

**KRISHNA UNIVERSITY**  
**Course Structure and Syllabus for M.C.A Course**  
**(Regulation: R2010)**

1	Title of the Course	M.C.A
2	Duration of the course	3 years (Six semesters)
3	Eligibility criteria for admission	The candidate seeking admission in to M.C.A course should have passed a Bachelor's Degree examination of not less than three years duration in any discipline with mathematics at 10+2 level or should have passed Bachelor's Degree Examination of not less than three years duration in any discipline with Mathematics as one of the subjects.
4	In take	40 Seats
5	Mode of Admission	The admission will be through ICET examination conduct by the Government or a method prescribed by the Government from time to time.
6	Objectives of the course	The Objective of M.C.A course is to impart knowledge and training in the recent advancements and modern trends and technologies in the field of computer applications with aim to develop working knowledge about computers effectively in developing commercial and scientific applications.
7	Course Requirement	The course shall include Theory papers, Labs, Seminars, Assignments, Test and Practicals.
8	Course structure and Scheme of Examination	The course will be conducted on credit system and evaluation will be on seven point grading system.
9	Credit System	In this system credits will be allotted to each paper. Each theory paper will be given credits on the basis of number of teaching hours shown against each paper in the following table. One hour of teaching of theory paper in a week will be given one credit. Each practical will be given credits on the basis of number of practical hours shown against each practical in the following table. Two hours of practical paper in a week will be given one credit.
10	Gradation System	The course will be evaluated and the students will be graded on ten point scale with seven letter grades i.e., <b>O, A, B,C,D,E,F.</b>
11	Number of working days	In each semester at least ninety working days (15 weeks of six working days) must be dedicated for theory classes, practical classes and seminars.

**ANNEXURE- 1**  
**COURSE STRUCTURE AND SYLLABUS**  
**SCHEME FOR MASTER OF COMPUTER APPLICATIONS**

**SEMESTER-I**

S. No	Subject Code	Name of the Subject	Internal Marks	External Marks	Total Marks	No. of Hours/week	No. of Credits / week
1.	MCA 101	IT Fundamentals	30	70	100	4	4
2.	MCA 102	Programming in C	30	70	100	4	4
3.	MCA 103	Computer Organization	30	70	100	4	4
4.	MCA 104	Discrete Mathematical Structures	30	70	100	4	4
5.	MCA 105	Accounting & Financial Management	30	70	100	4	4
6.	MCA 106	PC Software Lab	30	70	100	6	3
7.	MCA 107	'C' Lab	30	70	100	6	3
8.	MCA 108	Seminar/soft skills	50	-	50	3	2
Total					750	35	28

**SEMESTER-II**

S.No	Subject Code	Name of the Subject	Internal Marks	External Marks	Total Marks	No. of Hours/week	No. of Credits / week
1.	MCA 201	Language Processors	30	70	100	4	4
2.	MCA 202	Database Management System	30	70	100	4	4
3.	MCA 203	Data Structures using C++	30	70	100	4	4
4.	MCA 204	Operating Systems	30	70	100	4	4
5.	MCA 205	Probability & Statistics	30	70	100	4	4
6.	MCA 206	Data Structure using C++ Lab	30	70	100	6	3
7.	MCA 207	DBMS Lab	30	70	100	6	3
8.	MCA 208	Seminar/soft skills	50	-	50	3	2
Total					750	35	28

**SEMESTER-III**

S.No	Subject Code	Name of the Subject	Internal Marks	External Marks	Total Marks	No. of Hours/week	No. of Credits / week
1.	MCA 301	Object Oriented Programming through JAVA	30	70	100	4	4
2.	MCA 302	Computer Networks	30	70	100	4	4
3.	MCA 303	Operations Research	30	70	100	4	4
4.	MCA 304	Computer Graphics	30	70	100	4	4
5.	MCA 305	Artificial Intelligence	30	70	100	4	4
6.	MCA 306	Java Programming Lab	30	70	100	6	3
7.	MCA 307	Unix & Shell Lab	30	70	100	6	3
8.	MCA 308	Seminar/soft skills	50	-	50	3	2
Total					750	35	28

**SEMESTER-IV**

S.No	Subject Code	Name of the Subject	Internal Marks	External Marks	Total Marks	No. of Hours/ week	No. of Credits / week
1.	MCA 401	Principals of Programming Languages	30	70	100	4	4
2.	MCA 402	Object Oriented Modeling and Design Using UML	30	70	100	4	4
3.	MCA 403	Web Technologies	30	70	100	4	4
4.	MCA 404	Software Engineering	30	70	100	4	4
5.	MCA405.1	Elective (One to be chosen) Grid and Cluster Computing	30	70	100	4	4
	MCA405.2	Cryptography and Networks Security					
	MCA405.3	Simulation Modeling and Analysis					
6.	MCA 406	Web Technologies Lab	30	70	100	6	3
7.	MCA 407	Visual Programming Lab	30	70	100	6	3
8.	MCA 408	Seminar/soft skills	50	-	50	3	2
Total					750	35	28

**SEMESTER-V**

S.No	Subject Code	Name of the Subject	Internal Marks	External Marks	Total Marks	No. of Hours/ week	No. of Credits / week
1.	MCA 501	Data Warehousing and Data Mining	30	70	100	4	4
2.	MCA 502	.Net Programming	30	70	100	4	4
3.	MCA 503	Design And Analysis of Algorithms	30	70	100	4	4
4.	Elective-I (One to be chosen)		30	70	100	4	4
	MCA 504.1	Embedded Systems					
	MCA 504.2	Mobile Computing					
	MCA504.3	Software Testing Techniques					
5.	Elective-II (One to be chosen)		30	70	100	4	4
	MCA 505.1	Image Processing					
	MCA 505.2	Microprocessor & Interfacing					
	MCA 505.3	Web Engineering					
6.	MCA 506	.Net Programming Lab	30	70	100	6	3
7.	MCA 507	Advanced Java Lab	30	70	100	6	3
8.	MCA 508	Seminar/soft skills	50	-	50	3	2
Total					750	35	28

**SEMESTER-VI**

S. No	Subject Code	Name of the Subject	Internal Marks	External Marks	Total Marks	No. of Hours/week	No. of Credits
1.	MCA 601	Project Work (Industry/Campus)	-	150	150	5 Months Duration	18

TOTAL NUMBER OF CREDITS AT THE END OF COURSE: **158**

S.No	SEMESTER	CREDITS
1	1 <sup>ST</sup> SEMESTER	28
2	2 <sup>ND</sup> SEMESTER	28
3	3 <sup>RD</sup> SEMESTER	28
4	4 <sup>TH</sup> SEMESTER	28
5	5 <sup>TH</sup> SEMESTER	28
6	6 <sup>TH</sup> SEMESTER	18
	<b>TOTAL</b>	<b>158</b>

## PROCEDURE TO EVALUATE INTERNAL ASSESSMENT

### THEORY

Internal Tests	20Marks
Seminars / Group Discussions	5 Marks
Attendance	5Marks
<b>Total</b>	<b>30 Marks</b>

### PRACTICAL (LAB)

Continuous Assessment at the end of each credit			Internal Assessment (consolidation of credits, 2 Exams, mid & Final)	Attendance	Total
Performance	Viva	Record			
10 marks	3 marks	2 marks	10 marks	5 marks	30 marks

\* If a student is absent for any experiment, he has to complete it before coming to the next lab class to get the marks.

\* Final External lab examiner may give any experiment, in form confined to the syllabus and need not be from the list of experiments.

### Passing Standards for PG Professional Courses

Course: **M.C.A**

S. No	Name of the Course	Total Marks		Paper Minimum required for pass when secured aggregate 50%		Paper Minimum required for pass when not secured aggregate 50%	
		External	Internal	External	Total (External + Internal)	External	Total (External + Internal)
1	Theory(T)	70%	30%	40%	40%	40%	50%
2	Practicval(P)	70%	30%	50%	50%	NA	NA
3	Project work(PW)	100%	0%	50%	50%	NA	NA
4	Seminar/softskill (S)	0%	100%	0%	50%	NA	NA



## Grading System for PG Professional courses

### MCA

#### Performance in a paper

(Conversion of marks to grade points and letter grade)

S.No.	Range of Marks	Grade Points	Letter Grade
1	>85%	10.0	O
2	75%-85%	9.0	A
3	67%-74%	8.0	B
4	58%-66%	7.0	C
5	50%-57%	6.0	D
6	40%-49%	5.0	E
7	<40%	0.0	F

#### Calculation of SGPA and CGPA

$$\text{Semester Grade Point Average (SGPA)} = \frac{\sum(C \times GP)}{\sum C}$$

$$\text{The Cumulative Grade Point Average (CGPA)} = \frac{\sum(C \times GP)}{\sum C}$$

Where, C = Credits of the Subject GP = Grade Points of the Subject

SGPA is calculated considering only the subjects of that semester.

CGPA is calculated considering all the subjects.

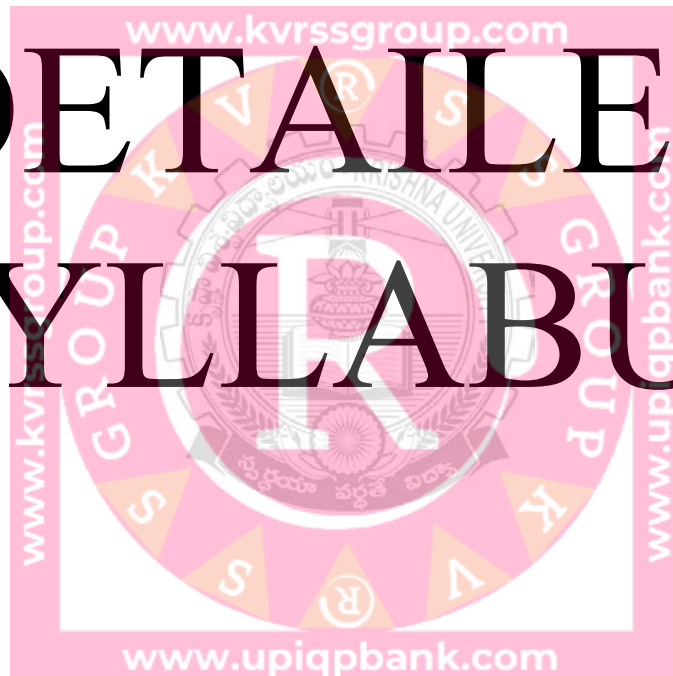
#### Overall Performance

(Conversion of CGPA to grade and classification of final result)

S. No.	Range of CGPA	Grade	Classification of final result
1	8.00 to 10.00	O	First Class with Distinction
2	6.50 to < 8.00	A	First Class
3	5.50 to < 6.50	B	Second Class
5	< 5.50	D	Re-appear



# DETAILED SYLLABUS





**KRISHNA UNIVERSITY - MACHILIPATNAM**  
**MCA 101: IT FUNDAMENTALS**

**Details of the syllabus**

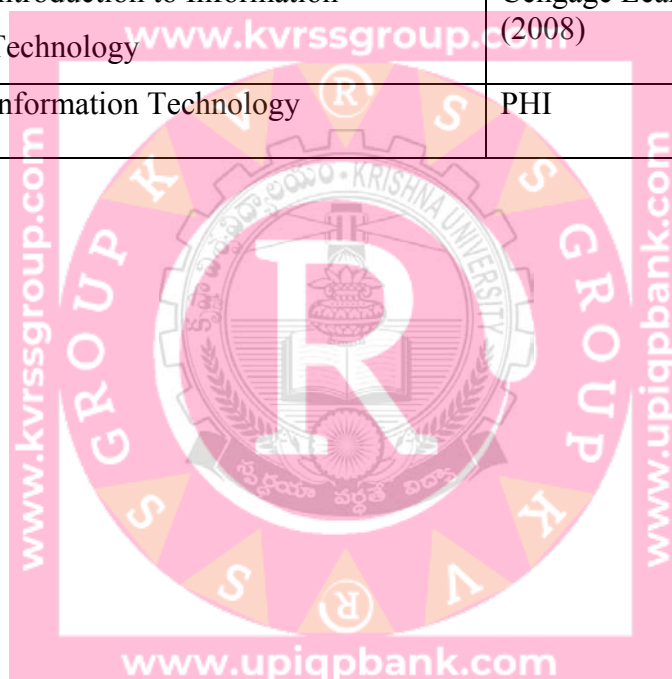
<b>Unit 1</b>	<p><b>Business and information technology</b></p> <p><b>Business in the information age:</b> Pressures and responses, why you need to know about Information Technology, what is an Information System?</p> <p><b>Information technologies in the modern organization</b></p> <p><b>Basic concepts of information systems organizations:</b> Structure and IT support, IT support at different organizational levels, managing Information Technology in organizations, IT people and careers.</p>
<b>Unit 2</b>	<p><b>Computer hardware:</b> The significance of hardware, the central processing unit, computer memory, computer hierarchy, input technologies, output technologies</p> <p><b>Computer software:</b> Software history and significance, system software, application software, software issues, programming languages, enterprise software</p> <p><b>Managing organizational data and information:</b> Basics of data arrangement and access, the traditional file environment, Databases – The modern approach, database management system, logical data models, data warehouses</p>
<b>Unit 3</b>	<p><b>Telecommunications and networks:</b> The Telecommunications system, networks, network communication software, network processing strategies, Telecommunication applications</p> <p><b>The Internet, Intranets and Extranets:</b> What exactly is the Internet?, the evolution of the Internet, the operation of the Internet, services provided by the Internet, the World Wide Web, Internet Challenges, Intranets, Extranets, Enterprise information protocols, The Mobile Internet</p>
<b>Unit 4</b>	<p><b>Functional, Enterprise, and Inter Organizational Systems:</b> Information Systems to support business functions, transaction processing, Information systems, accounting and finance systems, marketing and sales systems, production and operations management systems, human resources management systems, integrated information systems and enterprise resource planning, inter organizational /global information systems</p> <p><b>Electronic Commerce:</b> Overview of E – commerce, business – to – consumer applications, market research, advertising, and consumer service, business – to – business collaborative commerce applications, innovative applications of E – commerce, infrastructure and E – commerce support service</p>
<b>Unit 5</b>	<p><b>Computer based supply chain management and information systems integration:</b> Supply chain and their management, supply chain problems and solutions, IT supply chain support and systems integration</p> <p><b>Data, Knowledge, and Decision support:</b> Management and decision making, data transformation and management, decision support systems</p>

### Text books

	Author	Title	Publisher
1	EFRAIM Turban, R. Kelly Rainer, Richard E. Potter	Introduction to Information Technology	John Wiley(2000) (Chapter 1-9, 10.1, 10.2, 10.3 and 11.1, 11.2, 11.3 only)

### Reference books

	Author	Title	Publisher
1	ITL Education Solutions Ltd	Introduction to Information Technology	Pearson India(2008)
2	Deborah Morley, Charless S. Parker	Understanding Computers Today and Tomorrow	11 <sup>th</sup> edition, Thomson (2007)
3	Aksoy, DeNardis	Introduction to Information Technology	Cengage Learning (2008)
4	Ajoy Kumar Ray, Tinku Acharya	Information Technology	PHI



**MCA 102: PROGRAMMING WITH 'C'****Details of the syllabus**

<b>Unit 1</b>	<p><b>Introductory Concepts:</b> Types of Programming Languages, Introduction to C, Desirable Program Characteristics</p> <p><b>Introduction to C Programming:</b> The C Character Set, Writing First Program of C, Identifiers and Keywords, Datatypes, Constants, Variables and Arrays, Declarations, Expressions Statements, Symbolic Constants</p> <p><b>Operators and Expressions:</b> Arithmetic Operators, Unary Operators, Relational and Logical Operators, Assignment Operators, The Conditional Operator, Library Functions.</p> <p><b>Data Input and Output:</b> Preliminaries, Single Character Input-The Getchar Function, Single Character Output – The Puchar Function, Enter Input Data – The Scanf Function, More About the Scanf Function, Writing Output Data – The Printf Function, More About the Printf Function, The Gets and Puts Functions</p> <p><b>Preparing and Running A Complete C Program:</b> Planning a C Program, Writing a C Program, Error Diagnostics, Debugging Techniques</p>
<b>Unit 2</b>	<p><b>Control Statements:</b> Preliminaries, Branching: The IF-ELSE Statement, Looping: The while Statement, More Looping: The do-while Statement, Still More Looping: The for Statement, Nested Control Structures, The Switch Statement, The break Statement, The continue Statement, The comma Statement, The goto Statement.</p> <p><b>Functions:</b> A Brief Overview, Defining a Function, Accessing a Function, Function Prototypes, Passing Arguments to a Function, Recursion</p> <p><b>Program Structure:</b> Storage Classes, Automatic Variables, External (Global) Variables, Static Variables.</p>
<b>Unit 3</b>	<p><b>Arrays:</b> Defining an Array, Processing an Array, Passing Arrays to Functions, Multidimensional Arrays, Arrays and Strings</p> <p><b>Pointers:</b> Fundamentals, Pointer Declarations, Passing Pointers to a Function, Pointers and One-dimensional Arrays, Dynamic Memory Allocation, Operations on Pointers, Pointers and Multidimensional Arrays, Arrays of Pointers, Passing Functions to Other Functions</p>
<b>Unit 4</b>	<p><b>Structures and Unions:</b> Defining a Structure, Processing a Structure, User-defined Data Types (Typedef), Structure and Pointers, Passing Structures to Functions, Self-referential Structures, Unions</p> <p><b>Data Files:</b> Why Files, Opening and Closing a Data File, Reading and Writing a Data File, Processing a Data File, Unformatted Data Files, Concept of Binary Files</p>
<b>Unit 5</b>	<p><b>Low-Level Programming:</b> Register Variables, Bitwise Operations, Bit Fields</p> <p><b>Some Additional Features of C:</b> Enumerations, Command Line Parameters, More About Library Functions, Macros, The C Processor</p> <p><b>Appendix H Library Functions</b></p>

### Text books

	Author	Title	Publisher
1	Byron S Gottfriend	Programming with C	Second Edition, Schaum Out Lines, TATA Mc Graw Hill (2007)  <b>Chapters:</b> 1.8 to 1.10,2,3,4,5,6,7,8.1 to 8.4,9,10.1 to 10.9,11,12,13,14 and Appendix H

### Reference books

	Author	Title	Publisher
1	Behrouy A. Foreuyan & Richard F. Gilberg	Computer Science A structured programming Approach using C	Third Edition, Cengage Learning (2008)
2	Herbert Schildt	The Complete Reference C	Fourth Edition, TMH (2008)
3	Ashok N. Kamthane	Programming with ANSI and TurboC	Pearson Education (2008)
4	Mullish Cooper	The Spirit of C – An Introduction to Modern Programming	Jaico Books (2006)

**Details of the syllabus**

<b>Unit 1</b>	<p><b>Digital Logic Circuits:</b> Digital Computers, Logic Gates, Boolean algebra, Map Simplification, Combinational Circuits, Flip-flops, Sequential Circuits.</p> <p><b>Digital Components:</b> Integrated Circuits, Decoders, Multiplexers, Registers, Shift Registers, Binary Counters, Memory Unit.</p>
<b>Unit 2</b>	<p><b>Data Representation:</b> Data types, Complements, Fixed-point Representation, Floating-point representation, other binary codes, Error detection Codes.</p> <p><b>Register Transfer and Micro operations:</b> Register transfer language, Register transfer, Bus &amp; memory Transfers, Arithmetic micro operations, logic micro operations, Shift micro operations, Arithmetic Logic Shift Unit</p> <p><b>Basic Computer Organization and Design:</b> Instruction Codes, Computer registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-output Interrupt</p>
<b>Unit 3</b>	<p><b>Micro programmed Control:</b> Control memory, Address Sequencing, Micro program Example, Design of control Unit.</p> <p><b>Central Processing Unit:</b> General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control</p>
<b>Unit 4</b>	<p><b>Computer Arithmetic:</b> Introduction, Addition and subtraction, Multiplication algorithm, Floating point arithmetic operations, Decimal Arithmetic unit, Decimal Arithmetic operations.</p>
<b>Unit 5</b>	<p><b>Input-Output Organization:</b> Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt</p> <p><b>Memory Organization:</b> Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory</p>

### Text books

	Author	Title	Publisher
1	M. Morris Mano	Computer System Architecture	3 <sup>rd</sup> Edition, Pearson Education (2008). <b>Chapters</b> : 1,2,3, 4, 5.1 to 5.7, 7, 8.1 to 8.7, 10.2 to 10.5, 11.1 to 11.5, 12.1 to 12.5

### Reference books

	Author	Title	Publisher
1	V. Rajaraman, T. Radha Krishnan	Computer Organization and Architecture	PHI
2	Behrooz Parhami	Computer Architecture	Oxford (2007)
3	ISRD group	Computer Organization	ace series, TMH (2007)
4	William Stallings	Computer Organization and Architecture – Designing for Performance	Pearson Education (2005)
5	P.Chakraborty	Computer Architecture and Organization	1. Jaico Books (2008)



**MCA 104: DISCRETE MATHEMATICAL STRUCTURES****Details of the syllabus**

<b>Unit 1</b>	<p><b>The Foundations: Logic and Proofs:</b> Propositional Logic – Propositional Equivalences – Predicates and Quantifiers – Nested Quantifiers – Rules of Inference – Introduction to Proofs – Proof Methods and Strategy</p> <p><b>Basic Structures: Sets, Functions, Sequences and Sums:</b> Sets – Set Operations – Functions – Sequences and Summations</p> <p><b>The Fundamentals : Algorithms , The Integers and Matrices:</b> Algorithms – The Growth of Functions – Complexity of Algorithms – The Integers And Divisions – Primes and Greatest Common Divisors – Integers and Algorithms – Applications of Number Theory – Matrices</p>
<b>Unit 2</b>	<p><b>Introduction and Recursion :</b> Mathematical Induction – Strong Induction and Well-Ordering – Recursive Definitions and Structural Induction – Recursive Algorithms – Program Correctness</p> <p><b>Counting:</b> The Basics of Counting – The Pigeon Hole Principle – Permutations and Combinations – Binomial Coefficients – Generalized Permutations and Combinations – Generating Permutations and Combinations</p>
<b>Unit 3</b>	<p><b>Advanced Counting Techniques:</b> Recurrence Relations – Solving Linear Recurrence Relations – Divide and Conquer Algorithms and Recurrence Relations – Generating Functions – Inclusion – Exclusion – Applications of Inclusion &amp; Exclusion</p> <p><b>Relations :</b> Relations and Their Properties – n-ary Relations and Their Applications – Representing Relations – Closures of Relations – Equivalence Relations – Partial Orderings</p>
<b>Unit 4</b>	<p><b>Graphs:</b> Graphs and Graph Models – Graph Terminology and Special Types of Graphs – Representing Graphs and Graph Isomorphism's – Connectivity – Euler and Hamilton Paths – Shortest Path Problems – Planar Graphs - Graph Coloring</p>
<b>Unit 5</b>	<p><b>Trees:</b> Introduction to Trees – Applications of Trees – Tree Traversal – Spanning Trees – Minimum Spanning Trees</p> <p><b>Boolean Algebra:</b> Boolean Functions – Representing Boolean Functions – Logic Gates – Minimization of Circuits</p>

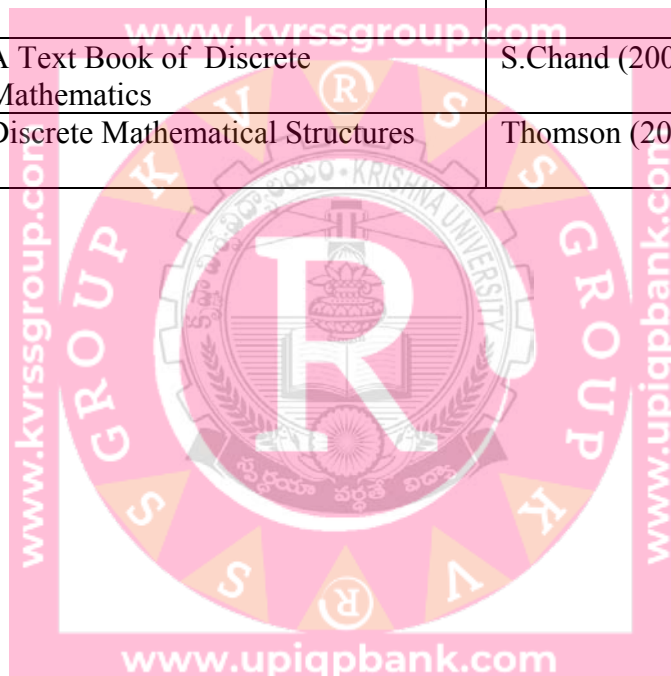


### Text books

	Author	Title	Publisher
1	Kenneth H Rosen	Discrete Mathematics and its Applications	6 <sup>th</sup> Edition, McGraw-Hill (2007) Chapters(1-10)

### Reference books

	Author	Title	Publisher
1	Ralph P. Grimaldi, B.V. Ramana	Discrete and Combinational Mathematics	5 <sup>th</sup> Edition, Pearson Education (2008).
2	Swapan Kumar Sarkar	A Text Book of Discrete Mathematics	S.Chand (2008)
3	D.S.Malik and M.K.Sen	Discrete Mathematical Structures	Thomson (2006)



**MCA 105: ACCOUNTING AND FINANCIAL MANAGEMENT****Details of the syllabus**

<b>Unit 1</b>	<b>Financial Accounting:-</b> Accounting Concepts, Double Entry System, Journal-ledger-Trail balance preparation of final accounts, Nature of financial statement-preparation of trading-profit and loss accounts-balance sheet of joint stock companies.
<b>Unit 2</b>	<b>Cost Accounting:-</b> Cost Sheet, Marginal Costing, Budget & Budgetary Control.
<b>Unit 3</b>	<b>Cost Accounting &amp; Financial Management:-</b> Standard Costing, Nature and scope of finance function, Nature of financial decisions.
<b>Unit 4</b>	<b>Financial Analysis:-</b> Concepts of Financial Analysis.
<b>Unit 5</b>	<b>Working Capital Management:-</b> Concepts of Working capital, Inventory Management, Forecasting of working capital management.

**Text books**

	Author	Title	Publisher
1	K. Rajeswara Rao and G. Prasad	Accounting and Finance	Jaibharat Publishers, 2002

**Reference books**

	Author	Title	Publisher
1	Vanherne & James C, John M. Wechowicz JR	Fundamentals of Financial Management	PHI, 2002.
2	Hornigren, Sundem Ellictt	Introduction to Financial Accounting	Pearson Education-2002
3	Ambrish Gupta	Financial Accounting for Management	ThirdEdition, Pearson Education (2009)
4	Paresh Shah	Basic Financial Accounting for Management	OxfordHigher Education (2008)

**MCA 201: LANGUAGE PROCESSORS****Details of the syllabus**

<b>Unit 1</b>	<b>Language Processor:</b> Introduction, Language Processing Activities, Fundamentals of Language Processing, Fundamentals of Language Specification, Language Processor Development Tools. <b>Data Structure for Language Processing:</b> Search Data Structures, Allocation Data Structures.
<b>Unit 2</b>	<b>Scanning and Parsing:</b> Scanning, Parsing. <b>Assemblers:</b> Elements of Assembly Language Programming, A Simple Assembly Scheme, Pass Structure of Assemblers, Design of a Two Pass Assembler, A single pass assembler for IBM PC.
<b>Unit 3</b>	<b>Macros and Macro Processors:</b> Macro Definition and Call, Macro Expansion, Nested Macro Class, Advanced Macro Facilities, Design of a Macro Preprocessor. <b>Compilers and Interpreters:</b> Aspects of Compilation, Memory Allocation, Compilation of Expressions, Compilation of Control Structures, Code Optimization, Interpreters.
<b>Unit 4</b>	<b>Linkers:</b> Relocation and Linking Concepts, Design of a Linker, Self-Relocating Programs, A linker for MS DOS, Linker for overlays, loaders.
<b>Unit 5</b>	<b>Software Tools:</b> Software Tools for Program Development, Editors, Debug Monitors, Programming Environments, User Interfaces.

**Text books**

	Author	Title	Publisher
1	Dhamdhare D.M	System Programming and Operating Systems	2nd revised edition, TMH(2008).Chapters: 1 through 8

KRISHNA UNIVERSITY - MACHILIPATNAM  
**MCA 202: DATABASE MANAGEMENT SYSTEM**

**Details of the syllabus**

<b>Unit 1</b>	<p><b>Databases and Database Users:</b> Introduction, Characteristics of the Database Approach, Actors on the Scene, Workers behind the scene, Advantages of the using the DBMS Approach.</p> <p><b>Database System Concepts and Architecture:</b> Data Models, Schemas and Instances, Three Schema architecture and Data Independence, Database Languages and Interfaces, Centralized and Client/Server Architecture for DBMS, Classification of Database Management Systems.</p> <p><b>Disk Storage, Basic File Structures and Hashing:</b> Introduction, Secondary Storage Devices, Buffering of Blocks, Placing file Records on Disk, Operations on Files, Files of Unordered Records, Files of Ordered Records, Hashing Techniques, Other Primary File Organizations, Parallelizing Disk Access using RAID Technology.</p> <p><b>Indexing Structures for Files:</b> Types of Single-Level Ordered Indexes, Multilevel Indexes, Dynamic Multilevel Indexes Using B-Trees and B<sup>+</sup> Trees, Indexes on Multiple Keys, Other Types of Indexes.</p>
<b>Unit 2</b>	<p><b>Data Modeling Using the ER Model:</b> Conceptual Data models, Entity Types, Entity Sets, Attributes and Keys, Relationship types, Relationship sets, roles and structural Constraints, Weak Entity types, Relationship Types of Degree Higher than Two, Refining the ER Design for the COMPANY Database.</p> <p><b>The Enhanced Entity-Relationship Model:</b> Sub classes, Super classes and Inheritance, Specialization and Generalization, Constraints and Characteristics of Specialization and Generalization Hierarchies, Modeling of Union Types using Categories, An Example University ERR Schema, Design Choices and Formal Definitions.</p>
<b>Unit 3</b>	<p><b>The Relational Data Model and Relational Database Constraints:</b> Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions and Dealing with Constraint Violations.</p> <p><b>The Relational Algebra and Relational Calculus:</b> Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from set Theory, Binary Relational Operations: JOIN and DIVISION, Additional Relational Operations, Examples, The Tuple Calculus and Domain Calculus.</p> <p><b>SQL-99: Schema Definition, Constraints, Queries and Views:</b> SQL Data Definitions and Data Types, Specifying Constraints in SQL, Schema Change Statements on SQL, Basic Queries in SQL, More Complex SQL Queries, INSERT, DELETE and UPDATE statements in SQL, Triggers and Views.</p>

<b>Unit 4</b>	<p><b>Functional Dependencies and Normalization for Relational Databases:</b> Informal Design Guidelines for Relation Schemas, Functional dependencies, Normal Forms Based in Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form.</p> <p><b>Relational Database Design Algorithms and Further Dependencies:</b> Properties of Relational Decompositions, Algorithms for Relational Database Schema Design, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form, Inclusion Dependencies, Other Dependencies and Normal Forms.</p>
<b>Unit 5</b>	<p><b>Introduction to Transaction Processing Concepts and Theory:</b> Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing schedules Based on Serializability.</p> <p><b>Concurrency Control Techniques:</b> Two Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Multiversion Concurrency control techniques, Validation concurrency control Techniques, Granularity of Data Items and multiple Granularity Locking.</p> <p><b>Distributed Databases and Client Server Architectures:</b> Distributed Database Concepts, Data Fragmentation, Replication, and allocation Techniques for Distributed Database Design, Types of Distributed Database Systems, An Overview of 3 Tier Client Server Architecture.</p>

#### Text books

	Author	Title	Publisher
1	Elmasri.Rand Navathe.S	Fundamentals of Database Systems.	Pearson Education (2007) <b>Chapters:</b> 1.1 to 1.6, 2, 13.1 to 13.10, 14, 3.1 to 3.6, 3.9, 4.1 to 4.5, 5, 6, 8, 10, 11, 17, 18.1 to 18.5, 25.1 to 25.3, 25.6

#### Reference books

	Author	Title	Publisher
1	Peter Rob, Carlos Coronel	Database Systems– Design, Implementation and Management	Eighth Edition, Thomson (2008)
2	C.J. Date, A.Kannan, S.Swamynathan	An Introduction to Database Systems	VII Edition Pearson Education (2006).
3	Raman A Mata – Toledo, Panline K. Cushman	Database Management Systems	Schaum's Outlines, TMH (2007)
4	Steven Feuerstein	Oracle PL/SQL – Programming	10 <sup>th</sup> Anniversary Edition, OREILLY (2008)

**MCA 203: DATA STRUCTURES****Details of the syllabus**

<b>Unit 1</b>	<p><b>Software Engineering Principles and C++ Classes</b> : Classes: Variable - Accessing Class members – Operators – Functions and Classes – Reference parameters and Class Objects – Implementation of member function – Constructors – Destructors ; Data Abstraction, Classes and ADT – Information Hiding.</p> <p><b>Pointers and Array based Lists</b> : Pointer Data types and Pointer variables: Declaring Pointer Variables – Address of Operator – Dereferencing Operator - Classes, Structures and Pointer Variables – Initializing Pointer Variables – Dynamic Variables – Operators on Pointer Variables.</p>
<b>Unit 2</b>	<p><b>Linked Lists</b> : Linked List – Properties – Item Insertion and Deletion – Building a Linked List – Linked List as an ADT – Ordered Linked Lists – Doubly Linked Lists – Linked Lists with header and trailer nodes – Circular Linked Lists.</p>
<b>Unit 3</b>	<p><b>Recursion</b>: Recursive Definitions – Problem solving using recursion – Recursion or iteration - Recursion and Backtracking: n- Queens Puzzle.</p> <p><b>Search Algorithms</b>: Search Algorithms: Sequential – Binary search – Performance of binary search – insertion into ordered list; Hashing: Hash functions – Collision Resolution – Hashing : Implementation using Quadratic Probing – Collision Resolution : Chaining.</p>
<b>Unit 4</b>	<p><b>Stacks</b>: Stack operations – Implementation of stacks as arrays – Linked implementation of stacks – Application of stacks.</p> <p><b>Queues</b>: Queues: Queue operations – Implementation of Queues as arrays ; Linked implementation of Queues ; Priority Queue ; Application of Queues</p> <p><b>Sorting Algorithms</b>: Selection Sort – Insertion Sort – Quick Sort – Merge Sort – Heap Sort</p>
<b>Unit 5</b>	<p><b>Trees</b>: Binary Trees – Binary Tree Traversal – Binary Search Tree – Nonrecursive Binary Tree Traversal Algorithms – AVL Trees.</p> <p><b>Graphs</b>: Graph Definitions and Notations – Graph Representation – Operations on graphs – Graph as ADT – Graph Traversals – shortest path Algorithm – Minimal Spanning Tree.</p>

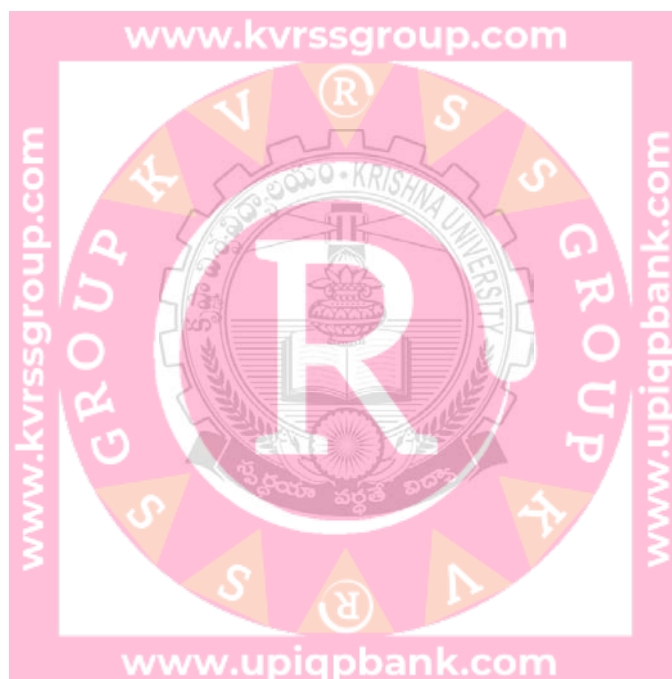


### Text books

	Author	Title	Publisher
1	D.S.Malik	Data Structures using C++	Cengage Learning India Edition (2008). ( Chapters 1, 3, 5, 6, 7, 8, 9, 10, 11 and 12.)

### Reference books

	Author	Title	Publisher
1	Mark Allen Weiss	Data structures and Algorithm Analysis in C++	Third Edition , Pearson Education (2008).
2	Adam Drozdek	Data Structures and Algorithms in C++	Cengage Learning , India Edition .





**MCA 204: OPERATING SYSTEMS****Details of the syllabus**

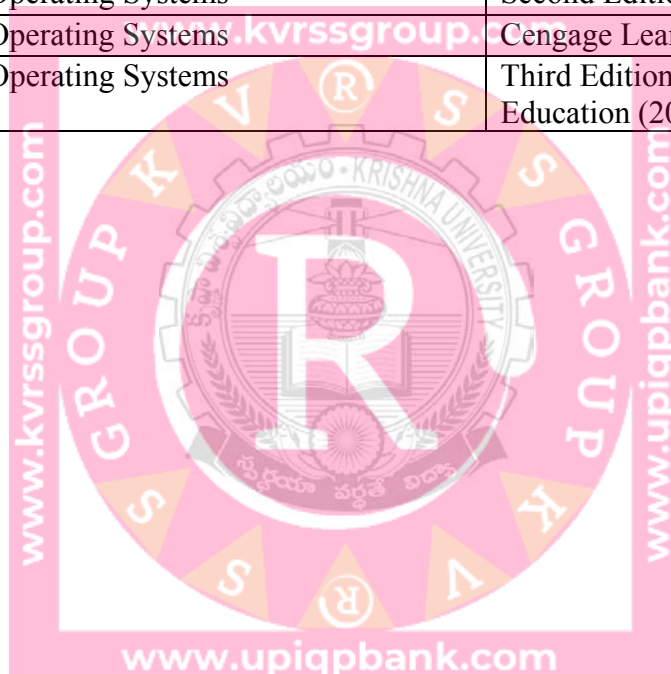
<b>Unit 1</b>	<p><b>Introduction :</b> What Operating Systems Do – Computer System Organization – Computer system Architecture – Operating System Structure – Operating System Operations – Process Management – Memory Management – Storage Management – Protection and Security – Distributed Systems – Special purpose Systems – Computing Environments.</p> <p><b>System Structure:</b> Operating System Services – User Operating System Interface – System Calls – Types of System Calls – System Programs – Operating System Design and Implementation – Operating System Structure – Virtual Machine – Operating System Generation – System Boot.</p> <p><b>Process Concept :</b> Overview – Process Scheduling – Operations on Processes – Interprocess Communication – Examples of IPC Systems – Communication in Client Server Systems.</p>
<b>Unit 2</b>	<p><b>Multithreaded Programming:</b> Overview – Multithreading Models – Thread Libraries – Threading Issues – Operating System Examples.</p> <p><b>Process Scheduling:</b> Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple Processor Scheduling – Thread Scheduling.</p> <p><b>Synchronization:</b> Background – The Critical Section Problem – Peterson's solution – Synchronization Hardware – Semaphores – Classic Problem of Synchronization – Monitors – Synchronization Examples – Atomic Transaction.</p>
<b>Unit 3</b>	<p><b>Deadlocks:</b> System Model – Deadlock Characterization – Methods for Handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock.</p> <p><b>Memory Management Strategies:</b> Background – Swapping – Contiguous Memory Allocation – Paging – Structure of the Page Table – Segmentation – Example: The Intel Pentium.</p> <p><b>Virtual Memory Management:</b> Background – Demand Paging – Copy on Write – Page Replacement – Allocation of Frames – Thrashing.</p>
<b>Unit 4</b>	<p><b>File System :</b> File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection.</p> <p><b>Implementing File Systems :</b> File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free Space Management – Efficiency and Performance – Recovery – Log structured File Systems.</p>
<b>Unit 5</b>	<p><b>Secondary Storage Structure :</b> Overview of Mass – Storage Structure – Disk Structure – Disk Attachment – Disk Scheduling – Disk Management – Swap Space Management – RAID structure.</p> <p><b>I/O Systems:</b> Overview – I/O Hardware – Application I/O Interface – Kernel I/O Interface – Transforming I/O requests to Hardware Operations – Streams – Performance.</p>

### Text books

	Author	Title	Publisher
1	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne	Operating System Principles	Seventh Edition, Wiley. <b>Chapters:</b> 1.1 – 1.12, 2.1 – 2.10, 3.1 – 3.6, 4.1 – 4.5, 5.1 – 5.5, 6.1 – 6.9, 7.1 – 7.7, 8.1 – 8.7, 9.1 – 9.6, 10.1 – 10.6, 11.1 – 11.8, 12.1 – 12.7, 13.1 – 13.7

### Reference books

	Author	Title	Publisher
1	William Stallings	Operating Systems – Internals and Design Principles	Fifth Edition, Pearson Education (2007)
2	Achyut S Godbole	Operating Systems	Second Edition, TMH (2007).
3	Flynn/McHoes	Operating Systems	Cengage Learning (2008).
4	Deitel & Deitel	Operating Systems	Third Edition, Pearson Education (2008)



## Details of the syllabus

<b>Unit 1</b>	<p><b>Some probability laws:</b> Axioms of Probability, Conditional Probability, Independence of the Multiplication Rule, Bayes' theorem</p> <p><b>Discrete Distributions:</b> Random Variables, Discrete Probability Densities, Expectation and distribution parameters, Binomial distribution, Poisson distribution, simulating a Discrete distribution,</p>
<b>Unit 2</b>	<p><b>Continuous distributions:</b> continuous Densities, Expectation and distribution parameters, exponential distribution, Normal distribution, Weibull distribution and Reliability.</p> <p><b>Estimation:</b> Point estimation, interval estimation and central limit theorem.</p>
<b>Unit 3</b>	<p><b>Inferences on the mean and the Variance of a distribution:</b> Hypothesis Testing, significance testing, Hypothesis and significance test on the mean, Hypothesis tests on the Variance</p> <p><b>Inferences on proportions:</b> estimating proportions, testing hypothesis on a proportion, Comparing two proportions: estimation, comparing two proportions: hypothesis testing.</p>
<b>Unit 4</b>	<p><b>Comparing two means and two variances:</b> point estimation: independent samples, Comparing variances: the F-distribution, Comparing means: variances equal</p> <p><b>Analysis of Variance:</b> One-way classification fixed effects model, comparing variances, pair wise comparisons, randomized complete block design</p>
<b>Unit 5</b>	<p><b>Simple linear regression and correlation:</b> model and parameter estimation, inferences about slope, inferences about intercept, Co-efficient of determination</p> <p><b>Multiple linear regression models:</b> least square procedures for model fitting, a matrix approach to least squares, interval estimation.</p>

## Text books

	Author	Title	Publisher
1	Susan Milton and Jesse C. Arnold	Introduction to Probability and Statistics	Fourth edition, TMH,(2007). <b>Chapters:</b> 2, 3.1 to 3.3, 3.5,3.8,3.9,4.1,4.2,4.4,4.7.1,7.4, 8.3 to 8.6,9,10.1 to 10.3, 11.1, 11.3, 11.6, 12.1, 12.2, 12.4, 13.1 to 13.3,13.5.

## Reference books

	Author	Title	Publisher
1	William Mendenhall, Robert J Beaver, Barbara M Beaver	Introduction to Probability and Statistics	Twelfth edition, Thomson

**MCA 301: OBJECT ORIENTED PROGRAMMING THROUGH JAVA****Details of the syllabus**

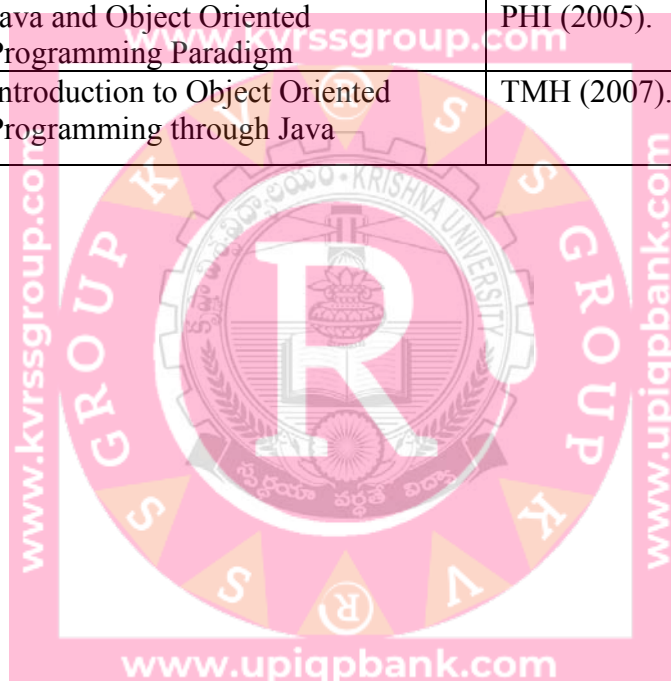
<b>Unit 1</b>	<p><b>Object Oriented Programming:</b> Introduction to OOP, Objects and Classes, Characteristics of OOP, Difference between OOP and Procedure Oriented Programming, Summary</p> <p><b>Introduction to Java Programming:</b> Introduction, Features of Java, Comparing Java and other languages, Applications and Applets, Java Development Kit, More Complex Programs, Java Source file structure, Prerequisites for Compiling and Running Java Programs.</p>
<b>Unit 2</b>	<p><b>Java Language Fundamentals:</b> The building Blocks of Java – Data types – variable declarations – wrapper classes – Operators and Assignment – Control structures – Arrays – Strings – The String Buffer Class.</p> <p><b>Java as an OOP Language:</b> Defining classes – Modifiers – Packages – Interfaces.</p>
<b>Unit 3</b>	<p><b>Exception Handling :</b> Introduction – Basics of Exception Handling in Java – Exception Hierarchy – Constructors and Methods in Throwable class – Unchecked and checked exceptions – Handling exceptions in Java – Exception and Inheritance – Throwing User defined Exceptions – Redirecting and Rethrowing Exceptions – Advantages of Exception – Handling Mechanism.</p> <p><b>Multithreading:</b> Introduction : An Overview of Threads – Creating Threads – Thread Life – cycle – Thread priorities and Thread scheduling – Thread synchronization – Thread groups – Communication of Threads.</p>
<b>Unit 4</b>	<p><b>Files and I/O Streams :</b> An Overview of I/O streams – Java I/O – File streams – File Input stream and File output stream – Filter streams – Random Access File – Serialization.</p> <p><b>Applets:</b> Introduction – Java applications versus Java Applets – Applet Life cycle – Working with Applets – The HTML Applet Tag.</p> <p><b>Database Handling Using JDBC :</b> An Overview of DBMS – JDBC Architecture – Working with JDBC</p>
<b>Unit 5</b>	<p><b>Servlets :</b> Introduction – How to run servlets – The Life – cycle of the servlet – servlet API – Multitier Applications using JDBC from a servlet.</p> <p><b>Networking and Remote Method Invocation :</b> Introduction to Networking – Understanding Ports – Networking classes in JDK – Introduction to RMI – RMI Architecture – Implementing Remote class and interface – security.</p>

### Text books

	Author	Title	Publisher
1	P. Radha Krishna	Object Oriented Programming through Java	Universities Press (2008) <b>Chapters:</b> 1,2,3,4,5,6.1-6.5,6.7,6.8,7,8.1-8.5,9.1-9.3,12.1-12.5, 13

### Reference books

	Author	Title	Publisher
1	Cay S. Horstmann Gray Cornell	Core Java – Volume 1 Fundamentals	Eighth Edition, Pearson Education
2	E.Balagurusamy	Programming with Java	3e, TMH (2007)
3	H.M.Deitel, P.J.Deitel	Java How to Program	Sixth Edition, Pearson Education (2007)
4	Debasish Jana	Java and Object Oriented Programming Paradigm	PHI (2005).
5	ISRD Group	Introduction to Object Oriented Programming through Java	TMH (2007).





KRISHNA UNIVERSITY - MACHILIPATNAM  
MCA 302: COMPUTER NETWORKS

**Details of the syllabus**

<b>Unit 1</b>	<p><b>Introduction :</b> Uses of Computer Networks: Business Application, Home Applications, Mobile Users – Social Issues. Network Hardware : Local Area Networks – Metropolitan Area Networks – Wide Area Networks – Wireless Networks – Home Networks – Internetworks. Network Software: Protocol Hierarchies – Design Issues for the Layers – Connection Oriented and Connectionless Services – Service Primitives – The relationship of Services to Protocols. Reference Models: The OSI Reference Model – The TCP/IP Reference Model – A Comparison of OSI and TCP/IP reference Model – A Critique of the OSI Model and Protocols – A Critique of the TCP/IP reference model. Example Networks: The Internet – Connection Oriented Networks: x.25, Frame Relay, and ATM – Ethernet – Wireless LANs Network Standardization: Who's who in the Telecommunication World – Who's who in the International Standards World – Who's who in the Internet Standards World.</p> <p><b>Physical Layer:</b> Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics</p> <p><b>Data Link Layer:</b> Data Link Layer Design Issues: Services Provided to the Network Layer – Framing – Error Control – Flow Control. Error Detection and Correction: Error correcting Codes – Error Detecting Codes. Elementary Data Link Protocols : An unrestricted Simplex Protocol – A simplex Stop- and – wait Protocol – A simplex Protocol for a Noisy channel. Sliding Window Protocols: A one-bit sliding Window Protocol – A Protocol using Go Back N – A Protocol using selective Repeat. Example Data Link Protocols: HDLC – The Data Link Layer in the Internet.</p>
<b>Unit 2</b>	<p><b>The Medium Access Control Sublayer :</b> Ethernet : Ethernet Cabling – Manchester Encoding – The Ethernet MAC sublayer Protocol – The Binary Exponential Backoff Algorithm – Ethernet Performance – Switched Ethernet – Fast Ethernet – Gigabit Ethernet – IEEE 802.2: Logical Link Control – Retrospective on Ethernet. Wireless LANS: The 802.11 Protocol Stack - The 802.11 Physical Layer - The 802.11 MAC sublayer Protocol - The 802.11 Frame Structure. Bluetooth: Bluetooth Architecture – Bluetooth Applications – The Bluetooth Protocol Stack – The Bluetooth Radio Layer – The Bluetooth Baseband Layer – The Bluetooth L2CAP layer – The Bluetooth Frame Structure. Data Link Layer Switching: Bridges from 802.x to 802.y – Local Internetworking – Spanning Tree Bridges – Remote Bridges – Repeaters, Hubs, Bridges, Switches, Routers and Gateways – Virtual LANs.</p>
<b>Unit 3</b>	<p><b>The Network Layer:</b> Network Layer Design Issues : Store – and Forward Packet Switching – Services Provided to the Transport Layer – Implementation of Connectionless Services – Implementation of Connection Oriented Services – Comparison Of Virtual Circuit and Datagram subnets. Routing Algorithms : The Optimality Principle – Shortest Path Routing – Flooding – Distance Vector Routing – Link State Routing – Hierarchical Routing – Broadcast Routing – Multicast Routing – Routing for Mobile Hosts. Internet Working : How Networks Differ – How Networks can be connected – Concatenated Virtual Circuits – Connectionless Internetworking – Tunneling – Internet work Routing – Fragmentation. The Network Layer in the Internet: The IP Protocol – IP address – Internet Control Protocols – OSPF – The Internet Gateway Routing Protocol – BGP – The Exterior Gateway Routing Protocol.</p>

<b>Unit 4</b>	<p><b>The Transport Layer:</b> The Transport Service: Services provided to the Upper Layers – Transport Services Primitives – Berkeley Sockets. Elements of Transport Protocols : Addressing – Connection Establishment – Connection Release – Flow Control and Buffering – Multiplexing – Crash Recovery. The Internet Transport Protocols :UDP</p> <p>Introduction to UDP – Remote Procedure Call – The Real Time Transport Protocol. The Internet Transport Protocols: TCP Introduction to TCP – The TCP Service Model – the TCP Protocol – The TCP segment header – TCP connection establishment – TCP connection release – Modeling TCP connection management- TCP Transmission Policy – TCP congestion Control – TCP Timer Management – Wireless TCP and UDP – Transactional TCP.</p>
<b>Unit 5</b>	<p><b>The Application Layer:</b> DNS : The Domain Name System : The DNS Name Space – Resource Records – Name Servers. Electronic Mail : Architecture and Services – The User Agent – Message Formats – Message Transfer – Final Delivery. The World Wide Web: Architecture Overview – Static Web Documents – Dynamic Web Documents – HTTP – The Hyper Text Transfer Protocol – Performance Enhancements – The Wireless Web. Multimedia: Introduction to Digital Audio – Audio Compression – Streaming Audio – Internet Radio – Voice Over IP – Introduction to Video – Video Compression – Video on Demand.</p>

#### Text books

	Author	Title	Publisher
1	Andrew S. Tanenbaum	Computer Networks	Fourth Edition, PHI <b>Chapters:</b> 1.1 to 1.6, 2.2, 3.1 to 3.4, 3.6, 4.3, 4.4, 4.6, 4.7, 5.1, 5.2.1 to 5.2.9, 5.5, 5.6.1 to 5.6.5, 6.1.1 to 6.1.3, 6.2, 6.4, 6.5, 7.1 to 7.4

#### Reference books

	Author	Title	Publisher
1	James F.Kurose, Keith W.Ross	Computer Networking	Third Edition, Pearson Education
2	Behrouz A Forouzan	Data Communications and Networking	Fourth Edition, TMH (2007)
3	Michael A. Gallo, William M. Hancock	Computer Communications and Networking Technologies	Cengage Learning (2008)



**Details of the syllabus**

<b>Unit 1</b>	<b>Linear Programming:</b> Introduction, formulation of Linear Programming Models, Graphic solution of Linear programming Models, Maximization with Less-than-or-equal to constraints, equalities and Greater than or equal to constraints
<b>Unit 2</b>	Minimization of the objective function, the simplex Method, properties of simplex Method, transportation problem, Assignment Problem.
<b>Unit 3</b>	<b>Deterministic inventory Models:</b> Introduction, Infinite Delivery Rate with No Backordering, Finite delivery Rate with no Backordering, Infinite Delivery Rate with Backordering, finite Delivery rate with Backordering.
<b>Unit 4</b>	<b>Game Theory:</b> Introduction, Minimax -Maxmini pure strategies, Mixed Strategies and Expected Payoff, solution of 2x2 games, dominance, solution of 2xn games, solution of mx2 games, Brown's algorithm
<b>Unit 5</b>	<b>PERT:</b> Introduction, PERT Network, Time Estimates for Activities(ET), Earliest Expected completion of events(TE), Latest Allowable Event Completion time(TL), Event Slack Times(SE),Critical path

**Text books**

	Author	Title	Publisher
1	Belly E. Gillett	Introduction to Operations Research - A computer-oriented algorithmic approach	TMH (2008) <b>Chapters:</b> 3.2 to 3.7, 3.10 to 3.12, 6.1 to 6.5, 11.1 to 11.4, 11.6 to 11.9, 12.1 to 12.7

**Reference books**

	Author	Title	Publisher
1	J K Sharma	Operation Research theory and applications	Third edition, MACMILLAN

**MCA 304: COMPUTER GRAPHICS****Details of the syllabus**

<b>Unit 1</b>	<p><b>Overview of Computer Graphics:</b> Video Display Devices, Raster Scan Displays, Random Scan Displays, Color CRT Monitors, Direct View Storage Tubes, Flat Panel Displays, Raster Scan Systems, Random Scan Systems, Input Devices.</p> <p><b>Graphical User Interfaces and Interactive Input Methods:</b> The User Dialogue, Windows and Icons, Input of Graphical Data, Input Functions</p>
<b>Unit 2</b>	<p><b>Output Primitives:</b> Points and Lines, Line-Drawing Algorithms: DDA Algorithm, Bresenham's Line Algorithm, Line Function, Circle Generation Algorithms, Ellipse Generation Algorithms</p>
<b>Unit 3</b>	<p><b>Attributes of output Primitives:</b> Line Attributes, Color and GrayScale levels, Area Fill Attributes, Character Attributes, Bundled Attributes, Antialiasing.</p>
<b>Unit 4</b>	<p><b>Two Dimensional Geometric Transformations:</b> Basic Transformations, Matrix Representation and Homogenous Coordinates, Composite Transformations, Other Transformations.</p> <p><b>Two Dimensional Viewing:</b> The Viewing pipeline, Viewing Coordinates Reference Frame, Window to Viewport Coordinate Transformations, Two Dimensional Viewing Functions, Clipping Operations, Point Clipping, Line Clipping: Cohen-Sutherland Line Clipping, Polygon Clipping: Sutherland-Hodgeman Polygon Clipping, Curve Clipping, Text Clipping, Exterior Clipping.</p>
<b>Unit 5</b>	<p><b>Three Dimensional Concepts:</b> Three Dimensional Display Methods.</p> <p><b>Three Dimensional Object Representations:</b> Polygon Surfaces, Quadric Surfaces, Superquadrics.</p> <p><b>Three Dimensional Geometric and Modeling Transformations:</b> Translation, Rotation, Scaling, Other Transformations, Composite Transformations, Three Dimensional Transformation Functions.</p> <p><b>Three Dimensional Viewing:</b> Viewing pipeline, Viewing Coordinates, Projections, Clipping</p>

**Text books**

	Author	Title	Publisher
1	Donald Hearn and M. Paulin Baker	Computer Graphics	PHI (Second Edition)

**Reference books**

	Author	Title	Publisher
1	Shalini Govil-Pai	Principles of Computer Graphics – Theory and Practice using open GL and Maya	Springer (2007)
2	ISRD group	Computer Graphics	ace series, TMH (2006)
3	Amearendra N. Sinha, Arun D Udai	Computer Graphics	TMH (2008)

## Details of the syllabus

<b>Unit 1</b>	<p><b>What is AI? :</b> The AI Problems, The Underlying Assumption, What is AI Technique?, The level of the Model, Criteria for Success.</p> <p><b>Problems, Problem spaces &amp; Search:</b> Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the design of Search Programs, Additional Problems.</p> <p><b>Heuristic search techniques:</b> Generate and Test, Hill Climbing, Best First Search, Problem Reduction, Constraint Satisfaction, Means Ends Analysis.</p>
<b>Unit 2</b>	<p><b>Knowledge Representation Issues:</b> Representations and Mappings, Approaches to Knowledge Representation, Issues in Knowledge Representation, The Frame Problem</p> <p><b>Using Predicate Logic:</b> Representing Simple Facts in Logic, Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution, Natural Deduction</p> <p><b>Representing knowledge using Rules:</b> Procedural versus Declarative Knowledge, Logic Programming, Forward versus Backward Reasoning, Matching, Control Knowledge</p>
<b>Unit 3</b>	<p><b>Symbolic Reasoning under Uncertainty:</b> Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Implementation Issues, Augmenting a Problem Solver, Implementation: Depth-First Search, Implementation: Breadth-First Search</p> <p><b>Weak slot &amp; filler Structures:</b> Semantic Nets, Frames</p>
<b>Unit 4</b>	<p><b>Planning :</b> Overview, An Example Domain : The Blocks World, Components of a Planning System, Goal Stack Planning, Nonlinear Planning Using Constraint Posting, Hierarchical Planning, Reactive Systems, Other Planning Techniques</p> <p><b>Natural Language Processing:</b> Introduction, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing</p>
<b>Unit 5</b>	<p><b>Commonsense:</b> Qualitative Physics, Commonsense Ontologies, Memory Organisation, Case-Based Reasoning</p> <p><b>Expert Systems:</b> Representing and Using Domain Knowledge, Expert System Shells, Explanation, Knowledge Acquisition</p>

## Text books

	Author	Title	Publisher
1	Rich & Knight	Artificial Intelligence	TMH (1991)

## Reference books

	Author	Title	Publisher
1	Winston. P.H	Artificial Intelligence	Addison Wesley (1993)

# KRISHNA UNIVERSITY

## MCA 401: PRINCIPLES OF PROGRAMMING LANGUAGES

### Details of the syllabus

<b>Unit 1</b>	<p><b>Introduction:</b> What is a programming language, Abstractions in programming languages, Computational paradigms, Language definition, Language translation, Language design.</p> <p><b>History:</b> Early History : The first programmer, The 1950s : The first programming languages, The 1960s : An explosion in programming languages, The 1970s : Simplicity, abstraction, study, The 1980s : New directions and the rise of object –orientation, The 1990s : Consolidation, The Internet, libraries and scripting, The future.</p> <p><b>Language Design Principles:</b> History and design criteria, Efficiency, regularity, Further language design principles, C++ : A Case study in language design.</p> <p><b>Syntax :</b> Lexical structure of programming languages, Context-free grammars and BNFs, Parse trees and Abstract syntax trees, Ambiguity, Associativity and precedence, EBNFs and syntax diagrams, Parsing techniques and tools, Lexical vs Syntax vs Semantics</p>
<b>Unit 2</b>	<p><b>Basic Semantics:</b> Attributes, binding and semantic functions, Declarations, blocks and scope, The symbol table, Name resolution and overloading, Allocation, Lifetimes and the environment, Variables and Constants, Aliases, Dangling references and garbage.</p> <p><b>Data Types :</b> Data types and type information, Simple types, Type constructors, Type equivalence, Type Checking, Type conversion, Polymorphic type checking, Explicit polymorphism.</p>
<b>Unit 3</b>	<p><b>Control – I: Expressions and Statements:</b> Expressions, Conditional Statements and Guards, Loops and Variation on “while”, The “goto” controversy, Exception handling.</p> <p><b>Control – II : Procedures and Environments :</b> Procedure definition and activation, Procedure semantics, Parameter passing mechanisms, Procedure environments, activations and allocation, Dynamic memory management, Exception handling and environments.</p> <p><b>Abstract data types and Modules :</b> The algebraic specification of abstract data types, Abstract data type mechanisms and modules, Separate compilation in C, C++ name spaces and Java packages, Ada packages, Modules in ML, Modules in earlier languages, Problems with abstract data type mechanisms, The mathematics of abstract data types.</p>
<b>Unit 4</b>	<p><b>Object – Oriented Programming :</b> Software reuse and independence, Java : objects, Classes and methods, Inheritance, Dynamic binding, C++, Small Talk, Design issues in object – oriented languages, Implementation issues in object – oriented languages.</p> <p><b>Functional Programming:</b> Programs as functions, Functional programming in an imperative language, Scheme : A Dialect of LISP, ML : Functional programming with static typing, Delayed Evaluation, Haskell – A fully curried lazy language with overloading, The Mathematics of functional programming I : Recursive functions, The Mathematics of functional programming II : Lambda calculus.</p> <p><b>Logic Programming :</b> Logic and Logic programs, Horn clauses, Resolution and Unification, The language Prolog, Problems with logic programming, Extending logic programming : Constraint logic programming and Equational systems.</p>
<b>Unit 5</b>	<p><b>Formal Semantics:</b> A Sample small language, Operational semantics, Denotational semantics, Axiomatic semantics, Proofs of program corrections.</p> <p><b>Parallel programming :</b> Introduction to parallel processing, Parallel processing and programming languages, Threads, Semaphores, Monitors, Message passing, Parallelism in non-imperative languages.</p>

### Text books

	Author	Title	Publisher
1	Kenneth C. Louden	Programming Languages Principles and Practice	Second Edition, Cengage Learning (2008). <b>Chapters:</b> 1through 14

### Reference books

	Author	Title	Publisher
1	Terrence W. Pratt & Mervin V. Zelkowitz	Programming Languages Design and Implementation	Fourth Edition, Pearson Education (2008)
2	Robert W. Sebesta	Concepts of Programming Languages	Pearson Education 2001





# KRISHNA UNIVERSITY

## MCA 402: OBJECT ORIENTED MODELING AND DESIGN USING UML

### Details of the syllabus

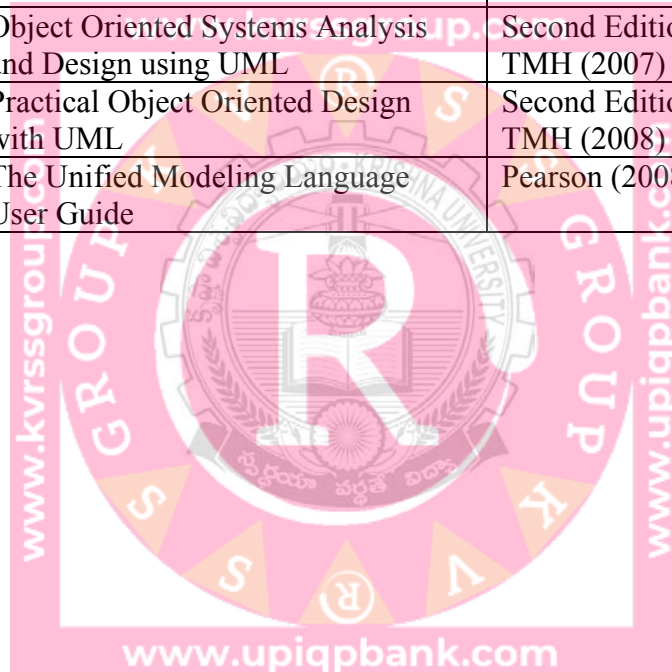
<b>Unit 1</b>	<p><b>Introduction:</b> what is Object Orientation, What is OO Development, OO Themes, Evidence for Usefulness of OO Development.</p> <p><b>Modeling as Design Technique:</b> Modeling, Abstraction, Three Models</p> <p><b>Class Modeling:</b> Object and Class Concepts, Link and Association concepts, Generalization and Inheritance, A Sample Class Model.</p> <p><b>Advanced Class Modeling:</b> Advanced Object and Class Concepts, Association Ends, N-Ary Association, Aggregation, abstract Classes, Multiple Inheritance, Metadata, Reification, Constraints, Derived data, Packages.</p>
<b>Unit 2</b>	<p><b>State Modeling:</b> Events, States, Transitions and Conditions, state diagrams, state diagram behavior.</p> <p><b>Advanced State Modeling:</b> Nested State Diagrams, Nested states, signal generalization, concurrency, A Sample State Model.</p>
<b>Unit 3</b>	<p><b>Interaction Modeling:</b> Use Case Models, Sequence Models, Activity Models.</p> <p><b>Advanced Interaction Modeling:</b> Use Case Relationships, Procedural Sequence Models, Special Constructs for Activity Models.</p> <p><b>Process Overview:</b> Development Stages, Development Life Cycle.</p>
<b>Unit 4</b>	<p><b>System Conception:</b> Devising a system Concept, Elaborating a Concept, Preparing a Problem Statement.</p> <p><b>Domain Analysis:</b> Overview of analysis, Domain Class Model, Domain State model, Domain Interaction Model, Iterating the Analysis.</p> <p><b>Application Analysis:</b> Application Interaction Model, Application Class Model, Application State Model, Adding Operations.</p>
<b>Unit 5</b>	<p><b>System Design:</b> Overview of system Design, Estimating Performance, Making a Reuse Plan, Breaking a System into Subsystem, Identifying Concurrency, Allocation of Subsystems, Management of data storage, Handling Global Resources, Choosing a Software Control Strategy, Handling Boundary Conditions, Setting Trade-off priorities, Common Architecture of ATM System.</p> <p><b>Class Design:</b> Overview of Class Design, Realizing Use Cases, Designing Algorithms, Recursing Downward, Refactoring, Design Optimization, Reification of Behavior, Adjustment of Inheritance, Organizing a class design.</p> <p><b>Implementation Modeling:</b> Overview of Implementation, Fine Tuning classes, fine tuning Generalization, Realizing Associations, Testing.</p> <p><b>Programming Style:</b> Object Oriented Style, Reusability, Robustness, Extensibility, Programming-in the Large.</p>

### Text books

	Author	Title	Publisher
1	Michael Blaha, James Rumbaugh	Object Oriented Modeling and Design with UML	Second Edition, PHI. <b>Chapters :</b> 1.1 to 1.4, 2, 3.1 to 3.4, 4, 5, 6.1 to 6.5, 7, 8, 10, 11, 12, 13, 14, 15, 17, 20

### Reference books

	Author	Title	Publisher
1	Meilir Page-Jones	Fundamentals of Object Oriented Design in UML	Pearson Education (2008).
2	Hans-Erik Eriksson	UMLZ Took Kit	Wiley (2008).
3	Pascal Roques	Modeling Software Systems Using UML2	Wiley (2008).
4	Simon Benett, Steve Mc Robb	Object Oriented Systems Analysis and Design using UML	Second Edition, TMH (2007)
5	Mark Priestley	Practical Object Oriented Design with UML	Second Edition, TMH (2008)
6	Grady Booch, James Rumbaugh	The Unified Modeling Language User Guide	Pearson (2008)





**KRISHNA UNIVERSITY**  
**MCA 403: WEB TECHNOLOGIES**

**Details of the syllabus**

<b>Unit 1</b>	<p><b>Introduction:</b> What is Internet, History of Internet, Internet services and accessibility, uses of the Internet, protocols, web concepts – the client/server model of the web, retrieving data from the web, How the web works?, web browsers, searching information on the web, Internet standards</p> <p><b>Internet protocols:</b> Introduction, Internet protocols – Internet protocol (IP), Transmission control protocol (TCP), User datagram protocol (UDP), host names, Internet applications and application protocols – Datagram Vs. Stream, Trivial file transfer protocol (TFTP), FTP – File Transfer Protocol, Telnet, HTTP (Hyper Text Transfer Protocol), e – mail protocols SMTP (Simple Mail Transfer Protocol), POP (Post Office Protocol, version 3),IMAP</p>
<b>Unit 2</b>	<p><b>Java network programming:</b> Introduction, UDP/IP and TCP/IP communications, I/O streams – types of streams, character and byte streams, input stream, output stream, filter streams, readers and writers, data streams, object streams, sockets – creating client sockets, server socket, datagram socket, a simple example, Multicast sockets - multicast groups and addresses, a simple example, remote method invocation, protocol handler – developing a protocol handler, a simple protocol handler, content handlers – developing a content handler, a simple content handler, the “Grid Content Handler” class, the “Get Grid Application” program</p> <p><b>HTML:</b> Introduction, SGML – DTD, DTD elements, attributes, outline of an HTML document, head section – prologue, link, base, meta, script, style, body section – headers, paragraphs, text formatting, linking, internal linking, embedded images, lists, tables, frames, other special tags and characters, HTML forms</p>
<b>Unit 3</b>	<p><b>Java Script:</b> Introduction – need of a scripting language, language elements – identifiers, expressions, java script keywords, operators, statements, functions, objects of a java script – the “window” object, the “Document” object, forms object, text boxes and text areas, buttons, radio buttons, check boxes, the “Select” object, other objects – the “date” object, the “math” object, the “string” object, regular expressions, arrays, worked examples</p> <p><b>VB Script:</b> Introduction, embedding VB script code in an HTML document, comments, variables – array variables, operators – assignment operator, numerical operators, string concatenation, procedures – sub procedure, function procedure, conditional statements, looping statements, object and VB script, cookies: cookie variables, creating a cookie, a cookie with multiple values, reading cookie value</p>
<b>Unit 4</b>	<p><b>Dynamic HTML (DHTML):</b> Introduction, cascading style sheets (CSS) : coding css, properties of tags, property values, other style properties, in – line style sheets, Embedded style sheets, External Style Sheets, grouping, inheritance, class as selector, ID as selector, contextual selectors, pseudo classes and pseudo elements, positioning, backgrounds, element dimensions, DHTML document object model and collections – using the collections “all”, moving objects around the document, event handling – assigning event handlers, event bubbling, filters and transitions – filters, transitions, data binding – using tabular data control, sorting data, dynamic sorting, filtering</p>

	<p><b>XML:</b> Introduction, HTML vs. XML, syntax of XML document, XML attributes: use of elements vs. use of attributes, XML validation: “well formed” XML documents, “valid” XML documents, XML DTD: internal DTD, external DTD, the building blocks of XML documents, DTD elements: declaring an element, empty elements, elements with data, elements with children, wrapping, declaring only one occurrence of the same elements, declaring minimum one occurrence of the same element, defining zero or one occurrence of the same element, declaring mixed content, DTD attributes: declaring attributes, default attribute value, implied attribute, required attribute, fixed attribute value, enumerated attribute values, DTD entities, DTD validation, XSL, XSL transformation, XML namespaces, XML schema</p> <p><b>Common Gateway Interface (CGI):</b> Introduction, server - browser interaction, CGI script structure – the CGI .pm module, perl variables, CGI environment variables – processing forms – sending mail – validating the form data – handling check boxes – SSI - CGI server side and client side applets, CGI security issues</p>
<b>Unit 5</b>	<p><b>Servlets:</b> Introduction, advantages of servlets over CGI, installing servlets, the servlets life cycle, servlets API, a simple servlet, handling HTTP “Get” requests, handling HTTP “Post” requests, cookies, session tracking, multi tier applications using database connectivity, servlets chaining</p> <p><b>Java Server Pages (JSP):</b> Introduction, advantages of JSP, developing first JSP, components of JSP, reading request information, Retrieving the data posted from a HTML file to a JSP file, JSP sessions, cookies, disabling sessions</p> <p><b>Active Server Pages (ASP):</b> Introduction, advantages of ASP, first Asp script, processing ASP scripts with forms, variables and constructs, subroutines, Include/Virtual, ASP cookies, Asp objects, connecting to data with ASP</p>

#### Text books

	Author	Title	Publisher
1	N.P Gopalan, J.Akilandeswari	Web Technology – A Developer’s Perspective	PHI (2008) <b>Chapters</b> : 1 through 12

#### Reference books

	Author	Title	Publisher
1	Robert W. Sebesta	Programming the World Wide Web	Third Edition, Pearson Education (2007).
2	Anders Moller and Michaelschwartzbach	An Introduction to XML and Web Technologies	Addison Wesley (2006)
3	Chris Bates	Web Programming–Building Internet Applications	Second Edition, Wiley (2007).
4	Jeffrey C. Jackson	Web Technologies – A Computer Science Perspective	Pearson Education (2008)

**KRISHNA UNIVERSITY**  
**MCA 404: SOFTWARE ENGINEERING**

**Details of the syllabus**

<b>Unit 1</b>	<p><b>Introduction to Software Engineering:</b> The Evolving Role of Software, Software, The Changing Nature of Software, Legacy Software: The Quality of legacy software, Software Evolution, Software Myths.</p> <p><b>A Generic View of Process:</b> Software Engineering-A Layered Technology, A Process Frame Work, The capability Maturity Model Integration (CMMI), Process Patterns, Process Assessment, Personal and Team Process Models: Personal Software Process (PSP), Team Software Process (TSP), Process Technology, Product and Process.</p> <p><b>Process Models:</b> Prescriptive Models, The Waterfall Model, Incremental Process Models: The Incremental Model, The RAD Model, Evolutionary Process Model: Prototyping, The Spiral Model, The Concurrent Development Model, Specialized Process Models: Component Based Development, The formal Methods Model, The Unified Process.</p> <p><b>An Agile View of Process:</b> What is Agility? What is Agile Process? Agile Process Models: Extreme Programming, Adaptive Software Development, Dynamic Systems Development Method, Scrum, Crystal, Feature Driven Development, Agile Modeling.</p>
<b>Unit 2</b>	<p><b>Software Engineering Practice:</b> Software Engineering Practice, communication practices, Planning Practices, Modeling Practices, Construction Practices, Deployment.</p> <p><b>System Engineering:</b> Computer Based Systems, The System Engineering Hierarchy, Business Process Engineering: An Overview, System Modeling.</p> <p><b>Building the Analysis Model:</b> Requirement Analysis, Analysis Modeling Approaches, Data Modeling Concepts, Object Oriented Analysis, Scenario Based Modeling, Flow Oriented Modeling, Class Based Modeling, Creating a Behavioral Model.</p> <p><b>Design Engineering:</b> Design within the context of Software Engineering, Design Process and Design Quality, Design Concepts, The Design Model, Pattern Based Software Design</p>
<b>Unit 3</b>	<p><b>Testing Strategies:</b> A strategic Approach to Software Testing, Strategic Issues, Test Strategies for conventional Software, Testing Strategies for Object Oriented Software, Validation Testing, System Testing, the Art of Debugging.</p> <p><b>Testing Tactics:</b> Software Testing Fundamentals, Black Box and White Box Testing, White Box Testing, Basis Path Testing, Control Structure Testing, Black Box Testing, Object Oriented Testing Methods, Testing Methods Applicable at the class level, InterClass Test Case Design, Testing for Specialized Environments, Architectures and Applications, Testing Patterns.</p>
<b>Unit 4</b>	<p><b>Project Management:</b> The Management Spectrum, The People, The Product, The Process, The Project, The W5HH Principles.</p> <p><b>Metrics for Process and Projects:</b> Metrics in the Process and Project Domains, Software Measurement, Metrics for Software Quality, Integrating Metrics within Software Process, Metrics for Small Organizations, Establishing a Software Metrics Program.</p>

<b>Unit 5</b>	<p><b>Estimation:</b> Observations on Estimations, The project planning process, Software Scope and Feasibility, Resources, Software Project Estimation, Decomposition Techniques, Empirical Estimation Models, Estimations for Object Oriented Projects, Specialized Estimation Techniques, The Make/Buy Decision</p> <p><b>Quality Management:</b> Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Statistical Software Quality Assurance, Software Reliability, The ISO 9000 Quality Standards, the SQA Plan</p> <p><b>Formal Methods:</b> Basic Concepts, Object Constraint Language (OCL), The Z specification language, The Ten Commandments for Formal Methods.</p> <p><b>Cleanroom Software Engineering:</b> The Cleanroom Approach, Functional Specification, Cleanroom Design, Cleanroom Testing.</p>
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#### Text books

	Author	Title	Publisher
1	Roger S Pressman	Software Engineering– A Practitioner’s Approach	Sixth Edition, TMH International. <b>Chapters:</b> 1,2,3,4,5,6,8,9,13,14,21,22,23,26,28,29

#### Reference books

	Author	Title	Publisher
1	Soomerville	Software engineering	7th edition ,Pearson education
2	S.A.Kelkar	Software Engineering – A Concise Study	PHI.
3	Waman S.Jawadekar	Software Engineering	TMH.
4	Ali Behforooz and Frederick J.Hudson	Software Engineering Fundamentals	Oxford (2008)

**KRISHNA UNIVERSITY**  
**MCA 405.1: GRID AND CLUSTER COMPUTING**

**Details of the syllabus**

<b>Unit 1</b>	<p><b>Introduction :</b> The Data Centre, the Grid and the Distributed / High Performance Computing, Cluster Computing and Grid Computing, Metacomputing – the Precursor of Grid Computing, Scientific, Business and e-Governance Grids, Web Services and Grid Computing, Business Computing and the Grid – a Potential Win – win Situation, e-Governance and the Grid.</p> <p><b>Technologies and Architectures for Grid Computing :</b> Clustering and Grid Computing, Issues in Data Grids, Key Functional Requirements in Grid Computing, Standards for Grid Computing, Recent Technological Trends in Large Data Grids</p> <p><b>World Wide Grid Computing Activities, Organizations and Projects :</b> Standard Organizations, Organizations Developing Grid Computing Tool Kits, Framework, and Middleware, Grid Projects and Organizations Building and Using Grid Based Solutions, Commercial Organizations Building and Using Grid Based Solutions.</p>
<b>Unit 2</b>	<p><b>Web Services and the Service Oriented Architecture (SOA) :</b>History and Background, Service Oriented Architecture, How a Web Service Works, SOAP and WSDL, Description, Creating Web Services, Server Side.</p> <p><b>OGSA and WSRF:</b> OGSA for Resource Distribution, Stateful Web Services in OGSA, WSRF (Web Services Resource Framework), Resource Approach to Stateful Services, WSRF Specification.</p> <p><b>Globus Toolkit :</b> History of Globus Toolkit, Versions of Globus Toolkit, Applications of GT4-Cases, GT4-Approaches and Benefits, Infrastructure Management, Monitoring and Discovery, Security, Data, Choreography and Coordination, Main Features of GT4 Functionality – a Summary, GT4 Architecture, GT4 Command Line Programs, GT4 Containers</p> <p><b>The Grid and the Databases :</b> Issues in Database Integration with the Grid, The Requirements of a Grid-enabled Database, Storage Request Broker (SRB), How to Integrate the Databases with the Grid?, The Architecture of OGSA-DAI for Offering Grid Database Services</p>
<b>Unit 3</b>	<p><b>What is Cluster Computing? :</b> Approaches to Parallel Computing, How to Achieve Low Cost Parallel Computing through Clusters, Definition and Architecture of a Cluster, What is the Functionality a Cluster can Offer? Categories of Clusters</p> <p><b>Cluster Middleware : An Introduction :</b> Levels and Layers of Single System Image (SSI), Cluster Middleware Design Objectives, Resource Management and Scheduling, Cluster Programming Environment and Tools</p> <p><b>Early Cluster Architectures and High Throughput Computing Clusters :</b> Early Cluster Architectures, High Throughput Computing Clusters, Condor</p>



<b>Unit 4</b>	<p><b>Networking, Protocols &amp; I/O for Clusters :</b> Networks and Inter-connection/Switching Devices, Design Issues in Interconnection Networking/Switching, Design Architecture-General Principles and Trade-offs, HiPPI, ATM (Asynchronous Transmission Mode), Myrinet, Memory Channel (MC), Gigabit Ethernet</p> <p><b>Setting Up and Administering a Cluster :</b> How to Set Up a Simple Cluster?, Design Considerations for the Front End of a Cluster, Setting Up Nodes, Clusters of Clusters or Metaclasses, System Monitoring, Directory Services Inside the Clusters &amp; DCE, Global Clocks Sync, Administering Heterogeneous Clusters</p>
<b>Unit 5</b>	<p><b>Cluster Technology for High Availability :</b> Highly Available Clusters, High Availability Parallel Computing, Mission Critical (or Business Critical or Business Continuity) Applications, Types of Failures and Errors, Cluster Architectures and Configurations for High Availability, Faults and Error Detection, Failure Recovery, Failover/Recovery Clusters</p> <p><b>Load Sharing and Load Balancing :</b> Load Sharing and Load Balancing, Strategies for Load Balancing, Modelling Parameters</p> <p><b>Distributed Shared Memory :</b> Issues in DSM, Write Synchroni- zation for Data Consistency, Double Faulting, Application/Type Specific Consistency, Issues in Network Performance in DSM</p>

#### Text books

	Author	Title	Publisher
1	C.S.R.Prabhu	Grid and Cluster Computing	PHI(2008) <b>Chapters:</b> 1 to 13, 16, 17

#### Reference books

	Author	Title	Publisher
1	Jankiram	Grid Computing Models : A Research Monograph	TMH (2005)



# KRISHNA UNIVERSITY

## MCA 405.2: CRYPTOGRAPHY AND NETWORK SECURITY

### Details of the syllabus

<b>Unit 1</b>	<p><b>Introduction:</b> Security trends, the OSI security architecture, security attacks, security services, security mechanisms, a model for network security.</p> <p><b>Classical encryption techniques:</b> Symmetric cipher model, Substitution techniques, Transposition techniques, Rotor machines, Steganography.</p> <p><b>Block cipher and the data encryption standard:</b> Block cipher principles, the strength of DES, Differential and linear cryptanalysis, Block cipher design principles.</p> <p><b>Confidentiality using Symmetric Encryption:</b> Placement of encryption function, Traffic confidentiality, key distribution, random number generator.</p>
<b>Unit 2</b>	<p><b>Public key cryptography and RSA:</b> Principles of public key crypto systems, The RSA algorithm</p> <p><b>Key management: Other public-key crypto systems:</b> Key management, Diffie-Hellman key exchange.</p> <p><b>Message authentication and hash functions:</b> Authentication requirements, Authentication functions, message authentication codes, Hash functions, security of hash functions and MACs.</p>
<b>Unit 3</b>	<p><b>Digital signatures and authentication protocols:</b> Digital signatures, Authentication protocols, Digital Signature standard</p> <p><b>Authentication Applications:</b> Kerberos, X.509 authentication service</p>
<b>Unit 4</b>	<p><b>Email Security:</b> Pretty good privacy, S/MIME</p> <p><b>IP security:</b> IP security overview, IP security architecture, Authentication header, Encapsulating security payload, combining security associations, key management.</p> <p><b>Web security:</b> Web security considerations, Secure Socket Layer and transport layer security, Secure electronic transaction.</p>
<b>Unit 5</b>	<p><b>Intruders:</b> Intruders, Intrusion detection, password management</p> <p><b>Malicious Software:</b> Viruses and related threats, virus counter measures, distributed denial of service attacks.</p> <p><b>Firewalls:</b> Firewall Design principles, trusted systems, common criteria for information technology, security evaluation.</p>

### Text books

	Author	Title	Publisher
1	William Stallings	Cryptography and Network Security	Fourth edition, PHI <b>Chapters:</b> 1,2,3,7,9,10,11,13,14,15,16,17,18,19,20

### Reference books

	Author	Title	Publisher
1	William Stallings	Network Security Essentials – Applications and Standards	Third Edition, Pearson Education (2007)
2	Chris McNab	Network Security Assessment	2 <sup>nd</sup> Edition, O'Reilly (2007).
3	Jon Erickson	Hacking – The Art of Exploitation	\SPD, NOSTARCH Press (2006).
4	Neal Krawety	Introduction to Network Security	Thomson (2007)
5	Ankit Fadia	Network Security – A Hackers Perspective	Macmillan (2008)

# KRISHNA UNIVERSITY

## MCA 405.3: SIMULATION MODELLING AND ANALYSIS

### Details of the syllabus

<b>Unit 1</b>	<b>Basic simulation Modeling:</b> Systems , models and simulation , Discrete-Event simulation , Simulation of an inventory system , Problem statements, program organization and Logic, C program, simulation output and discussion, Steps in a Sound Simulation Study  <b>Other types of simulation:</b> Continuous simulation, Combined Discrete continuous simulations, Monte Carlo Simulation, Spreadsheet simulation, Advantages , disadvantages and Pitfalls of Simulation
<b>Unit 2</b>	<b>Modeling Complex Systems:</b> Introduction, List Processing in Simulation, A simple Simulation Language: simlib, Single Server Queueing Simulation with simlib, Time-Shared Computer Model, Multiteller Bank with Jockeying, Job-Shop Model, Efficient Event List Manipulation.
<b>Unit 3</b>	<b>Simulation Software:</b> Introduction, Comparison of simulation packages with Programming languages , Classification of Simulation Software. General purpose versus Application Oriented Simulation Packages, Modeling Approaches, Common Modeling Elements, Desirable Software features, General Capabilities, Statistical capabilities, Customer support and documentation, Object-Oriented Simulation.
<b>Unit 4</b>	<b>Random-Number Generators:</b> Introduction, Linear Congruential generators , Mixed generators, Multiplicative generators, Composite generators, Empirical Tests, Theoretical tests,
<b>Unit 5</b>	<b>Generating random variates:</b> General approaches to generating random variates, Inverse Transform, Acceptance –Rejection , Generating continuous Random variates, Uniform , Exponential, weibull and normal.

### Text books

### Prescribed books

	Author	Title	Publisher
1	Averill M Law	Simulation Modeling & Analysis	Fourth Edition, TMH (2008)

### Reference books

	Author	Title	Publisher
1	Jerry Banks, John S.Carson And Berry L. Nelson & David M. Nico	Discrete Event System Simulation	3 <sup>rd</sup> Edition, Pearson Educations

# KRISHNA UNIVERSITY

## MCA 501: DATA WAREHOUSING AND DATAMINING

### Details of the syllabus

<b>Unit 1</b>	<b>Warehouse:</b> What is it, Who Need It, and Why?, Things to Consider, Managing the Data Warehouse, Data Warehouse Design Methodology, Data Marts and Start Schema Design, Fundamentals of ETL Architecture, Partitioning Data, Indexing Data.
<b>Unit 2</b>	<b>Data mining</b> – Introduction, Data mining on what kind of data , Data mining functionalities classification of Data mining systems, Major issues in Data mining <b>Mining Association rules in large databases</b> - Association rule mining, Mining single-Dimensional Boolean association rules from Transactional databases, Mining multi-Dimensional Association rules from relational Databases and Data Warehouses
<b>Unit 3</b>	<b>Classification and Prediction</b> - Introduction classification by decision tree induction, Bayesian Classification. Other classification methods, classification by back propagation, Prediction, classifier accuracy
<b>Unit 4</b>	<b>Cluster analysis</b> – Introduction types of data in cluster analysis a categorization of major clustering methods portioning methods, hierarchical methods
<b>Unit 5</b>	<b>Density based methods:</b> DBSCAN, Grid-based method : STRING , Model based clustering method: Statistical Approach, outlier analysis.

### Text books

	Author	Title	Publisher
1	Michael Corey, Michael Abbey, Ian Abramson, Ben Taub	Oracle 8i Data Warehousing	TMH (For Unit-I)
2	Jiawei Han Micheline Kamber	Data mining & Techniques	Morgan Kaufmann Publishers (Unit-II to IV)

### Reference books

	Author	Title	Publisher
1	S.N.Sivanandam, S.Sumathi	Data Mining – Concepts, Tasks and Techniques	Thomson (2006).
2	Ralph Kimball	The Data Warehousing Toolkit	Wiley
3	Margaret H. Dunham	Data mining - Introductory and advanced topics	Pearson Education
4	D.Hand, H. Mannila and P.Smyth	Principles of Data mining	PHI (2001)

**KRISHNA UNIVERSITY**  
**MCA 502: .NET PROGRAMMING**

**Details of the syllabus**

Unit 1	<p><b>Visual basic 2005:</b></p> <p><b>Getting started with Visual Basic 2005:</b> Arithmetic Operators, Data type, Statements, Control Statements, Loops, Arrays, Structures, Val and Structure functions, Creating Visual studio, Applications, Saving Visual Basic 2005 Application.</p> <p><b>Object Oriented Programming:</b> Basic Principles of Object Oriented Programming, Member Access Modifiers, Define Class, Creating Objects, Constructors, Inheritance, Abstract Classes, Interfaces, Polymorphism</p> <p><b>Windows Forms:</b> Introduction to the windows forms, setting the title Bar Text, Minimizing and Maximizing a form, Setting initial position of a form, working with multiple forms, Creating adding controls to a form, Setting controls Tab order, Naming Controls, Setting Properties at design time, Setting properties at run time, Creating a message box, Creating a Input box, Creating MDI Applications, Creating Dialog box, Commenting the code</p> <p><b>Label, TextBox, Button, ComboBox and ListBox Controls:</b> Label Control, Button Control, ComboBox Control, ListBox Control, Project</p> <p><b>Panel, PictureBox, Progress Bar and Timer Controls:</b> Panel Control, Picture box Control, Progress Bar Control, Timer Control, Project</p> <p><b>Checkbox, radio button, and group box controls :</b>Checkbox control, Radio button control, Progress bar control, Timer control, Project.</p> <p><b>Menus, built-in dialog box, printing and tree view controls:</b> Menus, Folder Browser Dialog Control, Open File Dialog Control Save File Dialog Control, Font File Dialog Control, Color File Dialog Control, Print Document Control, Tree View Control, and Project</p> <p><b>Mouse Events and Keyboard Events:</b> Mouse Events, Keyboard Events</p> <p><b>Handling Errors and Exceptions:</b> Errors, Exceptions</p>
Unit 2	<p><b>ASP.NET 2.0</b></p> <p><b>ASP.NET 2.0 Essentials:</b> Introduction to Asp.NET, Benefits of Asp.NET, What's new Asp.NET?, Introduction Asp.NET 2.0 IDE</p> <p><b>Developing a Web Application:</b> HTML, DHTML, PHP, JSP, PERL, ASP.NET 2.0 Provider Model, ASP.NET 2.0 Coding Model, Code Sharing, Compilation in ASP.NET</p> <p><b>Standard Controls:</b> Introduction to standard controls, Label Control, TextBox Control, Button Control, Image Button Control ListBox Control, Radio Button Control</p> <p><b>Navigation Controls:</b> Introduction to Navigation Controls, Site Map Path Controls, Menu Controls, Tree View Controls</p> <p><b>Validation Controls:</b> Introduction to validation control, Base validator class, Required field validator control, Range validator control, Regular Expression validator control, Compare validator control, Custom validator control, Validation summary control</p> <p><b>Login controls:</b> Introduction to login controls, Login control Login view control, Login name control, Login status control Password recovery control</p> <p><b>Master pages and Themes:</b> Need for Master Pages and Themes, Creating a Simple Master Page, Creating a Nested Master Page Themes, Creating Themes, Applying Themes on controls at Run time</p>



<b>Unit 3</b>	<p><b>C#</b></p> <p><b>Introduction to Visual C# 2005:</b> Introduction, Features of Visual C# 2005, Creating Visual C# 2005, Key words, Identifiers, Data Types, Variables, Scope of Variables, Constants, Operators Operator Precedence and Associativity, Expressions, Punctuators Control Statements, Loops, Interrupting Loops using Jump Statements, Creating Arrays, Creating Enumerations, Creating Structures, Methods <b>Object Oriented Programming</b> : Basic Principles of Object Oriented Programming, Member Access Modifiers, Defining a Class, Creating Objects, Constructors, Static Members, Inheritance, Abstract Class, Interfaces, Polymorphism, Operator Overloading</p> <p><b>Windows Forms</b> : Introduction to Windows form, Setting the title bar Text, Minimizing or Maximizing a forms, Working with multiple Forms, Setting the startup form, Adding controls to a form, Setting controls Tab order, Setting properties at Design time, Setting properties at Run time, Showing and Hiding controls and Forms, Creating a message box, Commenting the code, Handling Events.</p> <p><b>Label, TextBox, Button, ComboBox and ListBox Controls:</b> Label Control, TextBox Control, Button Control, ComboBox Control ListBox Control, Project</p> <p><b>Panel, PictureBox, Progress Bar and Timer Controls:</b> Panel Control, Picture box Control, Progress bar Control, Timer Control Project</p> <p><b>Checkbox, Radio button and Group box controls</b> :Checkbox control, Radio button control, GroupBox Control, Project</p> <p><b>Menus, built-in dialog box, printing and tree view controls:</b> Menus, Folder Browser Dialog Control, Open File Dialog Control Save File Dialog Control, Font File Dialog Control, Color File Dialog Control, Print Document Control, Tree View Control, Project</p> <p><b>Mouse Events and Keyboard Events:</b> Mouse Events, Keyboard Events</p> <p><b>Handling Errors and Exceptions:</b> Errors, Exceptions</p>
<b>Unit 4</b>	<p><b>ADO.Net &amp; Data Binding :</b></p> <p><b>Accessing Data using ADO.NET (C# 2005):</b> What are Databases? Basic SQL Statements, Working with ADO.NET, Overview of ADO.NET Objects Data Grid View Control, Accessing Data using Server Explorer, Creating a new data connection, Accessing data using data adaptors and data sets, Previewing data from data adaptors Connecting to an MS Jet database</p> <p><b>Data Binding(C# 2005):</b> Introduction, Simple Data Binding, Complex Data Binding, Implementing Data Binding, Project</p> <p><b>Working with Databases (ASP.NET 2.0):</b> What are Databases?, Working with ADO.NET, Overview of ADO.NET Objects, Basic SQL statements, ASP.NET 2.0 data display controls, ASP.NET 2.0 data source controls, Accessing data with server explorer, Creating a web applications using data display controls</p>
<b>Unit 5</b>	<p><b>Accessing data using ADO.NET (Visual Basic 2005):</b> What are Databases?, Basic SQL statements, Working with ADO.NET, Overview of ADO.NET objects, Data Grid View Control, Accessing data using server explorer, Creating a new data connection, Accessing data using Data Adapters and Datasets, Previewing data from Data Adapters, Connecting to an MS Jet database</p> <p><b>Data Binding (Visual Basic 2005):</b> Introduction, Simple Data Binding, Complex Data Binding, Implementing Data Binding, Project</p>

### Text books

	Author	Title	Publisher
1	Vikas Gupta	.Net Programming	Dream Tech (2008)

### Chapters:

UNIT – I - 1 to 8, 11 chapters in Visual Basic 2005

UNIT – II – 1 to 7, 9 chapters in ASP.NET 2.0

UNIT – III – 1 to 8, 11 chapters in C# 2005

UNIT – IV – 9, 10 chapters in Visual Basic 2005

8 chapters in ASP.NET 2.0

9, 10 chapters in C# 2005

### Reference books

	Author	Title	Publisher
1	Xue Bai, Michael Ekedah	The Web Warrior Guide to Web Programming	Thomson (2006)
2	Kogent Solutions Inc	.Net Programming	Black Book, Dream Tech (2008)
3	Joe Duffy	Professional.Net Programming 2.0	Wiley
4	George Shepherd	ASP.NET 3.5 Microsoft	PHI (2008)



# KRISHNA UNIVERSITY

## MCA 503: DESIGN AND ANALYSIS OF ALGORITHMS

### Details of the syllabus

<b>Unit 1</b>	<p><b>Introduction :</b> What is Algorithm – Algorithm Specification : Pseudocode Conventions – Recursive Algorithms ; Performance Analysis: Space Complexity – Time Complexity – Asymptotic notation – Performance Measurement; Randomized Algorithms : Basics of probability theory – Randomized algorithms – Identifying the repeated element, Primality Testing – Advantages and Disadvantages.</p> <p><b>Elementary Data Structures:</b> Stacks and Queues ; Trees : Terminology – Binary Trees ; Dictionaries : Binary Search Trees ; Priority Queues : Heaps – Heapsort ; Sets and disjoint set Union : Introduction – union and find operations. ; Graphs: Introduction – Definitions – Graph Representations.</p>
<b>Unit 2</b>	<p><b>Divide – and – conquer:</b> General Method – Defective Chess Board – Binary Search – Finding Maximum and Minimum – Merge Sort – Quick sort – Selection Problem ; Strassen's Matrix Multiplication, Convex Hull: some geometric Primitives – The Quick Hull Algorithm – Graham's scan – An <math>O(n \log n)</math> divide – and – conquer algorithm.</p> <p><b>The Greedy Method:</b> The general Method – Container loading – Knapsack Problem – Tree Vertex Splitting – Job sequencing with deadlines ; Minimum cost spanning trees : Prim's Algorithm – Kruskal's Algorithm – Optimal Storage on tapes – Optimal Merge patterns – Single Source shortest paths.</p>
<b>Unit 3</b>	<p><b>Dynamic Programming :</b> The general method – Multi-stage graphs – All pairs shortest paths – Single source shortest paths – Optimal Binary Search Trees – String editing – 0/1 Knapsack – Reliability design – The traveling sales person problem – Flow shop Scheduling</p> <p><b>Basic Traversal and Search Techniques:</b> Techniques for Binary Trees – Techniques for graphs : Breadth First Search and Traversal – Depth First Search ; Connected Components and Spanning Trees – Bi-connected components and DFS</p>
<b>Unit 4</b>	<p><b>Back Tracking :</b> The general method – The 8-queens problem – sum of subsets – Graph coloring – Hamiltonian Cycles – Knapsack Problem .</p> <p><b>Branch and Bound :</b> The Method: Least Cost search – The 15 puzzle – control abstractions for LC search – Bounding – FIFO Branch – and –Bound – LC Branch and Bound; 0/1 knapsack problem: LC Branch and Bound solution – FIFO Branch and Bound solution; Traveling Sales person.</p>
<b>Unit 5</b>	<p><b>NP-Hard and NP – complex problems :</b> Basic concepts : Non deter- ministic algorithms –The classes NP hard and NP complex ; Cook's theorem – NP hard graph problems : Clique Decision Problem – Node cover decision problem – chromatic number decision problem – Directed Hamiltonian cycle – Traveling sales person decision problem – and/or graph decision problem; NP-hard scheduling Problems: scheduling identical processors – flow shop scheduling – job shop scheduling; NP-hard code generation problems:code generation with common subexpressions – Implementing parallel assignment instructions; Some simplified NP-hard problems.</p>

### Text books

	Author	Title	Publisher
1	Sartaj Sahni	Fundamentals of Computer Algorithms	Second Edition, Universities Press (2008) <b>Chapters : 1 to 8 and 11</b>

### Reference books

	Author	Title	Publisher
1	Anany Levitin	Introduction to the Design & Analysis of Algorithms	Second Edition, Pearson Education (2007)
2	I.Chandra Mohan	Design and Analysis of Algorithms	PHI.
3	Prabhakar Gupta, Vineet Agrawal	Design and Analysis of Algorithms	PHI
4	Parag Himanshu Dave	Design and Analysis of Algorithms	Pearson Education (2008)



**KRISHNA UNIVERSITY**  
**MCA 504.1: EMBEDDED SYSTEMS**

**Details of the syllabus**

<b>Unit 1</b>	<p><b>Introduction.:</b> Embedded system overview, Design challenges, Processor technology., IC technology, Design technology, Trade offs.</p> <p><b>Custom single purpose processors: Hardware:</b> Introduction, Combinational logic, Sequential logic, Custom single purpose processor design, RT-level custom single purpose processor design, Optimizing custom single purpose processor design.</p>
<b>Unit 2</b>	<p><b>General purpose processors : Software :</b> Introduction, Basic architecture, Operation, Programmer's view, Development environment, Application specific instruction set processors, Selecting a microprocessor, General purpose processor design</p> <p><b>Standard single purpose processors: Peripherals:</b> Introduction, Timers, Counters, Watchdog timers, UART, Pulse width modulators, LCD controllers, Keypad controllers, Stepper motor controller, Analog to digital converters, Real time clocks.</p>
<b>Unit 3</b>	<p><b>Memory:</b> Introduction, Memory write ability and storage permanence, Common memory types, Composing memory, Advanced RAM</p> <p><b>Interfacing:</b> Introduction, Communication basics, Microprocessor interfacing –I/O addressing, Microprocessor interfacing – Interrupts, Microprocessor interfacing – DMA, Arbitration, Multi level bus architectures, Advanced communication principles, Serial protocols, Parallel protocols, Wire less protocols</p>
<b>Unit 4</b>	<p><b>Digital camera example:</b> Introduction, Introduction to simple digital camera, Requirements specifications, Design</p> <p><b>State machine and concurrent process models:</b> Introduction, Models Vs languages, text Vs graphics, An introductory example, A basic state machine model-FSM</p>
<b>Unit 5</b>	<p><b>Finite state machine-contd...</b></p> <p>Finite state machine with data path model-FSMD, Using state machine, HCFSM and stack charts languages, Program state machine model –PSM, The role an appropriate model and language, Concurrent process model, Concurrent processes, Communication among the processes, Synchronization among the processes, Implementation, Data flow model, Real time systems</p>

**Text books**

	Author	Title	Publisher
1	Frank Vahid / Tony Givargis	Embedded System Design	Third edition, Wiley (2008) <b>Chapters : 1 to 8.</b>

**Reference books**

	Author	Title	Publisher
1	Raj Kamal	Embedded Systems	Second Edition , TMH (2008)

**KRISHNA UNIVERSITY**  
**MCA504.2: MOBILE COMPUTING**

**Details of the syllabus**

<b>Unit 1</b>	<p><b>Introduction:</b> Mobility of bits and bytes, Wireless – the beginning, mobile computing, dialogue control, networks, middleware and gateways, applications and services, developing mobile computing applications, security in mobile computing, standards – why is it necessary, standard bodies, players in the wireless space</p> <p><b>Mobile computing architecture:</b> History of computers, history of Internet, Internet – ubiquitous network, Architecture of mobile computing, three tier architecture, design considerations for mobile computing, mobile computing through Internet, making existing applications mobile – enabled</p>
<b>Unit 2</b>	<p><b>Mobile computing through telephony:</b> Evolution of telephony, multiple access procedure, mobile computing through telephone, developing an IVR application, voice XML, telephony application programming interface (TAPI)</p> <p><b>Emerging technologies:</b> Introduction, Bluetooth, radio frequency identification {RFid}, wireless broadband {WiMAX}, mobile IP, Internet protocol version 6 {IPv6}, java card</p>
<b>Unit 3</b>	<p><b>Global system for mobile communications (GSM):</b> Global system for mobile communications, GSM Architecture, GSM Entities, Call routing in GSM, PLMN Interfaces, GSM Addresses and identifiers, network aspects in GSM, GSM frequency allocation, Authentication and security</p> <p><b>Short message service (SMS):</b> Mobile computing over SMS, short message services (SMS), value added services through SMS, accessing SMS bearer</p>
<b>Unit 4</b>	<p><b>General packet radio service (GPRS):</b> Introduction, GPRS and packet data network, GPRS network architecture, GPRS network operations, data services in GPRS, applications for GPRS, limitations of GPRS, billing and charging in GPRS</p> <p><b>Wireless application protocol (WAP):</b> Introduction, WAP, MMS, GPRS applications</p> <p><b>CDMA and 3G:</b> Introduction, spread – spectrum technology, Is – 95, CDMA Vs GSM, wireless data, third generation networks, applications on 3G</p>
<b>Unit 5</b>	<p><b>Wireless LAN:</b> Introduction, wireless LAN advantages, IEEE 802.11 standards, wireless LAN Architecture, mobility in wireless LAN, deploying wireless LAN, mobile Ad Hoc networks and sensor networks, wireless LAN security, Wi- Fi vs. 3G</p> <p><b>Voice over Internet protocol and convergence:</b> Voice over IP, H.323 frame work for voice over IP, Session initiation protocol (SIP), comparison between H.323 and SIP, real time protocols, convergence technologies, call routing, voice over IP applications, IP Multi media subsystem (IMS), mobile VoIP</p> <p><b>Security issues in mobile computing:</b> Introduction, information security, security techniques and algorithms, security protocols, public key infrastructure, trust, security models, security frameworks for mobile environment</p>

**Text books**

	Author	Title	Publisher
1	Asoke K Talukder and Roopa R Yavagal	<b>Mobile Computing</b>	TMH (2008) <b>Chapters:</b> 1 to 10, 17,18

**Reference books**

	Author	Title	Publisher
1	Rajkamal	Mobile Computing	Oxford (2008)

# KRISHNA UNIVERSITY

## MCA504.3: SOFTWARE TESTING TECHNIQUES

### Details of the syllabus

<b>Unit 1</b>	<p><b>The Testing Challenge and Those Who Take It On :</b> Software Engineering Evolution, A Tester's True Goal, What is a User, Testers, What Makes Them Special</p> <p><b>Industrial –strength Software, It's Not a Science Project:</b> Industrial-strength Software, Production Environments, Mission-critical Software, Case Study: A Pension Plan Management Vendor</p> <p><b>The Development Process:</b> Test Process Definitions</p> <p><b>The Test and Development Divide:</b> Should Developers Test Their Own Software, Diplomacy : The Tester's Relationship with Development</p>
<b>Unit 2</b>	<p><b>Where to Start ? Snooping for Information:</b> The Importance of Knowing What You Test, Viewing All Software as a Solution to a Problem, Customer Reconnaissance, A Simple Test Preparation Tool, Don't Just Take, Give a Little</p> <p><b>Coping with Complexity through Teaming:</b> Complex Software Products : You Can't Know It All, Reducing Complexity through Component Spies, Sharing Expertise Across the Team.</p> <p><b>Test Plan Focus Areas:</b> The Test Plan Document, Unit Test Focus Areas, Function Verification Test Focus Areas, System Verification Test Focus Areas, Integration Test Focus Areas, Single-system versus Multisystem Testing, Test Plan Reviews</p>
<b>Unit 3</b>	<p><b>Testing for Recoverability:</b> Function Verification Test, System Verification Test, Integration Test, Case Study: Clustered System Recovery</p> <p><b>Planning for Trouble:</b> Scheduling, Entry and Exit Criteria, Injecting Testability into Development Plans, Case Study : The Testability of Errors</p> <p><b>The Magic of Reuse:</b> Who Writes More Code : Development or Test, Reuse Opportunities and Techniques, Case Study : Testing Real Memory Management</p>
<b>Unit 4</b>	<p><b>Developing Good Test Programs:</b> Function Verification Test Programs, System Verification Test Programs, Case Study: Termination Processing</p> <p><b>Data Corruption:</b> Data Integrity: What is it, Protecting against Data Corruption, The Need for Special Testing, Data Integrity Monitors, Case Study: Memory and File Thrashers</p>
<b>Unit 5</b>	<p><b>Tools-You Can't Build a House without Them:</b> The Magic Tool Myth, Tool Categories, Buy versus Build, Avoid the Tool Merry-Go-Round</p> <p><b>Test Execution:</b> Test Execution Sequence, Artistic Testing, An Iterative Approach: Algorithm Verification Testing, Catching Problems, Problem Diagnosis, Testing the Documentation</p> <p><b>Testing with a Virtual Computer:</b> Partitioning, Virtualization, Partitioning and Virtualization Combinations, Why Go Virtual</p> <p><b>The Customer's Role in Testing:</b> Controlled Early Introduction Programs, Preproduction Testing</p>



### Text books

	Author	Title	Publisher
1	Loveland, Miller, Prewitt, Shannon	Software Testing Techniques – Finding the Defects that Matter	SPD, Charles River Media (2007) <b>Chapters:</b> 1 to 13, 15, 16, 19

### Reference books

	Author	Title	Publisher
1	Rajini & Oak	Software Testing : Methodologies, Tools and Processes	TMH (2004)
2	Dortothy Graham	Foundations of Software Testing : ISTQB Certification	Thomson (2007)





# KRISHNA UNIVERSITY

## MCA505.1: SOFTWARE TESTING TECHNIQUES

### Details of the syllabus

<b>Unit 1</b>	Introduction, Image Shape, Human Vision System, Image Acquisition – Intensity Images, Real Time Capture, Colour Images, Video Camera, Capture, Analogue To Digital Conversion, Scanners, Character Recognitions Devices, Satellite Imaginary, Ranging Devices, Calibration, Image Presentation-Raster Screen, Printers (Matrix, Laser, Ink-Jet, Wax Thermal), Patterns, Dithering, Three-Dimensional Image.
<b>Unit 2</b>	<b>Statistical Operations</b> -Introduction, Gray-Level Transformations, Histogram Equalization, Multi-Image Operations, Spatial Operations And Transformations-Introduction, Spatial Dependent Transformations, Templates And Convolution, Edge Detection, Other Window Operations, Two-Dimensional Geometric Transformations, Segmentation And Edge Detection-Introduction, Region Operations, Basic Edge Detection, Second-Order Edge Detection, Pyramid Edge Detection, Crack Edge Relaxation.
<b>Unit 3</b>	<b>Morphological and Other Area Operations</b> -Introduction, Basic Morphological Operations, Opening and Closing Operations, Finding Basic Shapes-Combining Edges, Hough Transforms, Bresenham's Algorithms; Labeling Lines And Regions-Flat Surface And Straight Line Labeling, Dealing With Curves, Labeling Regions
<b>Unit 4</b>	<b>Frequency Domain</b> -Introduction, Hartley Transform, Fourier Transform, Optical Transformation, Power And Autocorrelation Functions; Image Compression-Introduction, Types And Requirements, Statistical Compression
<b>Unit 5</b>	<b>Image Compression-contd...</b> Spatial Compression, Contour Coding, Quantizing Compression, Real-Time Image Transmission, Quadrees; Texture-Introduction, Identifying Textures, Texture Gradient, Texture Segmentation.

### Text books

	Author	Title	Publisher
1	Adrian Low	Introductory Computer Vision And Image Processing	MC Graw Hill International Editions

### Reference books

	Author	Title	Publisher
1	Gojelez	Digital Image Processing	Addison Wesley
2	B.Chanda, D.Dutta Majunder	Digital Image Processing	PHI (2008).

# KRISHNA UNIVERSITY

## MCA505.2: MICROPROCESSORS AND INTERFACING

### Details of the syllabus

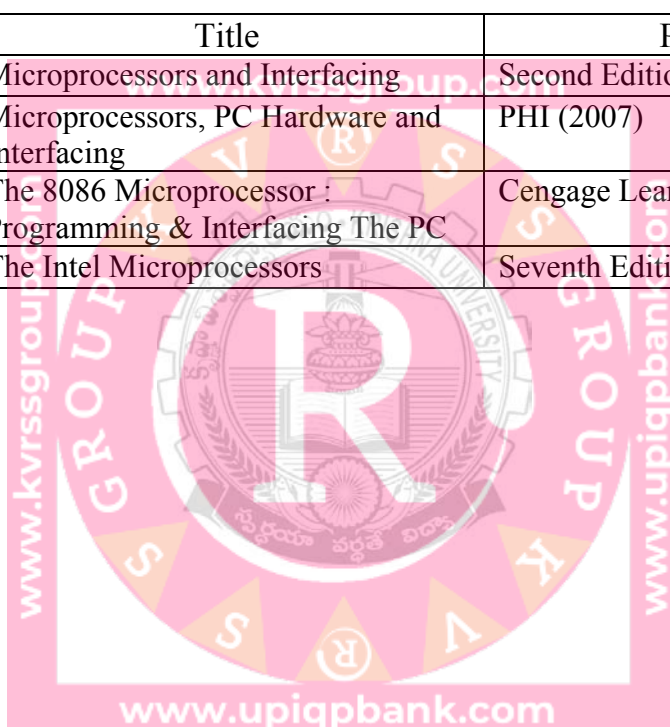
<b>Unit 1</b>	<b>Introduction :</b> Overview of Microcomputer Systems: Hardware – Software, Addresses – General Operation of a Computer – Microprocessors in Digital System Design. <b>8086 Architecture:</b> CPU Architecture – Internal Operation , Machine Language Instruction: Addressing modes – Instruction Formats.
<b>Unit 2</b>	<b>Assembler Language Programming:</b> Assembler Instruction Format – Data Transfer Instructions , Arithmetic Instructions: Binary Arithmetic – Packed BCD Arithmetic – Unpacked BCD Arithmetic, Branch Instructions: Conditional Branch Instructions - Unconditional Branch Instructions, Loop Instructions – NOP and HLT Instructions – Flag Manipulation Instructions – Logical Instructions – Shift and Rotate Instructions , Directives and Operators: Data Definition and Storage allocation – Structures – Records – Assigning Names to Expressions – Segment Definitions – Program Termination – Alignment Directives – Value returning attribute operators.
<b>Unit 3</b>	<b>Modular Programming:</b> Linking and Relocation: Segment Combination – Access to External Identifiers, Stacks , Procedures: calls, returns, and Procedure Definitions – Saving and Restoring Registers – Procedure Communication – Recursive Procedures, Interrupts and Interrupt Routines, Macros: ASM-86 Macro Facilities – Local Labels – Nested Macros – Controlled Expansion and Other Functions. <b>I/O Programming:</b> Fundamental I/O Considerations – Programmed I/O – Interrupt I/O – Block Transfers and DMA
<b>Unit 4</b>	<b>System Bus Structure:</b> Basic 8086/8088 Configurations: Minimum Mode – Maximum Mode, System Bus Timing, Interrupt Priority Management: Interrupt System Based on a Single 8259A. <b>I/O Interfaces:</b> Serial Communication Interfaces: Asynchronous Communication – Synchronous Communication – Physical Communication Standards – 8251A Programmable Communication Interface, Parallel Communication: 8255A Programmable Peripheral Interface - A/D and D/A Example, Programmable Timers and Event Counters: Intel's 8254 Programmable Interval Timer – Interval Timer Application to A/D, DMA Controllers.
<b>Unit 5</b>	<b>Advanced Microprocessors:</b> The 80386 : Introduction – Operating Modes – Processor Model – Programming Model, The 80486 : Introduction – Processor Model – Programming Model, The Pentium : Introduction – Processor Model – Programming Model – The Pentium Evolves – The Pentium MMX, The P6 Processors : Introduction – Overview – Processor Model – New Architectural Features.

### Text books

	Author	Title	Publisher
1	Yu-Cheng Liu, Glenn A Gibson	Microcomputer Systems: The 8086/8088 Family	Second Edition, Pearson Education (2008) <b>Chapters:</b> 1.1, 1.3 – 1.5, 2.1 - 2.3, 3.1 – 3.10, 4.1 – 4.5, 6.1 – 6.4, 8.1 – 8.2, 8.3.1, 9.1.1, 9.1.2, 9.1.4, 9.2, 9.3, 9.5
2	John Uffenbeck	The 80x86 Family Design, Programming and Interfacing	Third Edition, Pearson Education (2006) <b>Chapters:</b> 3.3, 3.5 – 3.7

### Reference books

	Author	Title	Publisher
1	Douglas V Hall	Microprocessors and Interfacing	Second Edition, TMH
2	N.Mathivanan	Microprocessors, PC Hardware and Interfacing	PHI (2007)
3	Kenneth J. Ayala	The 8086 Microprocessor : Programming & Interfacing The PC	Cengage Learning (2008)
4	Barry B. Brey	The Intel Microprocessors	Seventh Edition, PHI



**KRISHNA UNIVERSITY**  
**MCA505.3: WEB ENGINEERING**

**Details of the syllabus**

<b>Unit 1</b>	<p><b>Web-Based Systems:</b> The Web, Web Applications</p> <p><b>Web Engineering:</b> What is Web Engineering, The Components of Web Engineering, Web Engineering Best Practices?</p> <p><b>A Web Engineering Process:</b> Defining the Framework, Incremental Process Flow, Generic Actions and Tasks for the WebE Framework</p> <p><b>Communication:</b> The Communication Activity, Formulation Elicitation, Identifying WebApp Increments, Negotiation</p>
<b>Unit 2</b>	<p><b>Planning :</b> Understanding Scope, Refining Framework Activities, Building a WebE Team, Managing Risk, Developing a Schedule, Managing Quality, Managing Change, Tracking the Project, Outsourcing WebE Work.</p> <p><b>Analysis Modeling for WebApps:</b> Understanding Analysis in the Context of WebE, Analysis Modeling for WebApps, Understanding the Users, The Content Model, The Interaction Model, The Functional Model, The Configuration Model, Relationship-Navigation Analysis.</p> <p><b>WebApp Design :</b> Design for WebApps, Design Goals, Design and WebApp Quality, The Design Process, Initial Design of the Conceptual Architecture, Initial Design of the Technical Architecture</p>
<b>Unit 3</b>	<p><b>Interaction Design:</b> Interface Design Principles and Guidelines, Interface Design Workflow, Interface Design Preliminaries, Interface Design Steps, Aesthetic Design, Usability, Design Issues.</p> <p><b>Information Design:</b> Information Architecture, Organizing Content, Structuring the information Space, Blueprints: Adding Detail to a structure, Accessing Information, Wireframe Models, Navigation Design: Creating the Detailed structure, Summarizing the Design Process.</p>
<b>Unit 4</b>	<p><b>Functional Design:</b> WebApp Functionality, The Nature of WebApp Functionality, Functional Design in the Design Process, Functional Architecture, Detailed Functional Design</p> <p><b>Construction and Deployment:</b> Construction and Deployment within the WebE Process, Construction, Construction Principles and Concepts, Deployment, Construction and the Use of Components, Component-Level Design Guidelines, Component Design Steps</p>
<b>Unit 5</b>	<p><b>Technologies and Tools:</b> General Issues, Implementation Tools and Technologies, Development Tools and Technologies</p> <p><b>Testing WebApps:</b> Testing Concepts, The Testing Process-An Overview, Content Testing, User Interface Testing, Usability Testing, Compatibility Testing, Component-Level Testing, Navigation Testing, Configuration Testing, Security and Performance Testing</p>

**Text books**

	Author	Title	Publisher
1	Roger S Pressman, David Lowe	Web Engineering A Practitioner's Approach	TMH (2008) <b>Chapters:</b> 1 to 5, 7 to 12, 14, 15.