III**

Centralizing Email communications –collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation.

**UNIT -IV**

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications–Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing – Collaborating on Databases – Storing and Sharing Files – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis.

**UNIT -V**

OGSA – Sample Use Cases – OGSA Platform Components – OGSi – OGSA Basic Services. Globus Toolkit – Architecture – Programming Model – High Level Services – OGSi.Net. Middleware Solutions.

**TEXT BOOK**

1. Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, Que Publishing, 2008.

## REFERENCES

1. Haley Bear, “Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs”, Que Publishing, 2009.
2. Thomas Erl, “Cloud Computing”, Paperback, 2014.
3. Arshdeep Bahga, Vijay Madisetti, “Cloud Computing: A Handa-on Approach”, Universities Press, August 2014.
4. Rajkumar Buyya and James Broberg, “ Cloud Computing: Principles and Paradigms”, Paperback, 2013



SEMESTER –I

ELECTIVE PAPER- 1

4H/3C

*(To choose either A or B or C)*

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**C. PRINCIPLES OF PROGRAMMING LANGUAGES**

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**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 sub programs-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**

Inheritance: Inheritance-polymorphism; Language Translation Issues: Programming language syntax-stages in translation-formal translation models.

**UNIT - V**

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

**TEXTBOOK**

1. Terrance W.Pratt, Marvin V Zelkowitz, “Programming Languages, Design and Implementation”, PHI, 2002, (4<sup>th</sup> edition).

## REFERENCES

1. Ravi Sethi, “Programming Languages Concepts &Constructs”, Addison-Wesley, (2<sup>nd</sup> edition), 1996.
2. E.Horowitz, “Fundamentals of programming languages”, Galgotia Publishers, 1984.
3. A.B.Tucker, “Robert, Noonan, Programming Languages”, McGrawHill, 2002.
4. 4. D.Appleby, J.J.Vande Kopple, “Programming languages Paradigm and practice”, McGraw Hill, International Editions, (2<sup>nd</sup>edition), 1997.

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COMPILER DESIGN

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**UNIT-I**

Lexic an analysis: Regular expression- Non deterministic automata-deterministic automata  
EquivalenttoNFAs-minimizingthestatesofDFA-implementationoflexicalanalyzer.

**UNIT-II**

Syntax analysis: Top down parsing concepts-recursive descent parsing - predictive parsers-  
non recursive predicate parsing- bottom-up parsing- handle pruning- shift reduce parsing-  
operator parsing-LR parsers-parser generators -YACC.

**UNIT-III**

Intermediate code generation: Syntax directed definitions - construction of syntax trees-top  
down translation-bottom up evaluation of inherited attributed -recursive evaluators-  
assigning space at compiler construction time-type checking-overloading of functions and  
operators -polymorphic function.

**UNIT-IV**

Storage organization: Storage organization -storage allocation strategies - parameter  
passing - symbol tables-dynamic storage allocation - intermediate languages -  
representation of declarations - assignment statement - Boolean expression - back  
patching-procedure calls.

**UNIT-V**

Code generation and Code optimization: Design of code generators - runtime storage  
management - basic blocks-flow graphs-register allocation and assignment-DAG  
representation of basic blocks - peephole optimization - code optimization - the principle  
sources of optimization - optimization of basic blocks - global data flow analysis-loop  
optimizations.

## **TEXTBOOK**

1. AlfredAho, RaviSethi, JeffyD.Ullman, “Compilers-Principles, Techniques and Tools”, Pearson, 1986.

## **REFERENCES**

1. David Galles, “Modern Compiler Design”, Pearson Education Asia, 2007
2. Steven S. Muchnick, “Advanced Compiler Design & Implementation”, Morgan Kaufmann Pulishers, 2000
3. C. N. Fisher and R. J. LeBlanc, “Crafting a Compiler with C”, Pearson Education, 2000

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ENTERPRISE JAVA PROGRAMMING

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**UNIT-I**

Introduction -Enterprise Architecture Styles - J2EE Architecture - Containers - J2EE Technologies - Developing J2EE Applications - Naming and directory services - Using JNDI - JNDI Service providers Application Servers - Implementing the J2EE Specifications - J2EE packaging and Deployment - J2EE packaging overview - Configuring J2EE packages

**UNIT-II**

JSP Benefits - Framework roles - Simple JSF application - User Interface Component Model - Navigational Model - Life Cycle of JSF page - Using JSF in JSP Pages – Setting up a page, using core tags - using HTML tags - using localized messages - Using converters.

**UNIT-III**

Introduction to Enterprise Beans - Session Bean - Entity Bean - Message driven Bean - defining clients access with interfaces - contents of an enterprise Bean - life cycle of enterprise Bean - creation of Enterprise Bean - application client - web client - other Enterprise Bean features- handling exceptions.

**UNIT-IV**

Struts Architecture - Struts classes - Action Forward, Action Form, Action Servlet, Action classes - Understanding struts - config.xml, Understanding Action Mappings, Struts flow with an example application.

**UNIT-V**

Hibernate - Architecture of Hibernate - Life cycle of Hibernate Entities- Exploring HQL - Understanding Hibernate O/R Mapping - Collection Mapping - Association Mapping - Relationships in Java and Databases.

**TEXT BOOKS**

1. Marty Hall, Larry Brown., “Core Servlets and Java Server Pages”, 2nd Edition, Pearson Education, 2004
2. Stephanie Bodoffetl., “The J2EE<sup>TM</sup> Tutorial”, Pearson Education, Second Edition, 2005.
3. Minter Dave, Linwood Jeff, “Beginning Hibernate, From Novice to Professional”, Apress, Second Edition, 2006
4. <http://www.tutorialspoint.com/hibernate/>

**REFERENCES**

1. Patrick Naughton& Herbert Schildt, “The Complete Reference: Java 2”, Tata McGraw Hill, 1999
2. Bruce W.Perry, “Java Servlet and JSP Cook Book”, O'Reilly, 2004.

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ENTERPRISE APPLICATION USING C#

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**UNIT – I**

Introduction – Creating a Simple Component – Properties and State – Database Components – Consuming the Database Component –Enhancing the Component with Error Handling – Aggregate Information–Data Objects.

**UNIT - II**

User Controls–Creating a Simple User Control–Visual Studio .NET Custom Control Support – Independent User Controls –Integrated User Controls –User Control Events – Limitations – Deriving Custom Controls.

**UNIT - III**

Designing for Scalability–Profiling –Caching–Output Caching–Client Side–Query Structuring– Events–CustomCachingControl–CachingwithHTTPCachePolicyClass–Fragment Caching – Data Caching –A Simple Cache Test–Caching to Provide Multiple Views.

**UNIT – IV**

Determining Security Requirements –Restricted File Types – Security Concepts –ASP .NET Security Model–Security Strategies – Certificates – SSL –Forms Authentication –Web. Config Settings– Login Page – User Lists – Protecting User Passwords with Encryption – Custom Roles – Windows Authentication–IIS Settings –Web. Config Setting –A windows Authentication Test.

**UNIT – V**

EnterpriseLibrary–DevelopingApplicationswithEnterpriseLibrary–DesignBlocks–Caching– Cryptography–Data Access – Exception Handling –Logging – Policy Injection – Security – Unity – Validation – Deployment Tools –Development of Deployment Tools –Choosing a Deployment Strategy–Click once Update Strategy – Deployment and Security.

**TEXTBOOK**

1. Matthew Mac Donald, “The Complete Reference–ASP .NET”, Tata McGraw Hill, 2002.

**REFERENCES**

1. Stephen Walther, “ASP .NET 2.0 Unleashed”, SAMS Publishing, 2006.
2. ImarSpaanjaars, “Beginning ASP.NET 4.5 in C# and VB”, Paperback, 2012.
3. Scott Millett, “Professional ASP.NET Design Patterns”, Paperback, 2011.
4. Shivprasad Koriala and Rajesh Pillai, “C# and ASP .NET Projects”, Paperback, 2007.

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SEMESTER –II

MAIN PAPER- 8

4H/3C

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**UNIX NETWORKING PROGRAMMING**

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**UNIT-I**

Overview of UNIXOS - File I/O-File Descriptors -File sharing-Files and directories-File types-File access permissions-Files systems-Symbolic links-Standard I/Library- Streams and file objects-Buffering-System data files and information-Password file- Group file-Login accounting-system identification.

**UNIT-II**

Environment of a UNIX process - Process termination - command line arguments - Process control-Process identifiers-Process relationships terminal logins-Signals- threads.

**UNIT-III**

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**

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

**UNIT-V**

Application-Debugging techniques-TCPecho client server-UDPecho client server- Ping-Trace route-Client server applications like file transfer and chat.

**TEXTBOOKS**

1. W.Richard Stevens, Advanced programming in the UNIX environment, Addison Wesley, 999. (Unit1, 2 &3)
2. W. Stevens, Bill Fenner, Andrew Rudoff, "Unix Network Programming", Volume 1, The Sockets Networking API, 3rd Edition, Pearson education, Nov2003. (unit4&5)



## REFERENCES

1. Meeta Gandhi, Tilak Shetty and Rajiv Shah – The ‘C’ Odyssey Unix –The open Boundless C, 1<sup>st</sup> Edition, BPB Publications 1992.
2. Stvens,"Unix Network Programming: Inter process Communications”,Vol2,2<sup>nd</sup>ed., PHI.
3. Bill Fenner, “Unix Network Programming: The Sockets Networking”, Vol 1, 3<sup>rd</sup> ed., Paperback, 2012.
4. Mark G.Sobell, “A Practical Guide to Linux Commands, Editors and Shell Programming”, Paperback, 2012.

**SEMESTER –II**

**MAIN PRACTICAL PAPER- 4**

**3H/2C**

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**ENTERPRISE JAVA PROGRAMMING LAB**

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1. Simple JSF application using JSP in JSF
2. HTML render kit in JSF
3. Core render kit in JSF
4. Creating Enterprise Bean
5. Creating Web Client
6. Using Session Bean
7. Struts Action
8. Struts Forward Action
9. Object Relational Mapping
10. Collection Mapping

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ENTERPRISE APPLICATION USING C# LAB

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1. Creation and consumption of a simple component and database component and components using aggregate functions.
2. Creation of a Custom control which includes the following operation  
A textboxes that parses the separator and identifies the first name and last name.
2. Create a popup calendar control that consists of a textbox and calendar control. The calendar control pops up only by clicking the calendar control
3. Cache the output of the page for a specified time using Output Caching
5. Cache the data content of the web page using the Data Caching
6. Cache portion of a web page using Fragment caching
7. Create a simple profile and provide customized settings for the user.
8. Using the Forms Authentication, authenticate the user and encrypt the password using either SHA or RSA algorithm.
9. Implementation of deployment tools (XCOPY or Web Setup wizard)
10. Working with enterprise library tool with various features (Data access, exception, Cryptography, logging).

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 un 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 and a word. The program should then print the word 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.
9. Write a shell script program to include verbose Debug option for debugging.
10. Write a shell script program to include trace Debug option for debugging.

**SEMESTER –II**

**COMPULSORY PAPER**

**2H/2C**

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**HUMAN RIGHTS**

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**UNIT-I**

Definition of Human Rights - Nature, Content, Legitimacy and Priority - Theories on Human Rights - Historical Development of Human Rights.

**UNIT-II**

International Human Rights - Prescription and Enforcement up to World War II - Human Rights and the U .N .O. - Universal Declaration of Human Rights - International Covenant on Civil and Political Rights - International Covenant on Economic, Social and Cultural Rights and Optional Protocol.

**UNIT-III**

Human Rights Declarations - U.N. Human Rights Declarations - U.N. Human Commissioner.

**UNIT-IV**

Amnesty International - Human Rights and Helsinki Process - Regional Developments - European Human Rights System - African Human Rights System - International Human Rights in Domestic courts.

**UNIT-V**

Contemporary Issues on Human Rights: Children's Rights - Women's Rights - Dalit's Rights - Bonded Labour and Wages - Refugees - Capital Punishment.  
Fundamental Rights in the Indian Constitution - Directive Principles of State Policy - Fundamental Duties - National Human Rights Commission.

**TEXT BOOKS**

1. International Bill of Human Rights, Amnesty International Publication, 1988.
2. Human Rights, Questions and Answers, UNESCO, 1982
3. Mausice Cranston - What is Human Rights
4. Desai, A.R. - Violation of Democratic Rights in India
5. Pandey - Constitutional Law.
6. Timm. R.W. - Working for Justice and Human Rights.

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A. SOFTWARE TESTING

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**UNIT - I**

Introduction - Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs. Flow graphs and Path testing: - Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

**UNIT - II**

Transaction Flow Testing:-transaction flows, transaction flow testing techniques. Dataflow testing: - Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

**UNIT – III**

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability. Paths, Path products and Regular expressions: - path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

**UNIT - IV**

Logic Based Testing- overview, decision tables, path expressions, kv charts, specifications. State, State Graphs and Transition testing- state graphs- good & bad state graphs- state testing, Testability tips.

**UNIT - V**

Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like J Meter or Win runner).

**TEXT BOOKS**

1. Baris Beizer, Dream tech, “Software Testing techniques”, second edition, Paperback, 2002.
2. Dr.K.V.K.K. Prasad, Dream tech, “Software Testing Tools”, Paperback, 2004.

**REFERENCES**

1. Brian Marick, “The craft of software testing”, Pearson Education.
2. P.C.Jorgensen, “Software Testing”, 3rd edition, Aurbach Publications
3. Edward Kit, “Software Testing in the Real World”, Pearson.
4. Perry and John Wiley, “Effective methods of Software Testing”, 2nd Edition, 1999.

**SEMESTER –II**

**ELECTIVE PAPER- 2**  
*(to choose either A or B or C)*

**4H/3C**

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**B. WEB SERVICES**

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**UNIT – I**

Overview of Distributed Computing. Introduction to web services– Industry standards- Technologies and concepts underlying web services– their support to web services. Applications that consume web services.

**UNIT – II**

XML–its choice for web services–network protocols to backend databases-technologies–SOAP, WSDL–exchange of information between applications in distributed environment–locating remote web services–its access and usage. UDDI specification– an introduction.

**UNIT - III**

A brief outline of web services – conversation –static and interactive aspects of system interface and its implementation, workflow –orchestration and refinement, transactions, security issues– the common attacks – security attacks facilitated within web services quality of services – Architecting of systems to meet users requirement with respect to latency, performance, reliability, QOS metrics, Mobile and wireless services– energy consumption, network bandwidth utilization, portals and services management.

**UNIT - IV**

Building real world enterprise applications using web services– sample source code to develop web services– steps necessary to build and deploy web services and client applications to meet customer requirements– Easier development, customization, maintenance, transactional requirements, seamless porting to multiple devices and platforms.

**UNIT - V**

Deployment of Web services and applications onto Tomcat application server and axis SOAP server–Web services platform as a set of enabling technologies for XML based distributed computing.



## **TEXT BOOK**

1. Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services: Architects Guide, Prentice Hall, Nov2003.

## **REFERENCES**

1. Kirk Zurell- “C Programming for Embedded Systems” R&D, Books- 2000.
2. David. E, Simon, “An embedded software primer”, Pearson Education Asia-Addison Wesley Longman (Singapore), Low Priced Edition, 2001, ISBN- 81- 7808- 045- 1.
3. Michael Barr, “Programming Embedded Systems in C and C++”, Shroff Publishers & Distributors Pvt. Ltd., Calcutta. March 2001, ISBN- 81- 7366 - 076 – X.
4. Andreas Witting, Michael Wittig, “Amazon Web services in Action”, Paperback, 2015

**SEMESTER –II**

**ELECTIVE PAPER- 2**  
*(To choose either A or B or C)*

**4H/3C**

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**C. CRYPTOGRAPHY AND NETWORK SECURITY**

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**UNIT - I**

Security Problems: Security problem in computing- Security Attacks – Security Services – Security Mechanisms – OSI security attack-Standards and standard setting organizations

**UNIT - II**

Data Security: Basic encryption and decryption-Substitution-Transposition-Block ciphers  
Data encryption standard encryption and decryption-Differential and linear crypto analysis  
Advanced encryption–Standard encryption and decryption - Block cipher models-Triple DES with two keys-Stream cipher-RC4- RSA algorithm – Diffie -Hellman key exchange algorithm.

**UNIT - III**

Message Authentication: Hash Functions – MD5-Hash algorithm - SHA 512 logic - Authentication Protocols-Digital signature standards

**UNIT - IV**

Network Security: IP security overview, IP security architecture, Authentication header, Encapsulating security pay load, combining security association, Key management-Web security considerations, secure socket layer, secure electronic transaction.

**UNIT - V**

System Security: Intruders and intrusion detection-Malicious software, Viruses and related threats, virus counter measures, distributed denial of services attack-Firewalls design principles-Trusted systems.

**TEXT BOOK**

1. William Stallings, "Cryptography and Network Security – Principles & Practice", Third Edition Pearson Education.

**REFERENCES**

1. Charles P. Pleegeer, "Security in Computing", PHI Learning, 1998.
2. Prakash C. Gupta, "Cryptography and Network Security", Paperback, 2005.
3. Alfred J.Menezes and Paul C. Van Oorschot, "Handbook of Applied Cryptography", Kindle edition, 1996.
4. Nicholar J. Daras and Michael Th. Rassias, "Computation, Cryptography and Network Security", hard cover, 2015.

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**DISTRIBUTED OPERATING SYSTEMS**

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**UNIT-I**

Evolution –Models – Popularity - Distributed Operating System – Issues – Distributed Computed Environment - Features of a Good Message Passing – Issues- Synchronization – Buffering - – Multi data gram Messages – Encoding and Decoding of Message Data – Process Addressing – Failure Handling – Group Communication.

**UNIT-II**

The RPC Model –Transparency – Implementation – Stub – Messages – Marshaling - Server Management –Parameter Passing Semantics – Call Semantics – Communication protocols – Complicated – Client server Binding – Exception Handling – Security – Special types – Heterogeneous – Light Weight – Optimization

**UNIT-III**

Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Election Algorithms - Process Migration – Threads.

**UNIT-IV**

Meet Hadoop: Data - Data Storage and Analysis - Comparison with Other Systems - A Brief History of Hadoop - The Apache Hadoop Project – Map Reduce: A Weather Dataset - Analyzing the Data with UNIX Tools - Analyzing the Data with Hadoop - Scaling Out - Hadoop Streaming - Hadoop Pipes

**UNIT-V**

The Configuration API - Configuring the Development Environment - Running Locally on Test Data - Running on a Cluster - The Map Reduce Web UI - Using a Remote Debugger - Tuning a Job - Map Reduce Workflows

**TEXT BOOKS**

1. Pradeep K. Sinha, “Distributed Operating System Concepts and Design”, PHI, New Delhi, 2007.
2. Tom White, “Hadoop: The Definitive Guide”, Published by O’Reilly Media, Third Edition, 2009

**REFERENCES**

1. Andrew S Tanaenbaum, “Modern Operating System”, PHI, New Delhi, 2001
2. D.M. Dhamdhare, 2002, Operating System, Tata McGraw-Hill, New Delhi.
3. A.S. Tanenbaum, Operating Systems: Design and Implementation, Prentice-Hall of India, New Delhi.
4. Nutt, 2005, Operating Systems, 3 rd Edition, Pearson Education, Delhi.

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**SOFTWARE PROJECT MANAGEMENT**

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**UNIT-I**

Project Management-Introduction to Project and Project management- problems with software projects - Project Management Knowledge Area and Framework- Stages of project - Feasibility study -cost-benefit analysis - Planning - project execution - project and product lifecycle - Project Stakeholders - All Parties of project - role of project manager - Exploration of Open Source Software tools for project management. Checkpoints And Processes of Project -Major Milestones- Minor Milestones- Periodic status assessments. Project Processes- Initiating Processes- Planning Processes- Control Processes- Executing Processes- Closing Processes- Process Groups- Process Interactions.

**UNIT-II**

Project Planning -Integration Management - Introduction - Project plan development – Plan Execution - Scope Management - Introduction - methods for selecting projects - project charter - scope statement - work breakdown structure - Stepwise Project Planning -Overview - Main steps in project planning. Project Scheduling-Time Management- Importance of project schedules- Schedules and activities - Sequencing and scheduling activity - Project Network Diagrams - Network planning models- Duration Estimating and schedule development- Critical path analysis- Program evaluation and review Techniques.

**UNIT-III**

Technical Metrics For Software-Software Process and Project Metrics- Size Oriented Metrics- Function-Oriented Metrics- Extended Function Point Metrics- A Framework for Technical Software Metrics- Metrics for Requirement Specification Quality- Metrics for Analysis- Metrics for Design- Metrics for Source Code- Metrics for Testing- Metrics for Maintenance. Technical Metrics For Object-Oriented Systems-Intent of Object-Oriented Metrics- Characteristics of Object-Oriented Metrics - Metrics for OO Design Model- Class-Oriented Metrics- Operation-Oriented Metrics- Metrics for Object-Oriented Testing- Metrics for Object-Oriented Projects.

**UNIT-IV**

Overview- Benefits- Technologies related to ERP- E R P packages- Business Process Re-engineering- Implementation Life Cycle of ERP- Training - Team Training- End User Training- Post Implementation (Maintenance Mode) - Implementation in large-scale organization- Applications of ERP in functional areas- Marketing- Personnel- Financial & Production.

**UNIT-V**

Decision structure- Decision Support Trends- DSS Components- Using DSS- What-if analysis- sensitivity analysis- Goal Seeking Analysis- Optimization Analysis- Executive Information Systems- Enterprise portals and decision support- knowledge management systems.

### **TEXT BOOKS**

1. James A O'Brien, George M maracas, Ramesh Behl, "Management Information Systems", McGraw Hill.
2. Walker Royce: Pearson Education, 2005: Software Project Management.
3. Indu Chhabra, "Software Engineering: A Concise Study", Publishers, 1<sup>st</sup> Edition.

### **REFERENCES**

1. A Guide to the Project Management Body of Knowledge (PMBOK), Project Management Institute, PA, (2004).
2. Harold Kerzner, Frank P. Saladis, Project Management Workbook and PMP/CAPM Exam Study Guide, Wiley Publishers (2006)
3. Claudia M. Baca, Patti, PMP: Project Management Professional Workbook, Sybex, Workbook (2003).
4. Joel Henry, Pearson Education: Software Project Management.
5. PankajJalote, Pearson Education, 2005: Software Project Management.

**MOBILE COMPUTING**

**UNIT-I**

Mobile Computing – Mobile Computing Vs wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.

**UNIT-II**

Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP- Adaptation of TCP Window – Improvement in TCP Performance.

**UNIT-III**

Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS).

**UNIT-IV**

Ad-Hoc Basic Concepts – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols –Popular Routing Protocols – Vehicular Ad Hoc networks (VANET) – MANET Vs VANET – Security.

**UNIT-V**

MOBILE PLATFORMS AND APPLICATIONS Mobile Device Operating Systems – Special Constrains & Requirements – Commercial Mobile Operating Systems – Software Development Kit: i OS, Android, BlackBerry, Windows Phone – M Commerce – Structure – Pros & Cons – Mobile Payment System – Security Issues.

**TEXT BOOK**

1. Prasant Kumar Pattnaik, Rajib Mall, “Fundamentals of Mobile Computing”, PHI Learning Pvt. Ltd, New Delhi – 2012. 64



## REFERENCES

1. Jochen H. Schller, "Mobile Communications", Second Edition, Pearson Education, New Delhi, 2007.
2. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
3. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2003.
4. William.C.Y.Lee, "Mobile Cellular Telecommunications-Analog and Digital Systems", Second Edition, Tata McGraw Hill Edition, 2006.
5. C.K.Toh, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.
6. Android Developers : <http://developer.android.com/index.html>
7. Apple Developer : <https://developer.apple.com/>
8. Windows Phone Dev Center: <http://developer.windowsphone.com> 9. BlackBerry Developer : <http://developer.blackberry.com/>

**DESIGN AND ANALYSIS ALGORITHMS****UNIT-I**

Algorithm Analysis – Time Space Tradeoff – Asymptotic Notations – Conditional asymptotic notation – Removing condition from the conditional asymptotic notation - Properties of big-Oh notation – Recurrence equations – Solving recurrence equations – Analysis of linear search.

**UNIT-II**

Divide and Conquer: General Method – Binary Search – Finding Maximum and Minimum – Merge Sort – Greedy Algorithms: General Method – Container Loading – Knapsack Problem.

**UNIT-III**

Dynamic Programming: General Method – Multistage Graphs – All-Pair shortest paths – Optimal binary search trees – 0/1 Knapsack – Travelling salesperson problem .

**UNIT-IV**

Backtracking: General Method – 8 Queens problem – sum of subsets – graph coloring – Hamiltonian problem – knapsack problem.

**UNIT-V**

Graph Traversals – Connected Components – Spanning Trees – Biconnected components – Branch and Bound: General Methods (FIFO & LC) – 0/1 Knapsack problems – Introduction to NP-Hard and NP-Completeness.

**TEXT BOOKS**

1. Ellis Horowitz, SartajSahni and Sanguthevar Rajasekaran, Computer Algorithms/ C++, Second Edition, Universities Press, 2007. (For Units II to V)
2. K.S. Easwarakumar, Object Oriented Data Structures using C++, Vikas Publishing House pvt. Ltd., 2000 (For Unit I)

## REFERENCES

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.
2. T. H. Cormen, C. E. Leiserson, R.L.Rivest, and C. Stein, "Introduction to Algorithms", Second Edition, Prentice Hall of India Pvt. Ltd, 2003.
3. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 1999.

1. Creation of simple application using Button, Text View and Edit Text
2. Creating an application which uses Radio buttons & Option Group
3. Creating an application with Alert Dialog box
4. Creating an application with Date Picker Widget
5. Creating an application which creates Progress Bar
6. Creating an application with Spinner
7. Creating an application with Menus and Intents
8. Creating an application with File I/O
9. Creating an application which connects RDBMS (SQ Lite / My SQL)
10. Creating an application with Phone services (SMS, Call etc.)

1. Linear & Binary search using Divide and Conquer
2. Quick sort using Divide and Conquer
3. Merge Sort using Divide and Conquer
4. Selection Sort using Divide and Conquer
5. Maximum and Minimum using Divide and Conquer
6. 0/1 knapsack using Dynamic Programming
7. All pairs of Shortest path algorithm
8. Minimum Cost Spanning Tree using Prim's Algorithm & Kruskal Algorithm
9. N-Queens Problem using Backtracking
10. Sum of Subset of numbers

## MINI PROJECT

## REGULATIONS

- a) Students should do their Mini Project work in the College during 3<sup>rd</sup> semester.
- b) The Candidate should submit the filled in format as given in **Annexure-I** to the department for the approval during the 2<sup>nd</sup> week of July.
- c) Each internal guide shall have maximum of eight Students.
- d) Periodically the project should be reviewed minimum three times by the advisory committee.
- e) The Students should prepare two copies of the project work and submit the same on the date fixed by the Department for the evaluation. After evaluation one copy is to be retained in the College Library and the student can hold one copy.
- f) A Sample Cover page format of the Mini project work is enclosed in **Annexure-II**.
- g) Format of the **Title page** and **certificate** are enclosed in **Annexure-III**.
- h) The Students should use Presentation during their Mini Project Viva voce Examinations.
- i) To pass the Mini Project and viva-voce a candidate should secure 50% marks. The candidate should compulsorily attend viva-voce examination to secure pass in that paper.

The evaluation of Mini Project is as follows:

The maximum mark for each Mini Project is 100 with 25 for Continuous Internal Assessment (CIA) and 75 for Semester Examination.

CIA Project Work		
I	First Review	10 Marks
II	Second Review	10 Marks
III	Report Preparation	5 Marks
<b>Total</b>		<b>25 Marks</b>
Semester Project Work		
1.	Evaluation of Project Work Document	55 Marks
2.	Viva – Voce	20 Marks
<b>Total</b>		<b>75 Marks</b>

**SEMESTER –III**

**ELECTIVE PAPER- 3**  
*(to choose either A or B or C)*

**4H/3C**

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**A. SOFTWARE QUALITY ASSURANCE**

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**UNIT-I**

The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management

**UNIT-II**

Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management

**UNIT-III**

Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis

**UNIT-IV**

Software Quality Program Concepts – Establishment of a Software Quality Program – Software Quality Assurance Planning – An Overview – Purpose & Scope.

**UNIT-V**

Software Standards–ISO 9000 Quality System Standards - Capability Maturity Model and the Role of SQA in Software Development Maturity – SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI's CMM

**TEXT BOOKS**

1. Watts S Humphrey, “Managing the Software Process”, Pearson Education Inc
2. Mordechai Ben-Menachem / Garry S Marliss, “Software Quality”, Vikas Publishing House, Pvt, Ltd., New Delhi

**REFERENCES**

1. Gordon G Schulmeyer, “Handbook of Software Quality Assurance”, Third Edition, Artech House Publishers 2007
2. Nina S Godbole, “Software Quality Assurance: Principles and Practice”, Alfab Science International, Ltd, 2004

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**B. BIGDATA**

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**UNIT-I**

Big Data in the Enterprise: Search at Scale – Multimedia Content - Sentiment Analysis – Enriching and Contextualizing Data – Data Discovery and Exploratory Analytics – Operational Analytics or Exploratory Analytics – Realizing opportunities from Big Data – Taming the “Big Data” – New Information Management Paradigm: New Approach to enterprise Information management for Big Data – Implications of Big Data to Enterprise IT – Big Data Implications for Industry: Big Data use cases by Industry Vertical.

**UNIT-II**

Scale-Out architecture – Database Workloads – Database Technologies for managing the workloads – Columnar Database - Polyglot persistence: The next generation architecture - Big Data warehouse and analytics – How Hadoop Works – Additional consideration for BDW – Data Quality implications for Big Data.

**UNIT-III**

Understanding Data Integration Patterns – Big Data Workload Design Approaches – Map reduce patterns, algorithms and use cases, No SQL Modeling Techniques.

**UNIT-IV**

Challenges in Big Data Analysis – Big Data Analytics Methodology – Analyze and Evaluate Business Use case – Develop Business Hypotheses – Setting up Big Data Analytics System – Gathering Data with Apache Flume.

**UNIT-V**

In-Memory Computing Technology: Guidelines – Real Time Analytics and CAP Theorem – Hadoop and No SQL Conundrum – Using an In-Memory Data Grid for Real time Data Analysis – Map Reduce and real Time Processing – Big Data Workflow – Design Principles for Contextualizing Big Data.

**TEXT BOOK**

1. Soumendra Mohanty, Madhu Jagadeesh, and Harsha Srivatsa, “Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics”, Apress Publication.

**REFERENCES**

1. Big Data Now 2012 Edition”, O’Reilly, First Edition, 2012
2. Paul Zikopoulos, Thomas Deutsch, Dirk Deroos, David Corrigan, Krishnan Parasuraman and James Giles, “Harness the power of Big Data”, McGraw Hill, 2013



**SEMESTER –III****ELECTIVE PAPER- 3**  
*(to choose either A or B or C)***4H/3C**

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**C. SOFT COMPUTING**

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**UNIT-I**

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set – Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

**UNIT-II**

Derivative based Optimization – Descent Methods – The Method of Steepest Descent – classical Newton’s Method – Step Size Determination – Derivative Free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

**UNIT-III**

Supervised Learning Neural Networks – Perceptrons – Adaline Back propagation Multilayer perceptrons – Radial Basis Function Networks – Unsupervised Learning and Other Neural Networks – Competitive Learning Networks – Kohonen Self – Organizing Networks – Learning Vector Quantization – Hebbian Learning.

**UNIT-IV**

Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

**UNIT-V**

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

**TEXT BOOK**

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

**REFERENCES**

1. Timothy J. Ross, “Fuzzy Logic with Engineering Application, “ McGraw Hill, 1977.
2. Davis E. Goldberg, “Genetic Algorithms Search, Optimization and Machine Learning”, Addison Wesley, 1989.
3. S. Rajasekaran and G.A.V. Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2003. Emereo Pty Limited, July 2008.
4. Ahmar, Abbas, “Grid Computing A Practical Guide to technology and Applications”, Charles River media, 2003.

## PROJECT WORK

## REGULATIONS

- a. Students should do their four months Project work in Company / Institutions during fourth semester.
- b. The Candidate should submit the filled in format as given in **Annexure-IV** to the department for approval during the I<sup>st</sup> Week of January.
- c. Each internal guide shall have maximum of eight Students.
- d. Periodically the project should be reviewed minimum three times by the advisory committee.
- e. The Students should prepare three copies of the project work and submit the same on the date fixed by the department for the evaluation. After evaluation, one copy is to be retained in the College Library and one copy is to be submitted to the University (Registrar) and the student can hold one copy.
- f. A Sample Cover page format of the Project Work is enclosed in **Annexure-V**.
- g. Format of the **Title page** and **certificate** are enclosed in **Annexure-VI**.
- h. The Students should use Presentation during their Project Viva voce Examinations.
- i. For the project work and viva-voce a candidate should secure 50% of the marks for pass. The candidate should compulsorily attend viva-voce examination to secure pass in that paper.

The evaluation of project is as follows:

The maximum mark for each Project is 200 with 80 for Continuous Internal Assessment (CIA) and 120 for Semester Examination.

CIA Project Work		
I	First Review	25 Marks
II	Second Review	25 Marks
III	Report Preparation	30 Marks
<b>Total</b>		<b>80 Marks</b>
Semester Project Work		
1.	Evaluation of Project Work Document	80 Marks
2.	Viva – Voce	40 Marks
<b>Total</b>		<b>120 Marks</b>

For the conduct of University Examinations in practical subjects and Project work the University will appoint two external examiners.

**ANNEXURE - I**  
**THIRUVALUVAR UNIVERSITY**

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College Name :

Course :

Student Name :

Register Number :

Title of the Project :

Name of the Internal Guide :

Qualification :

Teaching Experience :

Place :

Date : Signature of Internal Guide

Name of the HOD :

Designation :

Place:

Date : Signature of the HOD  
(with seal)

## ANNEXURE-II

COLLEGE BONAFIDE CERTIFICATE

ACKNOWLEDGEMENT

ABSTRACT

TABLE OF CONTENTS

TABLE OF FIGURES

### CONTENTS

Title	Page No.
1. INTRODUCTION	
1.1 ORGANIZATIONPROFILE	
1.2 SYSTEM SPECIFICATION	
1.2.1 HARDWARECONFIGURATION	
1.2.2 SOFTWARESPECIFICATION	
2. SYSTEM STUDY	
2.1 EXISTINGSYSTEM	
2.1.1 DRAWBACKS	
2.2 PROPOSEDSYSTEM	
2.2.1 FEATURES	
3. SYSTEM DESIGN ANDDEVELOPMENT	
3.1 FILEDESIGN	
3.2 INPUT DESIGN	
3.3 OUTPUT DESIGN	
3.4 DATABASE DESIGN	
3.5 SYSTEM DEVELOPMENT	
3.5.1 DESCRIPTION OF MODULES (Detailed explanation about the project work)	
4. TESTINGAND IMPLEMENTATION	
5. CONCLUSION BIBLIOGRAPHY	

### APPENDICES

- A. DATA FLOW DIAGRAM
- B.TABLE STRUCTURE
- C.SAMPLE CODING
- D. SAMPLE INPUT
- E.SAMPLE OUTPUT

**ANNEXURE-III**

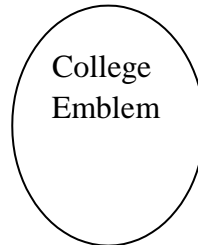
a. Format of the Cover Page

**TITLE OF THE PROJECT WORK**

Mini Project work submitted in partial fulfillment of the  
requirements for the degree of  
**Master of Science in Computer Science**  
to  
Thiruvalluvar University, Serkkadu, Vellore - Pin code

By

**STUDENTNAME REG. NO.**



**MONTH – YEAR**

**COLLEGE NAME**

**(AFFILIATED TO THIRUVALLUVAR UNIVERSITY)**

**PLACE with Pin Code**

b. Format of the certificate

**MINI PROJECTWORK**

**TITLE OF THE PROJECT WORK**

Bonafide Work Done by

STUDENTNAME

REG. NO.

Mini Project Work submitted in partial fulfillment of the  
requirements for the degree of

**Master of Science in Computer Science**

to the **College Name and Address, Affiliated college from Thiruvalluvar University, Serkkadu,  
Vellore – Pin code.**

INTERNALGUIDE

HEAD OF THE DEPARTMENT

Submitted for the Viva-Voce Examination held on \_\_\_\_\_

Internal Examiner

External Examiner

**NNEXURE-IV**

**THIRUVALLUVAR UNIVERSITY**

College Name :

Course :

Student Name :

Register Number :

Title of the Project :

Address of Organization / Institution:

Name of the Internal Guide :

Qualification :

Teaching Experience :

Place :

Date : Signature of Internal Guide

Name of the HOD :

Designation :

Place:

Date : Signature of the HOD  
(with seal)

Principal

**ANNEXURE-V**

Title Page  
Original Copy of the Approved Proforma of the Project Proposal  
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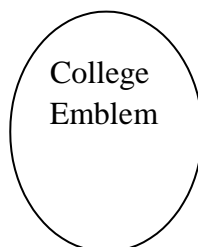
a. Format of the Cover Page

**TITLE OF THE PROJECT WORK**

Project work submitted in partial fulfillment of the  
requirements for the degree of  
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to the  
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By

**STUDENTNAME REG. NO.**



**MONTH – YEAR**

**COLLEGE NAME**

**(AFFILIATED TO THIRUVALLUVAR UNIVERSITY)**

**PLACE with Pin Code**

b. Format of the certificate

**PROJECTWORK**

**TITLE OF THE PROJECT WORK**

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REG. NO.

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