



JSS MAHAVIDYAPEETHA
JSS SCIENCE AND TECHNOLOGY UNIVERSITY, MYSURU
SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING, MYSURU

SCHEME I TO VI SEMESTER: 2017-2018
&
SYLLABUS I TO VI SEMESTER: 2017-2018

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS
Scheme of Teaching and Examination for MCA

JSS MAHAVIDYAPEETHA
JSS SCIENCE AND TECHNOLOGY UNIVERSITY, MYSURU
SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING, MYSURU
Scheme of Teaching and Examination for MCA

Credit Pattern for MCA Course

Semester	Credits
1	25
2	28
3	25
4	27
5	25
6	20
Total	150

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Scheme of Teaching and Examination for MCA

I Semester

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	MCA110	Java Programming	MCA	4	0	0	4.0	4	50	50	100	3
2.	MCA120	Data Structures using C	MCA	4	0	0	4.0	4	50	50	100	3
3.	MCA130	Management Information System	MCA	4	0	0	4.0	4	50	50	100	3
4.	MCA140	System Software	MCA	4	0	0	4.0	4	50	50	100	3
5.	MCA150	Mathematical foundations	MCA	4	0	0	4.0	4	50	50	100	3
6.	MCA11L	Java Programming Laboratory	MCA	0	0	1	1.0	3	50	00	50	0
7.	MCA12L	Data Structures using C Laboratory	MCA	0	0	1	1.0	3	50	00	50	0
8.	MCA13L	Management and Soft Skills Laboratory	MCA	0	0	1	1.0	3	50	00	50	0
9.	MCA14L	System Software Laboratory	MCA	0	0	1	1.0	3	50	00	50	0
10.	MCA15L	Mathematical foundations Laboratory	MCA	0	0	1	1.0	3	50	00	50	0
Total				20	0	5	25	35	500	250	750	-

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II Semester

Scheme of Teaching and Examination for MCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	MCA210	Advanced Java Programming	MCA	4	0	0	4.0	4	50	50	100	3
2.	MCA220	Analysis and Design of Algorithms using C++	MCA	4	0	0	4.0	4	50	50	100	3
3.	MCA230	Software Engineering	MCA	4	0	0	4.0	4	50	50	100	3
4.	MCA240	Operating System	MCA	4	0	0	4.0	4	50	50	100	3
5.	MCA250	Relation Database Management System	MCA	4	0	0	4.0	4	50	50	100	3
6.	MCA260	Soft Skills	MCA	2	0	0	2.0	2	50	50	50	1.5
7.	MCA21L	Advanced Java Programming Laboratory	MCA	0	0	1	1	3	50	00	50	-
8.	MCA22L	Analysis & Design of Algorithms using C++ Laboratory	MCA	0	0	1	1	3	50	00	50	-
9.	MCA23L	Software Engineering Laboratory	MCA	0	0	1	1	3	50	00	50	-
10.	MCA24L	Operating System and Linux Laboratory	MCA	0	0	1	1	3	50	00	50	-
11.	MCA25L	Relation Database Management System Laboratory	MCA	0	0	1	1	3	50	00	50	-
12.	MCA26L	Soft Skills Laboratory	MCA	0	0	1	1	3	50	00	50	-
Total				22	0	6	28	40	600	300	850	-

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III Semester

Scheme of Teaching and Examination for MCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	MCA310	Web Programming	MCA	4	0	0	4.0	4	50	50	100	3
2.	MCA320	Intelligent Algorithms	MCA	4	0	0	4.0	4	50	50	100	3
3.	MCA330	Object Oriented Modelingand Design	MCA	4	0	0	4.0	4	50	50	100	3
4.	MCA340	Computer Networks	MCA	4	0	0	4.0	4	50	50	100	3
5.	MCA35X	Streams	MCA	4	1	0	5.0	5	50	50	100	3
6.	MCA31L	Web Programming Laboratory	MCA	0	0	1	1	3	50	-	50	-
7.	MCA32L	Intelligent Algorithms Laboratory	MCA	0	0	1	1	3	50	-	50	-
8.	MCA33L	Object Oriented Modelingand Design Laboratory	MCA	0	0	1	1	3	50	-	50	-
9.	MCA34L	Computer Networks Laboratory	MCA	0	0	1	1	3	50	-	50	-
Total				20	1	4	25	33	450	250	700	-

Streams :

Stream-1		Stream-2		Stream-3	
Machine Intelligence Stream		Data Sciences Stream		Applications Stream	
MCA351	Computer Vision and Pattern Recognition	MCA352	Data Warehouse	MCA353	Enterprise Resource Planning

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IV Semester

Scheme of Teaching and Examination for MCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	MCA410	Python Programming	MCA	4	0	0	4.0	4	50	50	100	3
2.	MCA420	Data and Web Mining	MCA	4	0	0	4.0	4	50	50	100	3
3.	MCA430	Software Architecture	MCA	4	0	0	4.0	4	50	50	100	3
4.	MCA440	Cryptography and Network Security	MCA	4	0	0	4.0	4	50	50	100	3
5.	MCA45X	Streams	MCA	4	1	0	5.0	5	50	50	100	3
6.	MCA460	Foreign Language (French/German/Japanese)	MCA	2	0	0	2.0	2	50	50	50	1.5
7.	MCA41L	Python Programming Laboratory	MCA	0	0	1	1.0	3	50	-	50	-
8.	MCA42L	Data and Web Mining Laboratory	MCA	0	0	1	1.0	3	50	-	50	-
9.	MCA43L	Applications Laboratory	MCA	0	0	1	1.0	3	50	-	50	-
10.	MCA44L	Cryptography and Network Security Laboratory	MCA	0	0	1	1.0	3	50	-	50	-
Total				22	1	4	27	35	500	300	750	-

Streams :

Stream-1		Stream-2		Stream-3	
Machine Intelligence Stream		Data Sciences Stream		Applications Stream	
MCA451	Artificial Intelligence and Robotics	MCA452	NoSQL	MCA453	Business Intelligence

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V Semester

Scheme of Teaching and Examination for MCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	MCA510	.NET Technologies	MCA	4	0	0	4.0	4	50	50	100	3
2.	MCA520	Mobile Applications	MCA	4	0	0	4.0	4	50	50	100	3
3.	MCA530	Software Testing and Practices	MCA	4	0	0	4.0	4	50	50	100	3
4.	MCA540	Cloud Computing	MCA	4	0	0	4.0	4	50	50	100	3
5.	MCA55X	Streams	MCA	4	1	0	5.0	5	50	50	100	3
6.	MCA51L	.NET Technologies Laboratory	MCA	0	0	1	1.0	3	50	-	50	-
7.	MCA52L	Mobile Applications Laboratory	MCA	0	0	1	1.0	3	50	-	50	-
8.	MCA53L	Software Testing and Practices Laboratory	MCA	0	0	1	1.0	3	50	-	50	-
9.	MCA54L	Current Trends in IT Laboratory (Exploration and Presentation)	MCA	0	0	1	1.0	3	50	-	50	-
Total				20	1	4	25	33	450	250	700	-

Streams :

Stream-1		Stream-2		Stream-3	
Machine Intelligence Stream		Data Sciences Stream		Applications Stream	
MCA551	Soft Computing	MCA552	Big Data Analytics	MCA553	Software Project Management and Practices

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VI Semester

Scheme of Teaching and Examination for MCA

SL. No.	Subject Code	Course Title	Teaching Departme nt	Credits				Weekly Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Tota l		CIE	SEE	Tota l	
1.	MCA61P	Project Work	MCA	0	0	20	20.0	3	100	150	250	1
Total				0	0	20	20.0	3	100	150	250	-

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Theory	04	04	00	00	52
Course No		Course Title				Pre Requisites	
MCA110		Java Programming				--	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO1 :** Understand the basics and features of Java.
- CO2 :** Understand packages, interfaces and implement OOP concepts in Java.
- CO3 :** Implement Java program for multithread, synchronization concepts and able to implement exception handling in programs for handling errors.
- CO4 :** Demonstrate string and event handling and learn to use simple data structures like arrays and members of classes found in the Java API.
- CO5 :** Use graphical user interface using applets, swing components and networking concepts in Java.

TOPICS COVERED:**UNIT 1 – Java Basics****10 Hours**

History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, exploring string class

UNIT 2 – OOP Concepts in Java, Packages and Interfaces

10 Hours

Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class.

Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring java.io.

UNIT 3 - Exception Handling and Multi Threading

10 Hours

Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. String handling, Exploring java.util.

Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads; inter thread communication, thread groups, daemon threads. Enumerations, auto boxing, annotations, generics.

UNIT 4 - String and Event Handling

10 Hours

String fundamentals, String Constructors, Three string related language features, The Length() method, Obtaining the characters within the string, String comparison, using indexOf() and lastIndexOf(), changing the case of the characters within the string, String buffer and String builder.

Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scroll pane, dialogs, menu bar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT 5 – Applets, Swings and Networking with Java.Net**12 Hours**

Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Swings- Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing-JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

Networking fundamentals, Networking Classes & Interfaces, The InetAddress class, The Socket class, URL class, URL connection class, Http URL connection class, Exploring collection frame work, Collection overview, Collection classes and interfaces, Array class.

TEXT BOOKS / REFERENCES:**Text books:**

1. Herbert Schildt. Java - The Complete Reference, Ninth Edition. Oracle Press, McGraw Hill Education (India) Edition- 2014.

Reference books:

1. Cay S. Horstmann, Gary Cornell. Core Java, Core Java Volume-1 – Fundamentals, 9th edition, Pearson Education, 2014.
2. Timothy Budd, “Understanding Object-oriented programming with Java”, Updated Edition, Pearson Education, 2000.

ADDITIONAL LEARNING SOURCES:

1. <http://www.oracle.com/technetwork/java/index-jsp-135888.html>
2. <http://www.javaworld.com/article/2074929/core-java>
3. <http://www.javaworld.com/>
4. <http://www.learnjavaonline.org/>
5. <https://www.codecademy.com/learn/learn-java>

6. <http://www.tutorialspoint.com/java/>
7. <http://www.java-examples.com/>
8. <http://www.homeandlearn.co.uk/java/java.html>

CO - PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	H	M	M	M	M	H	M	M	M
CO2	H	M	M	H	M	M	H	M	M	M	L	L
CO3	H	M	M	H	M	H	H	M	H	M	L	L
CO4	H	M	M	H	M	M	M	M	M	M	L	L
CO5	H	H	H	H	M	M	H	M	M	M	L	L

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Theory	04	04	00	00	52
Course No		Course Title				Prerequisites	
MCA120		Data Structures using C				--	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events].
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Understand C programming concepts.

CO2: Understand abstract data types such as arrays, structures, strings and polynomials.

CO3: Implement various ADTs such as STACK, QUEUE, LIST and Tree.

CO4: Implement various searching and sorting algorithms.

CO5: Implement efficient linear and non-linear data structures.

TOPICS COVERED:**UNIT 1 - Introduction and overview of C Programming****12 Hours**

Introduction to C programming, Variables, Data types, Constants, Declarations, Operators, Precedence, Associativity, Order of evaluation. Input and output statements; Control Statements, Arrays – Single dimension, Two dimensional, Multi dimensional Arrays, Strings. Functions, Categories of functions. Examples Pointers, Pointer arithmetic, Call by value, Pointer Expression, Pointer as function arguments, recursion, passing strings to functions, Call by reference, Functions returning pointers, Pointers to functions, Programming Examples. Structures and Unions.

UNIT 2 - Introduction to Data Structures**8 Hours**

Information and its meaning: Abstract Data Types, Sequences as Value Definitions, ADT for Varying length character Strings, pointers and review of Pointers, Dynamic Memory Allocation - definition, malloc, calloc, and realloc, free. Data Structures: Array as an ADT, Arrays as Parameters, String as an ADT.

UNIT 3 - The Stack**12 Hours**

Definition and examples, Primitive operations, Example, The stack as an ADT, Representing stacks, Implementing the pop, push operations using function overloading, Examples for infix, postfix, and prefix expressions, Basic definition and Examples. Applications of Stacks: Expression Evaluations, Expression conversion, Recursion as application of stack, Properties of recursive definition or algorithm. Binary search, Towers of Hanoi problem.

UNIT 4 - Queues and Lists**12 Hours**

The queue and its sequential representation, the queue as ADT, Basic operations using polymorphism and inheritance, Priority queue, Array implementation of a priority queue. Linked lists, inserting and removing nodes from a list, Linked implementations of stacks, Linked implementation of queues, linked list as a data Structure. Example of list operations.

UNIT 5 - Linked Lists and Trees**8 Hours**

Other list structures: Circular lists, Stack as circular lists, doubly linked lists. Application of linked lists: Stacks, Queues, double-ended queues, priority queues. Sorting and Searching: Applications and implementation with function overloading. Tree: Definition and representation, Types of trees, Basic operations on Tree.

TEXT BOOKS/ REFERENCES :**Text Books :**

1. Programming in ANSI C, Third Edition, E. Balaguruswamy. 6th Edition (2013).
2. Data Structures Using C and C++ by Aaron.M. Tenenbaum, Yedidyah Langsam and Moshe J. Augustine, PHI, Edition, 2011.

Reference Books :

1. Data structures, Algorithms and Applications in C++, S. Sahani, University Press (India) Pvt Ltd, 2nd Edition.
2. The complete reference C, Herbert Schildt, Fifth Edition, Tata McGraw Hill.

ADDITIONAL LEARNING SOURCES:

1. <http://www.tutorialspoint.com/Data-Structures-in-C-Online-Training/classid=13>
2. http://nptel.ac.in/datastructures_c

CO - PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	M	M	H	H	M	M	M	H	M	M	M
CO2	H	M	M	H	M	M	H	H	M	M	L	L
CO3	H	M	M	H	M	H	H	M	H	M	L	L
CO4	H	M	M	H	M	M	M	M	M	M	L	L
CO5	H	H	H	H	H	M	H	M	M	M	L	L

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Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
MCA130	Management Information System	--

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events], Marks: 50 [10* 5 Events].
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

- CO1:** Able to understand the concepts of system, system components and development techniques with case studies.
- CO2:** Design and develop Information system for business environment by understanding the need and criticality of type of information and integrate information system into business requirement using management techniques.
- CO3:** Apply the different strategies for the management of business to formulate business process.
- CO4:** Analyze the need for business process re-engineering, and the process of making.
- CO5:** Understand the concepts and functionalities of enterprise systems like ERP, SCM, DSS

TOPICS COVERED:**UNIT 1- Systems Engineering, Information and Knowledge****12 Hours**

System concepts, system control, types of systems, handling system complexity, Classes of systems, General model of MIS, Need for system analysis, System analysis for existing system & new requirement, system development model, MIS & system analysis. Information concepts, classification of information, methods of data and information collection, value of information, information: A quality product, General model of a human as information processor, Knowledge, Introduction of MIS: MIS: Concept, Definition, Role of the MIS, Impact of MIS, MIS and the user, Management as a control system, MIS support to the management, Management effectiveness and MIS, Organization as system. MIS: organization effectiveness.

UNIT 2- Decision Making and DSS**10 Hours**

Decision making concepts; decision making process, decision-making by analytical modeling, and Behavioral concepts in decision making, organizational decision-making, Decision structure, DSS components, and Management reporting alternatives

Technology of Information System : Introduction, Data processing, Transaction processing, Application processing, information system processing, TQM of information systems, Human factors & user interface, Strategic nature of IT decision, MIS choice of information technology.

UNIT 3- Electronic Business systems**10 Hours**

Enterprise business system – Introduction, cross-functional enterprise applications, real world case, Functional business system, - Introduction, marketing systems, sales force automation, CIM, HRM, online accounting system, Customer relationship management, ERP, Supply chain management (real world cases for the above)

E-business Technology: Introduction to E-business, model of E-business, internet and World Wide Web, Intranet/Extranet, Electronic, Impact of Web on Strategic management, Web enabled business management, MIS in Web environment.

UNIT 4- Strategic Management of Business & Developing Business/IT Strategies /IT Solutions**10 Hours**

Concept of corporate planning, Essentiality of strategic planning, Development of the business strategies, Type of strategies, short-range planning, tools of planning, MIS: strategic business planning. Planning fundamentals (real world cases), Organizational planning, planning for competitive advantage, (SWOT Analysis), Business models and planning. Business/IT planning, identifying business/IT strategies, Implementation Challenges, Change management., Developing business systems, (real world case), SDLC, prototyping, System development process, implementing business system .

UNIT 5: E-Commerce Introduction**10 Hours**

Course overview; Introduction to e-commerce, E-commerce Business Models and Concepts, Ecommerce Infrastructure: The Internet and World Wide Web, Web design, JavaScript Internet Information Server (IIS); Personal Web Server (PWS).

E-Commerce techniques and Issues: Introduction to Active Server Pages (ASP), Building an E-Commerce Web Site, E-Commerce Payment Systems, E-Commerce Marketing Techniques, Building product catalogue, Search product catalogue, Web Spider and search agent, Ethical, Social and Political Issues in E-Commerce.

TEXT BOOKS /REFERENCES:**Text Books :**

1. Waman S Jhawadekar: Management Information System, 3rd Edition, Tata McGraw Hill.
2. James A O'Brien and George M Marakas: Management Information System, 7th Edition, Tata McGraw Hill, 2006
3. Turban, Rainer, and Potter, Introduction to E-Commerce, second edition, 2003
4. H. M. Deitel, P. J. Deitel and T. R. Nieto, E-Business and E-Commerce: How to Program, Prentice hall, 2001

Reference Books:

1. Ralph M Stair and George W Reynolds: Principles of Information Systems, 7th Edition, Thomson, 2010.
2. Steven Alter: Information Systems - The Foundation of E-Business, 4th Edition, Pearson Education, 2001
3. Elizabeth Chang: E-Commerce Fundamentals and Applications, Wile India Edition.

ADDITIONAL LEARNING RESOURCES:

1. <http://mbaexamnotes.com/management-information-system-notes>
2. https://www.tutorialspoint.com/management_information_system

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	M	M	M	H	H	H	M	M	L
CO2	H	H	M	H	L	H	M	H	H	M	H	M
CO3	M	H	M	M	H	H	H	M	L	H	H	M
CO4	M	M	L	H	M	L	M	M	L	H	H	H
CO5	L	L	M	M	H	L	L	M	M	L	M	H

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Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Theory	04	04	00	00	52
Course No		Course Title				Pre Requisites	
MCA140		System Software				-	

COURSE ASSESSMENT METHOD:

3. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
4. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be to:

- CO 1:** Understand Machine SIC & SIC/XE Architectures' and working of assemblers, design principles.
- CO 2:** Learn loader and linker functionalities, structure of editors and interactive debugging systems.
- CO 3:** Understand the working, design and structures of a macro processor.
- CO 4:** Understand the working of compilers and various design options.
- CO 5:** Learn fundamentals of scanner or Lexer and Parser and implement the lexer and parser using LEX and YACC tools.

TOPICS COVERED:**UNIT 1 - Machine Architectures and Assemblers****14 Hours**

Introduction, System Software and Machine Architecture, Simplified Instructional Computer (SIC) - SIC Machine Architecture, SIC/XE Machine Architecture, SIC and SIC/XE ,Examples.
Basic Assembler Function - A Simple SIC Assembler, Assembler Algorithm and Data Structures, Machine Dependent Assembler Features - Instruction Formats & Addressing Modes, Program

Relocation.

Machine independent Assembler Features – Literals, Symbol-Definition Statements, Expression, Program Blocks, Control Sections and Programming Linking, Assembler Design Operations - One-Pass Assembler, Multi-Pass Assembler, Implementation Examples - MASM Assembler.

UNIT 2 - Loaders, Linkers, Editors and Debugging Systems

12 Hours

Basic Loader Functions - Design of an Absolute Loader, A Simple Bootstrap Loader, Machine-Dependent Loader Features – Relocation, Program Linking, Algorithm and Data Structures for a Linking Loader; Machine-Independent Loader Features - Automatic Library Search, Loader Options, Loader Design Options - Linkage Editor, Dynamic Linkage, Bootstrap Loaders, Implementation Examples - MS-DOS Linker.

Text Editors - Overview of Editing Process, User Interface, Editor Structure, Interactive Debugging Systems - Debugging Functions and Capabilities, Relationship With Other Parts Of The System, User-Interface Criteria.

UNIT 3 - Macro Processor

8 Hours

Basic Macro Processor Functions - Macro Definitions and Expansion, Macro Processor Algorithm and Data Structures, Machine-Independent Macro Processor Features - Concatenation of Macro Parameters, Generation of Unique Labels, Conditional Macro Expansion, Keyword Macro Parameters, Macro Processor Design Options - Recursive Macro Expansion, General-Purpose Macro Processors, Macro Processing Within Language Translators, Implementation Examples - MASM Macro Processor, ANSI C Macro Processor.

UNIT 4 - Compilers

6 Hours

Compilers- Basic compiler functions: grammars, lexical analysis, syntactic analysis, code generation. Design options: division into passes, interpreters, p-code compilers and compiler-compilers, implementation examples: Sun0s C Compiler and The Yacc compiler-compiler.

UNIT 5 - Lex and Yacc**12 Hours**

Lex and Yacc - The Simplest Lex Program, Recognizing Words With LEX, Symbol Tables, Grammars, Parser-Lexer Communication, A YACC Parser, The Rules Section, Running LEX and YACC, Using LEX - Regular Expression, Examples of Regular Expressions. The Yacc Compiler-Compiler. Using YACC – Grammars, Recursive Rules, Shift/Reduce Parsing, What YACC Cannot Parse, A YACC Parser - The Definition Section, The Rules Section, Symbol Values and Actions.

TEXT BOOKS / REFERENCES:**Text books:**

1. Leland. L. Beck, D Manjula: System Software, 3rd Edition, Pearson Education, 2013.
2. John. R. Levine, Tony Mason and Doug Brown: Lex and Yacc, O'Reilly, SPD, 2009.

Reference books:

1. D. M. Dhamdhare: System Programming and Operating Systems, 2nd Edition, Tata McGraw – Hill, 2010.

ADDITIONAL LEARNING SOURCES:

1. <http://techterms.com/definition/systemsoftware>.
2. [Studymca.blogspot.com/2009/01/system-software_24.html](http://studymca.blogspot.com/2009/01/system-software_24.html).
3. cse.iitkgp.ac.in/~bivasm/notes/LexAndYaccTutorial.pdf

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	M	M	M	M	M	M	L	L	L	L	L	L
CO2	M	M	M	H	H	M	M	M	L	L	L	L
CO3	L	M	M	M	M	L	L	L	L	L	L	L
CO4	M	M	M	M	M	L	M	L	L	L	L	L
CO5	M	M	M	M	H	L	L	L	L	L	L	L

JSS MAHAVIDYAPEETHA
JSS Science and Technology University, Mysuru ,
Department of Master of Computer Applications [MCA].

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Theory	04	04	00	00	52
Course No		Course Title				Pre Requisites	
MCA150		Mathematical Foundations				-----	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO1:** Implement statistical measures and explore its applications
- CO2:** Analyse the errors, its interpretation and design the algorithms to solve a set of linear equations.
- CO3:** Study and understand the vector and linear functions
- CO4:** Apply the notion of relations on finite structures, like strings and analyze algorithms using the concept of functions.
- CO5:** Explore the techniques of Graph theory and its applications

TOPICS COVERED:

UNIT 1- Statistics

10 Hours

Univariate data – different measures of location, dispersion, relative dispersion, skewness and kurtosis, Moments, Measures based on them – comparison with moment measures, Correlation

and Regression Analysis.

UNIT 2 – Number Systems and Vector & Matrix Algebra

10 Hours

Errors in Numerical Computations, Types of Errors, Analysis and Estimation of Errors, Vector Algebra: Vector spaces with real field, Basis and dimension of a vector space, Orthogonal vectors, Properties of Matrices and Determinants: Matrix Operations, Elementary Matrices, Inverse Matrix, Diagonal Matrix, Symmetric Matrix, and Determinant Matrix.

UNIT 3 - Linear Algebraic Systems

11 Hours

Numerical methods for Linear Systems, Direct Methods for Linear Systems: Cramer's Rule, Gauss Elimination Method, Gauss Jordan Elimination Method, Pivoting Strategies, Gauss-Jordon Method, LU Decomposition Method, Tridiagonal Systems of Linear Equations, Iterative Methods for Solving Linear Systems, Jacobis Iteration Method, Gauss-Seidel Iterative Method, Convergence Criteria, Eigen Values and Eigen Vectors.

UNIT 4 – Relations and Functions

10 Hours

Cartesian products and Relations, Properties of Relations, Functions: Plain and One-to-One, Onto Functions: Stirling Numbers and the Second Kind, Special functions, The Pigeon-hole principle, Function composition and inverse functions.

UNIT 5 - Graph Theory

11 Hours

Definitions and Examples, Subgraphs, Complements, and Graph Isomorphism, Vertex Degree: Euler Trails and Circuits, Planar Graphs, Hamilton Paths and Cycles, Graph Coloring and Chromatic Polynomials.

TEXT BOOKS / REFERENCES:**TEXT BOOKS :**

1. Sant Sharan Mishra, “Computer Oriented Numerical and Statistical Methods”, PHI Learning Private Limited, 2013.
2. Rizwan Butt, “Introduction to Numerical Analysis Using Matlab”, Infinity Science Press LLC, 2008
3. Ralph P Grimaldi, B.V.Ramana, “Discrete & Combinatorial Mathematics, An Applied Introduction” 5th Edition, Pearson Education, 2009.

REFERENCES:

1. D.S. Chandrasekharaiah, Discrete Mathematical Structures, 4th Edition, PRISM Pvt. Ltd. 2012.
2. Bondy and U.S.R.Murty: Graph Theory and Applications (Freely downloadable from Bondy's website; Google-Bondy)
3. S. Kumarsean, “Linear Algebra A geometric approach”, Prentice Hall of India Private Limited, 2001.
4. Kenneth H Rosen, “Discrete Mathematics & its Applications" 7th edition, McGraw-Hill, 2010.

ADDITIONAL LEARNING SOURCES:

1. <http://www.personal.kent.edu/~rmuhamma/GraphTheory/graphTheory.htm>
2. http://www.tutorialspoint.com/discrete_mathematics/
3. <http://nptel.iitm.ac.in/>
4. <http://www.maths.lu.se/english/library/e-resources/>
5. <http://sunzi.lib.hku.hk/ER/detail/hkul/3743848>
6. <https://www.math.ucdavis.edu/~linear/linear-guest.pdf>

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	M	L	L	M	H	M	H	H	L	H
CO2	H	H	L	M	L	H	L	M	M	L	M	L
CO3	H	H	H	L	M	M	M	L	H	M	H	H
CO4	H	H	H	L	M	H	L	M	H	L	M	L
CO5	H	H	H	L	L	M	L	H	M	L	M	L

JSS MAHAVIDYAPEETHA

JSS Science and Technology University, Mysuru

Department of Master of Computer Applications [MCA]

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	

I	I	Laboratory	01	00	03	00	48
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COURSE ASSESSMENT METHOD:

<p>1. Internal Assessment [5 Events: Test1+Test2 + Observation book+ Record + Viva-voce] Marks: 50 [15+15+5+5+10]</p>
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- | |
|-------------------------|
| COURSE OUTCOMES: |
|-------------------------|

Upon successful completion of this course, students will be able to:

- CO1 :** Implement basic Java programs
- CO2 :** Implement object oriented concepts, packages and interfaces in Java.
- CO3 :** Implement Java program for multithread, synchronization, exception handling concepts.
- CO4 :** Demonstrate string, event handling, use simple data structures like arrays and members of classes found in the Java API.
- CO5 :** Demonstrate graphical user interface using applets, swing components and networking concepts in Java.

LIST OF PROGRAMS TO BE COVERED:
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1. Display Hello world
2. Check entered number is ODD or EVEN
3. Find factorial of number
4. Find the sum of the digits of a given number

1. Display Hello world
2. Check entered number is ODD or EVEN
3. Find factorial of number
4. Find the sum of the digits of a given number

5. Swap two numbers without using a temporary variable
6. Accept a name and display the name with greeting message using Class.
7. Generate a salary for an employee using class, object, constructors, methods and access control. Different parameters to be considered are Emp_No, Emp_Name, Age, Basic, DA, HRA, CA, PT, IT.
8. Generate a sales report for a sales executive using class, object, constructors, methods and access control. Different parameters to be considered are Emp_No, Emp_Name, Sales_Q1, Sales_Q2, Sales_Q3, Sales_Q4.
9. Demonstrate Constructor Overloading and Method Overloading.
10. Implement Inner class and demonstrate its Access protection.
11. Write a program in Java for String handling which performs the following:
 - a. Checks the capacity of StringBuffer objects.
 - b. Reverses the contents of a string given on console and converts the resultant string in upper case.
 - c. Reads a string from console and appends it to the resultant string of ii.
12. Demonstrate Inheritance.
13. Simple Program on Java for the implementation of Multiple inheritance using
 - a. interfaces to calculate the area of a rectangle and triangle.
14. Write a JAVA program which has
 - a. A Class called Account that creates account with 500Rs minimum balance, a deposit() method to deposit amount, a withdraw() method to withdraw amount and also throws LessBalanceException if an account holder tries to withdraw money which makes the balance become less than 500Rs.
 - b. A Class called LessBalanceException which returns the statement that says withdraw amount (Rs) is not valid.
 - c. A Class which creates 2 accounts, both account deposit money and one account tries to withdraw more money which generates a LessBalanceException take appropriate action for the same.
15. Write a JAVA program using Synchronized Threads, which demonstrates Producer Consumer concept.
16. Write a JAVA program to implement a Queue using user defined Exception Handling (also make use of throw, throws.).

17. Complete the following:

- a. Create a package named shape.
- b. Create some classes in the package representing some common shapes like Square,
- c. Triangle and Circle. Import and compile these classes in other program.

18. Write a JAVA Program

- a. Create an enumeration Day of Week with seven values SUNDAY through SATURDAY. Add a method is Workday() to the DayofWeek class that returns true if the value on which it is called is MONDAY through FRIDAY. For example, the call DayOfWeek.SUNDAY.isWorkDay () returns false.

19. Write a JAVA program which has

- a. A Interface class for Stack Operations
- b. A Class that implements the Stack Interface and creates a fixed length Stack.
- c. A Class that implements the Stack Interface and creates a Dynamic length Stack.
- d. A Class that uses both the above Stacks through Interface reference and does the Stack operations that demonstrates the runtime binding.

20. Print a chessboard pattern.

21. Write a JAVA Program which uses FileInputStream / FileOutputStream Classes.

22. Demonstrate utilities of LinkedList Class.

23. Write a JAVA applet program, which handles keyboard event.

24. Write a JAVA Swing program, to design a form.

25. Create a simple Student_Registaration application using Swings, JDBC and MySQL.

26. Write a JAVA program which uses Datagram Socket for Client Server Communication.

TEXT BOOKS / REFERENCES:

Text books:

1. Herbert Schildt. Java - The Complete Reference, Ninth Edition. Oracle Press, McGraw Hill Education (India) Edition- 2014.

Reference books:

1. Cay S. Horstmann, Gary Cornell. Core Java, Core Java Volume-1 – Fundamentals, 9th edition, Pearson Education, 2014.
2. Timothy Budd, “Understanding Object-oriented programming with Java”, Updated Edition, Pearson Education, 2000.

ADDITIONAL LEARNING SOURCES:

1. <http://www.oracle.com/technetwork/java/index-jsp-135888.html>
2. <http://www.javaworld.com/article/2074929/core-java>
3. <http://www.javaworld.com/>
4. <http://www.learnjavaonline.org/>
5. <https://www.codecademy.com/learn/learn-java>
6. <http://www.tutorialspoint.com/java/>
7. <http://www.java-examples.com/>
8. <http://www.homeandlearn.co.uk/java/java.html>

CO - PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	L	L	H	M	M	H	M	M	M	M	M
CO2	H	M	H	H	L	M	H	M	M	M	H	M
CO3	H	M	H	H	M	M	H	M	M	M	H	M
CO4	H	L	M	H	L	M	H	M	M	M	M	M
CO5	H	M	M	H	M	M	H	M	M	M	H	M

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Laboratory	01	00	03	00	48

Course No	Course Title	Prerequisites
MCA12L	Data Structures using C Laboratory	--

COURSE ASSESSMENT METHOD:

Internal Assessment [Test-1+Test-2+Observation book + Record + Viva : 15 + 15 + 05 + 05 +10=50marks]

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Implementing C programming aspects.

CO2: Understand the importance of abstract data type, arrays and string as ADT.

CO3: Understand the linked implementation, and its uses both in linear and non-linear data structure.

CO4: Implement various data structure such as stacks, queues, trees, etc. to solve various computing problems.

CO5: Implement various kinds of searching and sorting techniques and know when to choose which technique.

LIST OF EXPERIMENTS COVERED:**PROGRAMS ON C.**

1. Programs to learn and explore C data types, looping and decision making structures.

{mean, median, lcm, gcd, min max }

2. Calculate the salary of an employee given his basic pay, HRA = 10% of basic pay, TA=5% of his basic pay and deductions IT = 2.5% of his basic pay.

3. Solve quadratic equations to find the roots of the equation.
4. Programs to implement arrays and structures. {Ex: Students marks calculation, matrix operations}
5. Calculate the average marks of the student test marks and display the result using structure.
6. Programs to implement dynamic memory allocation: malloc, calloc, realloc and free.

STACK

7. Write a C program to evaluate the validity of an expression
8. Write a C program to evaluate a postfix expression.
9. Write a C program to convert an expression from infix to postfix.
10. Write a C program to implement multiple stack of integers.

QUEUES

11. Write a C program to perform basic operations on queue of integers, the program should provide the appropriate message to handle all concerned conditions
12. Write a C program to perform basic operations on list of students information stored in circular queue.

Let student information include regno, course title, year of study

13. Write a C program to implement dual queue.

LINKED LIST

14. Write a C program to implement stack operations using linked list.
15. Write a C program to implement queue operations using linked list.
16. Write a C program to create the students mark list based on the rank. Let the student record contain student-id, name, total marks.
17. Write a C program to perform operations.
 - a. Creation of list.
 - b. Insertion of new element [At Front, from rear, based on the position]
 - c. Deletion of a node [At Front, from rear, based on the position]
 - d. Display the list.
 - e. Replace the content of one element by another element.
 - f. Swap two nodes
18. Write a C program to perform the following operations on doubly linked list.

a. Creation of list by :

Insertion [At beginning, At end, In between]

Deletion [At beginning, At end, In between]

b. Display all the nodes.

c. Swap two nodes based on specific criteria.

TREES

19. Write a C program to perform / implement the binary tree using array and hence perform the following

- a. To print the left and right child of specified node
- b. To print all the ancestors of a specified node
- c. To print all the node in a specific level
- d. To print only the leaf node

20. Write a C program to perform / implement the binary tree using linked list and hence perform the following

- a. To print the left and right child of specified node
- b. To print all the ancestors of a specified node
- c. To print all the node in a specific level
- d. To print only the leaf node

21. Write a C program with recursive routines to traverse the binary tree in all possible orders

- a. Create a tree
- b. Pre-Order traversal
- c. In-Order traversal
- d. Post-Order traversal

22. Write a C program to construct a heap of n integers and hence sort them using heap sort algorithm

23. Implement the search techniques

- a. Linear Search
- b. Binary Search

TEXT BOOKS/ REFERENCES :**Text Books :**

1. Programming in ANSI C, Third Edition, E. Balaguruswamy. 6th Edition (2013).
2. Data Structures Using C and C++ by Aaron.M. Tenenbaum, Yedidyah Langsam and Moshe J. Augustine , PHI, Edition, 2011.

Reference Books :

1. Data structures, Algorithms and Applications in C++, S. Sahani, University Press (India) Pvt Ltd, 2nd Edition.
2. The complete reference C, Herbert Schildt, Fifth Edition, Tata McGraw Hill.

ADDITIONAL LEARNING SOURCES:

1. <http://www.tutorialspoint.com/Data-Structures-in-C-Online-Training/classid=13>
2. http://nptel.ac.in/datastructures_

CO - PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	H	M	M	M	M	H	M	M	M
CO2	H	M	M	H	M	M	H	M	M	M	L	L
CO3	H	M	M	H	M	H	H	M	H	M	L	L
CO4	H	M	M	H	M	M	M	M	M	M	L	L
CO5	H	H	H	H	M	M	H	M	M	M	L	L

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Laboratory	01	00	03	00	48
Course No		Course Title				Pre Requisites	
MCA13L		Management and Soft Skill Laboratory				---	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, Any 2 Events] Marks: 50 [10* 5 Events]

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Able to understand the concepts of system, system components and development techniques with case studies.

CO2: Design and develop Information system for business environment by understanding the need and criticality of type of information and integrate information system into business requirement using management techniques

CO3: Apply the different strategies for the management of business to formulate business process.

CO4: Analyze the need for business process re-engineering, and the process of making.

CO5: Understand the concepts and functionalities of enterprise systems like ERP, SCM, DSS etc.

TOPICS COVERED:
<ol style="list-style-type: none">1. XYZ Company manufacturing 3 models of mobile phones A, B, C. Suggest them various ways to improve their business.2. Dolphin restaurant serving cold, hot food & drinks to their customers, Suggest an effective information system to monitor their sales and improve their business3. You are asked to collect the requirement for building an information system to Indian railways. How do you carry out your work and mention the vital information you collect for decision making4. Shyam opened a new travel agency to cater transport services to various tourist spots in and around MYSORE, he wants an information system from you, Explain the features that will provide him proper information5. Ms. Kanchana runs a beauty parlor, but she is not able to make much turn over, and she feels that she failed in managing proper information. Suggest a information system which helps her to monitor the activities6. Mr. Krishna runs a bakery in Mysore, he wish to extend his business with ice cream and cool drinks. But he is not sure whether he will be successful in his venture. Provide him various information to take proper decision.7. Mr. Firoz running a Readymade garment showroom in a city. He is not able to reach the break even in his other place. She is in dilemma; provide some vital information so that she can take a decision to shift.8. RK group is famous in the state for different types of business, now they are thinking to enter into the field of technical education. What are the different things they need to take care for entering into education filed.9. Dr. Abdul is running a clinic and got lot of patients. Now he is thinking of opening a hospital to provide different medical services to his patients. Suggest him what are the information he has to collect.

TEXT BOOKS/REFERENCES:**TEXT BOOKS:**

1. Waman S Jhawadekar: Management Information System, 3rd Edition, Tata McGraw Hill.
2. James A O'Brien and George M Marakas: Management Information System, 7th Edition, Tata McGraw Hill, 2006
3. Turban, Rainer, and Potter, Introduction to E-Commerce, second edition, 2003
4. H. M. Deitel, P. J. Deitel and T. R. Nieto, E-Business and E-Commerce: How to Program, Prentice hall, 2001

REFERENCES:

1. Ralph M Stair and George W Reynolds: Principles of Information Systems, 7th Edition, Thomson, 2010.
2. Steven Alter: Information Systems - The Foundation of E-Business, 4th Edition, Pearson Education, 2001
3. Elizabeth Chang: E-Commerce Fundamentals and Applications, Wile India Edition.

ADDITIONAL RESOURCES:

1. <http://mbaexamnotes.com/management-information-system-notes>
2. https://www.tutorialspoint.com/management_information_system

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	L	M	L	M	M	M	M	M	M
CO2	H	H	M	H	M	M	M	H	M	M	M	H
CO3	H	M	M	H	M	M	H	H	H	H	H	M

CO4	M	H	L	M	M	H	H	M	M	M	H	H
CO5	M	M	H	M	H	H	M	M	H	H	M	H

JSS MAHAVIDYAPEETHA JSS Science and Technology University, Mysuru Department of Master of Computer Applications [MCA]							
Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Lab	01	00	03	00	48
Course No		Course Title				Pre Requisites	
MCA14L		System Software Laboratory				-	

COURSE ASSESSMENT METHOD:

Internal Assessment [Test-1 + Test-2 + Observation book + Record + Viva: 15 + 15 + 05 + 05 + 10]=
Total 50 marks..

COURSE OUTCOMES:

Upon successful completion of this course, students will be

- CO1:** Understand the need and importance of Lex and Yacc tools.
- CO2:** Understand and the usage of different regular expressions.
- CO3:** Understand the structure and working principle of Lex and Yacc programs.
- CO4:** Write, execute and debug the Lex programs.
- CO5:** Write, execute and debug the Yacc programs.

TOPICS COVERED:

Lex Programs

1. To count the number of vowels and consonants in a given string.
2. To count the number of characters, words, spaces and lines in a given input file.
3. To count the number of positive and negative integers and positive and negative fractions.

4. To check whether the given sentence is a simple or compound sentence.
5. To count the number of strings, commands and drives.
6. To count the number of lines in a given c program, also eliminate them and copy the program into a separate file.
7. To count the number of 'scanf' and 'printf' statements in a c program and replace them with 'readf' and 'writef' statements.
8. To recognize a valid arithmetic expression and identify the identifiers and operators present, print them separately.
9. To recognize and count the number of identifiers in a given input file.
10. To read data from a input file and count the number of characters, spaces, words and lines, write the output to a separate file.
11. To read data from a input file and count the number of characters, spaces, words and lines, write the output to a separate file using command line arguments.
12. To count number of vowels, consonants, digits and spaces in a given input string.
13. To count the number of chars, spaces, digits and lines from a given data from the command line.
14. To count the number of comment lines from a C++ program file and remove the comments and write the output a new file.
15. To check the entered day is a week day or week end.
16. To check the given date falls under which quarter of the year.

Yacc Programs

1. To test the validity of a simple expression involving operators +,-,*,/.
2. To test the simple validity of postfix expression.
3. To recognize nested IF control statements and display the number of levels of nesting.
4. To recognize nested FOR control statements and display the number of levels of nesting.
5. To recognize nested WHILE control statements and display the number of levels of nesting.
6. To test the valid arithmetic expression that uses operators +,-,* and /.
7. To recognize a valid variable, which starts with a letter, followed by any number of letters or digits.
8. To recognize a valid variable , which starts with a letter with underscore, followed by any number of letters or digits.
9. To recognize a valid variable, which starts with a letter, followed by any number of letters ,

digits and special symbols' present in a file..

10. To evaluate an arithmetic expression involving operators +, -, * and /:
11. To recognize strings 'aaab', 'abbb', 'ab' and 'a' using the grammar ($a^n b^n$, $n \geq 0$)
12. To recognize the grammar ($a^n b$, $n \geq 10$)
13. To demonstrate what Yacc cannot parse.

TEXT BOOKS / REFERENCES:

Text books:

1. John.R.Levine, Tony Mason and Doug Brown: Lex and Yacc, O'Reilly, SPD, 1999.

Reference books:

1. John.R.Levine: Flex and Bison, O'Reilly, SPD, 2012

ADDITIONAL LEARNING SOURCES:

1. <http://dinosaur.compilertools.net/>
2. epaperpress.com/lexandyacc/download/LexAndYaccTutorial.pdf
3. ssd.sccc.ru/old/school/2005/files/nechaev.ppt

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	M	M	M	M	H	L	L	L	L	L	L	L
CO2	M	M	L	M	M	L	L	L	L	L	L	L
CO3	M	M	L	M	M	L	L	L	L	L	L	L
CO4	M	M	M	M	M	L	L	L	L	L	L	L
CO5	M	M	M	M	M	L	L	L	L	L	L	L

JSS MAHAVIDYAPEETHA
JSS Science and Technology University, Mysuru
Department of Master of Computer Applications [MCA].

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Laboratory	01	00	03	00	48
Course No		Course Title				Pre Requisites	
MCA15L		Mathematical Foundations Laboratory				-----	

COURSE ASSESSMENT METHOD:

Internal Assessment [Test -1, Test-2, Observation book + Record + Viva-voce] [15+15+05+05+10 = 50marks]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO1:** Implement statistical measures and explore its applications
- CO2:** Analyse the errors, its interpretation and design the algorithms to solve a set of linear equations.
- CO 3:** Study and understand the vector and linear functions
- CO 4:** Apply the notion of relations on finite structures, like strings and analyze algorithms using the concept of functions.
- CO 5:** Explore the techniques of Graph theory and its applications

TOPICS COVERED:

Students are instructed to implement the algorithms using Scilab / Matlab tool.

1. To perform data analysis and modeling by writing the program to find I order, II order and III order statistical measure of varied forms of data set and understand its inference on the applications of data.

[Write program using adequate data to infer the meaning of Mean, Median, Mode, SD, Variance, Kurtosis, Correlation and Regression Analysis]

2. Analyze different types of Errors and its sources. Explore the implementation of demonstrate the concepts in linear algebra: Viz Matrices, Vector space representation, Polynomials considering the real time data using Matlab.

[Program to find the Inverse, Determinants of a matrix, Finding the Eigen value , Eigen Vector, Singular Value decomposition of a given matrix]

3. To implement the algorithms used to solve a set of linear equations (atleast any 3) and analyse the computational efficiency.

[Write Program and cross validate the results using the tools to solve the set of linear equations using : Gauss Elimination, LU Decomposition, Gauss Jordon, Jacobis Methods]

4. Implement the concepts of functions and relations.

[Program to validate Relations and Functions, its different types. generate Stirling Numbers, The Pigeon-hole principle considering the appropriate data for input and conclude the hypothesis involved in them to infer the results]

5. Implement to find the Hamiltonian, Euler, and isomorphic graphs.

What does Scilab / Matlab / C do ?

Includes hundreds of mathematical functions. It has a high level programming language allowing access to advanced data structures, 2-D and 3-D graphical functions.

A large number of functionalities is included in Scilab:

For usual engineering and science applications including mathematical operations and data analysis. 2-D&3-D Visualization graphics functions to visualize, annotate and export data and many ways to create and customize various types of plots and charts.

<https://www.scilab.org/scilab/>

TEXT BOOKS / REFERENCES:

TEXT BOOKS :

1. Sant Sharan Mishra, “Computer Oriented Numerical and Statistical Methods”, PHI Learning Private Limited, 2013.
2. Rizwan Butt, “Introduction to Numerical Analysis Using Matlab”, Infinity Science Press LLC, 2008
3. Ralph P Grimaldi, B.V.Ramana, “Discrete & Combinatorial Mathematics, An Applied Introduction” 5th Edition, Pearson Education, 2009.

REFERENCES:

1. D.S. Chandrasekharaiah, Discrete Mathematical Structures, 4th Edition, PRISM Pvt. Ltd. 2012.
2. Bondy and U.S.R.Murty: Graph Theory and Applications (Freely downloadable from Bondy's website; Google-Bondy)
3. S. Kumarsean, “Linear Algebra A geometric approach”, Prentice Hall of India Private Limited, 2001.
4. Kenneth H Rosen, “Discrete Mathematics & its Applications" 7th edition, McGraw-Hill, 2010.

ADDITIONAL LEARNING SOURCES:

1. <http://www.personal.kent.edu/~rmuhamma/GraphTheory/graphTheory.htm>
2. http://www.tutorialspoint.com/discrete_mathematics/
3. <http://www.maths.lu.se/english/library/e-resources/>
4. <http://sunzi.lib.hku.hk/ER/detail/hkul/3743848>
5. <https://www.math.ucdavis.edu/~linear/linear-guest.pdf>

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	M	L	L	M	L	M	H	L	M	L
CO2	L	H	H	L	L	H	L	H	H	L	M	L
CO3	L	M	L	L	L	H	L	L	H	L	H	L
CO4	L	L	H	L	L	H	L	H	H	L	L	L
CO5	H	H	H	L	L	M	L	M	H	L	M	L

JSS Science and Technology University, Mysuru
Department of Master of Computer Applications[MCA]

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Theory	04	04	00	00	52
Course No		Course Title				Pre Requisites	
MCA210		Advanced Java Programming				Java Programming	

COURSE ASSESSMENT METHOD:

Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO1 :** Understand Enterprise Application Architecture and J2EE, Learn and develop Database Interaction Techniques using JDBC.
- CO2 :** Learn the concept of Server side applications using Servlets and develop the server side applications using Servlets.
- CO3 :** Understand JSP and write applications using JSP
- CO4 :** Design and developing components using Java Beans and Understand the Enterprise Java Bean (EJB) concepts.
- CO5 :** Understand the concept of Spring framework for application development.

TOPICS COVERED:

UNIT 1 – J2EE Basics, Java Database Connectivity (JDBC)

08 Hours

Introduction to J2EE, Different architectures for application development, advantages of multi tier architecture for over other architectures, Different components and technologies of J2EE.
Introduction on JDBC, Talking to database, Essential JDBC program, Using Prepared Statement

Object, Interactive SQL tool, JDBC in action result sets, Batch Updates, Mapping, Basic JDBC data types and Advanced data types.

UNIT 2 – Server Side Scripting using Servlets

08 Hours

CGI Technologies, Limitations, Advantages of Servlet over CGI , Servlet Structure, Servlet packaging, HTML building utilities, Lifecycle, Single Thread model interface, Handling Client Request: Form Data, Handling Client Request: HTTP Request Headers. Generating server Response: HTTP Status codes, Generating server Response: HTTP Response Headers, Handling Cookies, Session Tracking.

UNIT 3 - Java Server Pages (JSP)

12 Hours

Overview of JSP technology, Need of JSP, Benefits of JSP, Advantages of JSP, Basic syntax, Invoking java code with JSP scripting elements, Creating template text , invoking java code from JSP, Limiting java code in JSP, Using JSP expressions, Comparing servlets and JSP, writing scriptlets, for example using scriptlets to make parts of JSP conditional, Using declarations, declaration example. Controlling the structure of generated servlets.

The JSP page directive, import attribute, session attribute, isElignore attribute, Buffer and auto flush attributes, Info attribute, errorpage and iserrorpage attributes, isThreadsafe attribute, extends attribute, language attribute, Including files and applets in JSP pages, Using java beans component in JSP documents.

UNIT 4 – Packages, JAR files, Java Beans and Enterprise Java Beans (EJB)

12 Hours

Creating packages, JAR files. Working with java beans: introspection, customizers, creating java bean, manifest file, Bean Jar file, new bean, adding controls, Bean properties, Simple properties, Design Pattern events, creating bound properties, Bean methods, Bean an Icon, Bean info class, Persistence ,Java Beans API.

The problem domain, Breakup responsibilities, Code Smart not hard, the Enterprise java bean specification. Components Types, Server Side Component Types, Session Beans, Message Driven Beans, Entity Beans, The Java Persistence Model. Container services.

UNIT 5 – Introduction to Spring Framework**12 Hours**

Problems with the Traditional Approach to J2EE, Lightweight Frameworks, Enter Spring, Spring's values, Spring in Context: Technologies- Inversion of Control and Dependency Injection, Aspect-Oriented Programming, Consistent Abstraction, Resource Management, Techniques. Relationship to Other Frameworks: Persistence Frameworks, Web Frameworks, AOP Frameworks, Other Frameworks. Architecting Applications with Spring: The Big Picture, Persistence and Integration-Database, Data Access Objects. Persistent Domain Objects, Persistence Technology, Business Service Objects, Presentation, Web Tier, Remote Access Facade. A simple program in Spring framework.

TEXT BOOKS / REFERENCES:**Text Books:**

1. Marty Hall, Larry Brown. Core Servlets and Java Server Pages. Volume 1: Core Technologies. Second Edition. 2014.
2. Java 6 Programming Black Book, Dreamtech Press. 2012.
3. Andrew Lee Rubinger, Bill Burke. Developing Enterprise Java Components. Enterprise JavaBeans 3.1.O'reilly. 2010.
4. Rod Johnson, Juergen Hoeller, Alef Arendsen, Thomas Risberg, Colin Sampaleanu. Professional Java Development with the Spring Framework, John Wiley, Wrox publications, 2005.

Reference Books:

1. Michael Sikora, EJB 3 Developer Guide, A practical guide for developers and architects to the Enterprise Java Beans Standard, Shroff Publishers & Distributors PVT LTD. July 2008.
2. Herbert Schildt, Java - The Complete Reference, Ninth Edition. Comprehensive coverage

of the Java Language. Tata McGraw-Hill Edition – 2014.

3. Craig Walls. Spring in Action.4th Edition, Manning-Dreamtech Press-2015

ADDITIONAL LEARNING SOURCES:

1. www.j2eetutorials.50webs.com
2. www.docs.oracle.com/javaee/6/tutorial/doc/
3. www.tutorialspoint.com/listtutorials/java/j2ee/1
4. www.coderanch.com/t/534906/EJB-JEE/java/Tutorial-EE-Beginners
5. <http://w3schools.invisionzone.com/index.php?showforum=52>
6. <http://www.javagenious.com/search/jsp-tutorial-w3schools/>
7. http://gsraj.tripod.com/java/java_tutorial.html
8. <http://docs.spring.io/spring/docs/current/spring-framework-reference/html/overview.html>
9. <http://courses.springframework.guru/p/introduction-to-spring>
10. <http://spring.org>

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	M	H	H	H	H	H	H	M	M	M	H	M
CO2	H	M	H	M	M	M	H	L	M	M	M	L
CO3	H	M	H	M	M	M	H	L	M	M	M	L
CO4	H	M	M	M	M	M	H	L	M	M	M	L
CO5	M	H	H	H	H	H	H	M	H	M	H	H

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Theory	04	04	00	00	52
Course No		Course Title				Pre Requisites	
MCA 220		Analysis and Design of Algorithms using C++				--	

COURSE ASSESSMENT METHOD:

Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]

Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO 1:** Understanding basic ideas about C++.
- CO 2:** Understanding the concepts of time and space complexity, worst case, average case and best case complexities and the big-O notation.
- CO 3:** Understanding the range of behaviors of algorithms and the notion of tractable and intractable problems.
- CO 4:** Knowing and understanding a wide range of searching and sorting algorithms.
- CO 5:** Developing efficient algorithms for simple computational tasks and computing complexity measures of algorithms, including recursive algorithms using recurrence relations.

TOPICS COVERED:**UNIT 1 - Introduction and overview of C++ Programming****12 Hours**

C++ Class Overview- Class Definition, OOPs concepts ,Objects, Class Members, Access Control,

Class Scope, Inheritance and Polymorphism ,Constructors and destructors, parameter passing methods, Inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete), Exception handling.

UNIT 2 - Introduction and the fundamentals of the Analysis of Algorithm Efficiency

12 Hours

Notion of Algorithm, Fundamentals of Algorithmic Problem Solving, Important Problem Types, Fundamental data Structures. Analysis Framework, Asymptotic Notations and Basic efficiency classes, Mathematical analysis of Recursive and Non-recursive algorithms, Examples

UNIT 3 - Brute Force and Divide and Conquer

10 Hours

Selection Sort and Bubble Sort, Sequential Search and String Matching, Exhaustive Search, Merge-sort, Quick-sort, Binary Search, Binary tree Traversals and related properties.

UNIT 4 - Decrease-and-Conquer, Transform-and-Conquer

10 Hours

Insertion Sort, Depth First search and Breadth First Search, Topological sorting, Algorithms for Generating Combinatorial Objects. Presorting, Balanced Search Trees, Heaps and Heap sort, Problem Reduction.

UNIT 5 - Space and Time Tradeoffs and Dynamic Programming

10 Hours

Sorting by Counting, Input Enhancement in String Matching, Computing a binomial coefficient, Warshall's and Floyd's Algorithms, The Knapsack Problem and Memory Functions.

Text Book:

1. Anany Levitin: Introduction to the Design and Analysis of Algorithms, Pearson Education, 2003.
2. Herbert Scheldt: The Complete Reference C++, 6th Edition, Tata McGraw Hill 2013.

References:

1. Cormen T.H., Leiserson C.E., and Rivest R.L.: Introduction to Algorithms, PHI, 1998.
2. Horowitz E., Sahani S., Rajasekharan S.: Computer Algorithms, Galgotia Publications, 2001.

ADDITIONAL LEARNING SOURCES:

1. https://www.tutorialspoint.com/data_structures_algorithms/
2. <http://nptel.ac.in/courses/106101060/>

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	M	H	H	H	H	H	H	M	M	M	H	M
CO2	H	M	H	M	M	M	H	L	M	M	M	L
CO3	H	M	H	M	M	M	H	L	M	M	M	L
CO4	H	M	M	M	M	M	H	L	M	M	M	L
CO5	M	H	H	H	H	H	H	M	H	M	H	H

JSS MAHAVIDYAPEETHA
JSS Science and Technology University, Mysuru,
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Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Theory	04	04	00	00	52
Course No		Course Title				Pre Requisites	
MCA230		Software Engineering				Management Information system	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO1:** Account for what is significant for a software engineering approach to software development and the principles behind it.
- CO2:** Make judgment about applicability of techniques in some project.
- CO3:** Easily adapt to work processes using software engineering techniques.
- CO4:** Apply software testing and quality assurance techniques at the module level, and understand these techniques at the system and organization level
- CO5:** The ability to work in one or more significant application domains and to manage the development of software system.

TOPICS COVERED:

UNIT 1 - Introduction to Agile software Development:

12 Hours

Overview, Objectives ,Three Perspectives on Software Engineering , The Agile Manifesto ,

Individuals and Interactions over Processes and Tools, Working Software over Comprehensive Documentation, Customer Collaboration over Contract, Negotiation, Responding to Change over Following a Plan, Application of Agile Software Development , Data About Agile Software Development, Agile Software Development in Learning Environments University Course Structure, Teaching and Learning Principles, The Studio Environment, The Academic Coach Role , Overview of the Studio Meetings. Teamwork: Overview, Objectives, A Role Scheme in Agile Teams, Remarks on the Implementation of the Role Scheme, Human Perspective on the Role Scheme, Using the Role Scheme to Scale Agile Projects, Dilemmas in Teamwork, Teamwork in Learning Environments, Teaching and Learning Principles, Role Activities, Student Evaluation. Customers and Users: Overview, Objectives, The Customer, Customer Role, Customer Collaboration, The User, Combining UCD with Agile Development, Customers and Users in Learning Environments, Teaching and Learning Principles, Customer Stories.

UNIT 2 - Time

10 Hours

Overview, Objectives, Time-Related Problems in Software Projects, List of Time-Related Problems of Software Projects. the Time Perspective, Tightness of Software Development Methods, Sustainable Pace, Time Management of Agile Projects, Time Measurements, Prioritizing Development Tasks, Time in Learning Environments, The Planning Activity, Teaching and Learning Principles, Students' Reflections on Time-Related Issues, The Academic Coach's Perspective. Measures: Overview, Objectives, Why Are Measures Needed, Who Decides What Is Measured? What Should Be Measured, When Are Measures Taken? How Are Measures Taken? Who Takes the Measures? How Are Measures Used? Case Study, Monitoring a Large-Scale Project by Measures, Measure Definition, Measure Illustration, Measures in Learning Environments, Teaching and Learning Principles, Measurement Activities.

UNIT 3–Quality

10 Hours

Overview, Objectives, The Agile Approach to Quality Assurance, Process Quality, Product Quality, Test-Driven Development, How Does TDD Help to Overcome Some of the Problems Inherent in Testing, Learning: Overview, Objectives, Study Questions, How Does Agile Software

Development Support Learning Processes, Agile Software Development from the Constructivist Perspective, The Role of Short Releases and Iterations in Learning Processes, Learning in Learning Environments, Gradual Learning Process of Agile Software Engineering, Learning and Teaching Principle, The Studio Meeting, End of the First Iteration, Intermediate Course Review and Reflection, Abstraction: Overview, Objectives, Study Questions, Abstraction Levels in Agile Software Development, Roles in Agile Teams.

UNIT 4 - Planning:

10 Hours

The Stand-Up Meeting, Design and Refactoring, Abstraction in Learning Environments, Teaching and Learning Principles. Trust: Overview, Objectives, Software Intangibility and Process Transparency, Game Theory Perspective in Software Development, Ethics in Agile Teams, Diversity, Trust in Learning Environments, Teaching and Learning Principle. Globalization: Overview, Objectives, Study Questions, The Agile Approach in Global Software Development, Communication in Distributed Agile Teams, Planning in Distributed Agile Projects, Case Study, Tracking Agile Distributed Projects, Reflective Processes in Agile Distributed Teams, Organizational Culture and Agile Distributed Teams, Application of Agile Principles in Non-Software Projects.

UNIT 5–Reflection

10 Hours

Overview, Objectives, Case Study, Reflection on Learning in Agile Software Development, Reflective Practitioner Perspective, Retrospective, The Retrospective Facilitator, Case Study, Guidelines for a Retrospective Session, Application of Agile Practices in Retrospective Sessions, End of the Release Retrospective, Reflection in Learning Environments. Change: Overview, Objectives, A Conceptual Framework for Change Introduction, Changes in Software Requirements, Organizational Changes, Transition to an Agile Software Development Environment. Leadership: Overview, Objectives, Leaders, Leadership Styles, Case Study, The Agile Change Leader, Coaches, Leadership in Learning Environments, Teaching and Learning Principles. Delivery and Cyclicity: Overview, Objectives, Delivery, Towards the End of the Release, Release Celebration, Reflective Session Between Releases, Cyclicity, Delivery and Cyclicity in Learning Environments, The Delivery in the Studio, Teaching and Learning Principles.

TEXT BOOKS / REFERENCES:

Text books:

Orit Hazzan and Yael Dubinsky, Agile Software Engineering, Springer, 2009

Reference books:

1. Cockburn, Agile Software Development, Pearson Education India
2. Mike Cohn, Agile Estimating and Planning, Pearson Education, 2005
3. Michele Sliger, StaciaBroderick, The Software Project Manager's Bridge to Agility, Addison-Wesley Professional, 2008

ADDITIONAL LEARNING SOURCES:

1. www.allaboutagile.com/what-is-agile-10-key-principles/
2. <https://www.versionone.com/agile-101>

CO-PO MAPPING:

[illegible]

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
MCA240	Operating System with Linux	--

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

- CO1:** Know the basic components of operating systems, and understand their interrelationships, basics behind multi-process and multi-threaded programming.
- CO2:** Be familiar with current issues in operating-system-based system security; understand how various factors can influence the overall performance of an operating system.
- CO3:** understand the major parts of an operating system and how they work.
- CO4:** Learn the various resource management techniques for distributed systems.
- CO5:** Identify the different features of real time and mobile operating systems

TOPICS COVERED:

UNIT 1- Computer and Operating Systems Structure

11 Hours

Basic Elements, Processor Registers, Instruction Execution, The Memory Hierarchy, Cache Memory, I/O Communication Techniques, Introduction to Operating System, Mainframe Systems, Desktop Systems, Multiprocessor Systems, Distributed Systems, Clustered Systems, Real - Time Systems, Handheld Systems, Feature Migration, Computing Environments.

System Structures: System Components, Operating – System Services, System Calls, System Programs, System Structure, Virtual Machines, System Design and Implementation, System Generation

UNIT 2 - Process Management and Mutual Execution

10 Hours

Process, Process States, Process Description, Process Control, Execution of the Operating System, Security Issues, Processes and Threads, Symmetric Multiprocessing(SMP), Micro kernels, CPU Scheduler and Scheduling. Principles of Concurrency, Mutual Exclusion: Hardware Support, Semaphores, Monitors, Message Passing, Readers/Writes Problem.

UNIT 3 - Deadlock and Memory Management

11 Hours

Principles of Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, An Integrated Deadlock Strategy, Dining Philosophers Problem Memory Management: Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Process Creation, Page Replacement, Allocation of Frames, Thrashing

UNIT 4 - File System and Secondary Storage

10 Hours

File Concept, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection, File – System Structure, File – System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Disk Structure, Disk Scheduling, Disk Management.

UNIT 5 - Computer Security and Case study of Linux Operating system**10 Hours**

The Security Problem, User Authentication, Program Threats, System Threats. Linux System Linux history, Design Principles, Kernel modules, Process, management, scheduling, Memory management, File systems, Input and output, Inter-process communications.

TEXT BOOKS/REFERENCES:**TEXT BOOKS :**

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne: Operating System Principles, 8th edition, Wiley India, 2009.
5. William Stallings, "Operating System Internals and Design Principles" Pearson, 6th edition, 2012

REFERENCES:

1. Dhananjay M. Dhamdhere, "Operating Systems – A Concept – Based Approach", Tata McGraw – Hill, 3rd Edition, 2012.
2. Harvey M Deital: Operating systems, 3rd Edition, Pearson Education, 1990.
3. Chakraborty , "Operating Systems" Jaico Publishing House, 2011

ADDITIONAL RESOURCES:

1. https://www.tutorialspoint.com/operating_system/os_linux
2. <https://www.cs.uic.edu/~jbell/CourseNotes/OperatingSystems>.

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	L	M	L	M	M	M	M	M	M
CO2	H	H	M	H	M	M	M	H	M	M	M	H
CO3	H	M	M	H	M	M	H	H	H	H	H	M
CO4	M	H	L	M	M	H	H	M	M	M	H	H
CO5	M	M	H	M	H	H	M	M	H	H	M	H

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru,
Department of Master of Computer Applications [MCA].**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Theory	04	04	00	00	52
Course No		Course Title				Pre Requisites	
MCA250		Relational Database Management System				Data Structures	

COURSE ASSESSMENT METHOD:

Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]

Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO1:** Understand the modern data management issues, advantages of RDBMS over conventional file handling
- CO2:** Analyse the concepts of data models and modeling notations, use of SQL, algebraic expressions/ operations on relational database.
- CO3:** Handle the RDB, extraction / evaluation of DB using SQL using tuple relations and calculus.
- CO4:** Exposed to entity-relation model, design of schema.
- CO5:** Justify the need of normalization, normalize the RDB up to BCNF

TOPICS COVERED:**UNIT 1 – Introduction****10 Hours**

Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Information Retrieval, Specialty Databases, Database Users and Administrators, History of Database Systems.

Introduction to the Relational Model:

Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

UNIT 2 – Introduction to SQL**10 Hours**

Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Subqueries, Modification of the Database.

Intermediate SQL:

Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization.

UNIT 3 - Advanced SQL**10 Hours**

Accessing SQL From a Programming Language, Functions and Procedures, Triggers, Recursive Queries, Advanced Aggregation Features, OLAP.

Formal Relational Query Languages:

The Relational Algebra, The Tuple Relational Calculus, The Domain Relational Calculus.

UNIT 4-Database Design and the E-R Model**10 Hours**

Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-

Relationship Design Issues, Extended E-R Features, Alternative Notations for Modeling Data, Other Aspects of Database Design.

UNIT 5 – Relational Database Design

12 Hours

Features of Good Relational Design, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional Dependency Theory, Algorithm for Decomposition, Decomposition Using Multivalued Dependencies, More Normal Forms, Database-Design Process, Modeling Temporal Data.

TEXT BOOKS / REFERENCES:

Text Books :

1. “Database System Concepts”, A.Silberschatz, Henry.F.Korth, S.Sudharshan, 6th Edition.
2. “Database Systems”, Ramez Elmasri, Shamkant.B.Navathe, 6th Edition.

Reference Books:

9. “Database Management Systems”, Raghu Ramakrishnan and J Gehrke 3rd Edition
10. “An Introduction to Database System” C.J.Date , AKannan, S..Swamynathan 8th Edition

ADDITIONAL LEARNING SOURCES:

1. www.tutorialspoint.com/sql/sql-rdbms-concepts.htm
2. nptel.ac.in/courses/106106093/6
3. msdis.missouri.edu/resources/gis_advanced/pdf/relational.pdf

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	H	M	L	K	L	M	M	M	M
CO2	H	H	M	H	M	L	M	L	M	M	M	M
CO3	H	H	H	H	M	L	M	L	L	M	L	L
CO4	H	M	M	M	L	L	L	L	L	M	L	L
CO5	H	L	M	H	L	L	M	M	M	L	M	L

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru,
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Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Theory	02	02	00	00	26
Course No		Course Title				Pre Requisites	
MCA260		Soft Skills					

COURSE ASSESSMENT METHOD:

. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]

. Semester End Exam [50 Marks, 1½ Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO 1:** Understand the basics of communication, barriers of communication
- CO 2:** Understand the importance of ethics in information.
- CO 3:** Manage tasks and relationships among the team using leadership skills.
- CO 4:** Develop knowledge on creativity, idea generation and innovation.
- CO 5:** Understanding entrepreneurship and its opportunities

TOPICS COVERED:**UNIT:1 – Basics of Communication****05 Hours**

Communication, Basics of technical communication, barriers of communication, Technology in Communication Active listening: types, traits and implications, and effective presentation strategies.

UNIT:2 – Overview of Ethics in IT**05 Hours**

What are Ethics: Definition of ethics, Importance of Integrity, Ethics in the Business world. Ethics in Information Technology (IT). IT professionals, The Ethical behavior of IT professionals, IT Users: Common ethical issues for IT users, Supporting the ethical practices of IT users.

UNIT:3 – Individuals as leaders, Leadership traits**05 Hours**

Leadership is everyone's business, leadership managerial roles, levels of analysis of leadership theory, leadership theory paradigms. Personality traits and leadership, traits of effective leaders, leadership attitudes, ethical leadership. Leadership behavior and styles.

UNIT:4 – Introduction to Innovation**05 Hours**

Innovation: Definition, Types & Forms, Difference between Innovation, Invention and Discovery, Interesting Techniques of Innovations SCAMPER, Difference between Creativity (Ability) & Innovation (Process), Creativity, Innovation and Entrepreneurship, Critical Thinking and Creative Thinking, Strategy vs. Innovation, Where do Innovation come from?, Workable, Working and Profiting Ideas, Innovation: Publish & Prosper.

UNIT:5 – Entrepreneurship**06 Hours**

Meaning of entrepreneur: Evolution of the concept: Functions of an Entrepreneur, Types of Entrepreneur, Entrepreneur- an emerging class, Concept of Entrepreneurship-Evolution of Entrepreneurship: Development of Entrepreneurship; The Entrepreneurial Culture; Stages in Entrepreneurial process.

TEXT BOOKS / REFERENCES:**Text books:**

1. Meenakshi Raman and Sangeeta Sharma, Technical communication principles and practices,

Oxford University press 2004.

2. George Reynolds, Ethics in Information Technology, 2nd Edition, Thomson Course Technology, 2007.
3. Lussier/Achua, Effective Leadership, 3rd Edition, Thomson Education , India edition, 2010.
4. Rajiv V Dharaskar, Innovation – Growth Engine for Nation, Shroff Publishers & Distributors Pvt. Ltd. 2014.
5. Poornima Charantimath, Entrepreneurship Development-Small Business Enterprise-Pearson Education, 2007

Reference books:

1. Diana Winstanley : Personal Effectiveness , 1st Edition, Excel books, 2009.
2. Northouse, P. G. (2013). (6th ed.) Leadership: Theory and Practice. Thousand Oaks:CA: Sage Publications.
3. Dr.Mathe J Manimala, Entrepreneurship Theory at crossroads, Biztantra, 2007.
4. Vasant Desai, Entrepreneurship Development and Management, Himalaya Publishing House, 2007.
5. Raj Shankar, Entrepreneurship-Theory and Practice, Vijay Nicole Imprints Pvt. Ltd, 2006.

ADDITIONAL LEARNING SOURCES:

1. <https://www.ted.com/topics/communication>
2. <https://nptel.ac.in/courses/109104031/>
3. www.directionservice.org/cadre/section4.cfm.
4. <https://www.reference.com/business-finance/importance-ethics-information-technologyaa2450ed890d3574>
5. <http://www.useoftechnology.com/5-ethical-challenges-information-technology/>
6. https://www.ted.com/playlists/329/new_tech_new_morals
7. https://www.ted.com/talks/jason_pontin_can_technology_solve_our_big_problems

CO - PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	M	H	M	M	M	M	M	M	H	M	M	M
CO2	H	M	M	H	M	M	H	H	M	M	L	L
CO3	M	M	M	M	M	H	H	M	H	H	M	L
CO4	H	M	M	H	M	M	M	M	M	M	L	L
CO5	H	H	H	H	M	M	H	M	M	M	L	H

JSS MAHAVIDYAPEETHA

JSS Science and Technology University, Mysuru

Department of Master of Computer Applications [MCA]

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Laboratory	01	00	03	00	48

Course No	Course Title	Pre Requisites
MCA21L	Advanced Java Programming Laboratory	Java Programming

. Internal Assessment [5 Events: Test1 + Test2 + Observation book + Record + Viva-voce] Marks: 50 [15+15+10+5+5]

Upon successful completion of this course, students will be able to:

- CO1 :** Understand Enterprise Application Architecture and J2EE, and develop Database applications using JDBC.
- CO2 :** Understand the concept of Server side applications using Servlets and develop server side applications.
- CO3 :** Understand JSP and write applications using JSP
- CO4 :** Design and develop components using Java Beans and understand Annotations
- CO5 :** Apply the concept of middle & Data Based application layers for an enterprise application using Enterprise Java Beans (EJB) and learn to develop the Server Side Component Models.

1. Create a Static web page using HTML.
2. Write a JDBC program to establish connection to a Database
3. Write a JDBC program to INSERT, UPDATE, DELETE records to the Database using

Statement Object

4. Write a JDBC program to INSERT, UPDATE, DELETE records to the Database using PreparedStatement Object
5. Write a JDBC program to INSERT, UPDATE, DELETE records to the Database using Statement Object With Batch Insert, Update & Delete.
6. Write a JDBC program to INSERT, UPDATE, DELETE records to the Database using PreparedStatement Object with Batch Insert, Update & Delete.
7. Write a servlet program to display hello world.
8. Write a servlet program to generate a plain text and HTML output.
9. Write a servlet program to generate lottery numbers
10. Write a servlet program to demonstrate single thread model.
11. Write a servlet program to read three parameters from Form Data
12. Write a servlet program to read all data from Form data.
13. Write a servlet program to demonstrate response header.
14. Write a servlet program to show request header.
15. Write a servlet program to display number of visitors visited the page.
16. Write a servlet program to handle cookies.
17. Write a servlet program to demonstrate session tracking
18. Create a simple Login application using HTML, MySQL, Servlet and Web-XML.
19. Create a simple User Registration application using HTML, MySQL, Servlet and Web-XML.
20. Write a Servlet program to generate an output in different MIMEs (Excel, HTML, PDF etc.)
21. Write a JSP program to read three parameters from another JSP page and display.
22. Write a JSP program to display Sales entry information.
23. Write a JSP program to test the background color of the page
24. Write a JSP program to generate access counter.
25. Write a JSP program which conditionally generates a spreadsheet
26. Write a program to generate a Plug in Applet using JSP
27. Write a program to generate a string bean using JSP
28. Write a program to create a Excel sheet using JSP
29. Write a program to create a Bean sheet using

30. Write a program to create a reusable footer using JSP
31. Write a program to count the shared counts using JSP.
32. Write a Program which includes files using JSP
33. Write a JSP program which generates the wishes for the day based on time.
34. Write a JSP program to generate random numbers.
35. Write a JSP program to generate a order confirmation by taking the order details from the user.
36. Write a JSP program which should compute the speed.
37. Create a Java Bean component for generating the access counter for the page visit on Click Button event. Use this bean component as reference to a new project and demonstrate the functionality of the Bean and its reusability.
38. Create a simple application using JSP, Servlets, JDBC, MIME, Java Bean and MySQL to accept the details from the student and display the marks list for the student with grade (Reference – your previous semester marks card)
39. Design and develop any application of your own using EJB Components (Session, Message Driven and Entity Bean)
40. Design and develop a simple application using spring frame work.

TEXT BOOKS / REFERENCES:

Text Books:

1. Marty Hall, Larry Brown. Core Servlets and Java Server Pages. Volume 1: Core Technologies. Second Edition.
2. Java 6 Programming Black Book, Dreamtech Press. 2012.
3. Andrew Lee Rubinger, Bill Burke. Developing Enterprise Java Components. Enterprise JavaBeans 3.1.O'reilly.
4. Rod Johnson, Juergen Hoeller, Alef Arendsen, Thomas Risberg, Colin Sampaleanu. Professional Java Development with the Spring Framework, John Wiley, Wrox publications, 2005.

Reference Books:

1. Michael Sikora, EJB 3 Developer Guide, A practical guide for developers and architects to the Enterprise Java Beans Standard, Shroff Publishers & Distributors PVT LTD. July 2008.
2. Craig Walls. Spring in Action.4th Edition, Manning-Dreamtech Press-2015

ADDITIONAL LEARNING SOURCES:

1. www.j2eetutorials.50webs.com
2. www.docs.oracle.com/javase/6/tutorial/doc/
3. www.tutorialspoint.com/listtutorials/java/j2ee/1
4. www.coderanch.com/t/534906/EJB-JEE/java/Tutorial-EE-Beginners
5. www.j2eebrain.com/
6. <http://w3schools.invisionzone.com/index.php?showforum=52>
7. <http://www.javagenious.com/search/jsp-tutorial-w3schools/>
8. http://gsraj.tripod.com/java/java_tutorial.html

CO - PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	H	H	H	H	M	M	M	H	M
CO2	H	M	H	M	H	M	H	L	M	M	M	L
CO3	H	M	H	M	H	M	H	L	M	M	M	L
CO4	H	M	M	M	H	M	H	L	M	M	M	L
CO5	H	H	H	H	H	H	H	M	H	M	H	H

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Laboratory	01	00	03	00	48

Course No	Course Title	Prerequisites
MCA22L	Algorithms with C++ Laboratory	C Programming

COURSE ASSESSMENT METHOD:

Internal Assessment [Test-1+Test-2+Observation book + Record + Viva : 15 + 15 + 05 + 05 +10 = 50marks]

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Implement OOPs and C++ programming aspects.

CO2: Understand the importance of structure and abstract data type, and their basic usability in different applications through different programming languages.

CO3: Understand different sorting techniques with its running time analysis.

CO4: Implement various shortest paths algorithms.

CO5: Implement various string matching algorithms to solve various real time problems.

LIST OF EXPERIMENTS COVERED:

1. Implement Recursive Binary search and Linear search and determine the time required to search an element. Repeat the experiment for different values of n, the number of elements in the list to be searched and plot a graph of the time taken versus n.

2. Sort a given set of elements using the Heapsort method and determine the time required to sort the elements. Repeat the experiment for different values of n , the number of elements in the list to be sorted and plot a graph of the time taken versus n .
3. Sort a given set of elements using Merge sort method and determine the time required to sort the elements. Repeat the experiment for different values of n , the number of elements in the list to be sorted and plot a graph of the time taken versus n .
4. Sort a given set of elements using Selection sort and determine the time required to sort elements. Repeat the experiment for different values of n , the number of elements in the list to be sorted and plot a graph of the time taken versus n .
5. Implement 0/1 Knapsack problem using dynamic programming.
6. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.
7. Sort a given set of elements using Quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n , the number of elements in the list to be sorted and plot a graph of the time taken versus n .
8. Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.
9.
 - a. Print all the nodes reachable from a given starting node in a digraph using BFS method.
 - a. b. Check whether a given graph is connected or not using DFS method.
10. Find a subset of a given set $S = \{s_1, s_2, \dots, s_n\}$ of n positive integers whose sum is equal to a given positive integer d . For example, if $S = \{1, 2, 5, 6, 8\}$ and $d = 9$ there are two solutions $\{1, 2, 6\}$ and $\{1, 8\}$. A suitable message is to be displayed if the given problem

instance doesn't have a solution.

11. a. Implement Horspool algorithm for String Matching.

a. b. Find the Binomial Co-efficient using Dynamic Programming.

12. Find Minimum Cost Spanning Tree of a given undirected graph using Prim's

a. algorithm.

13. Implement Floyd's algorithm for the All-Pairs- Shortest-Paths problem.

a. Compute the transitive closure of a given directed graph using Warshall's algorithm.

14. Implement N Queen's problem using Back Tracking.

TEXT BOOKS/ REFERENCES :

Text Books:

1. Herbert Schildt: The Complete Reference C++, 6th Edition, Tata McGraw Hill 2013.

Reference Books:

1. Data structures, Algorithms and Applications in C++, S. Sahani, University Press (India) Pvt.Ltd, 2nd Edition.

ADDITIONAL LEARNING SOURCES:

1. https://www.tutorialspoint.com/data_structures_algorithms/

2. <http://nptel.ac.in/courses/106101060/>

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	M	M	L	M	M	L	L	M	L
CO2	H	M	L	M	M	L	L	L	L	M	M	M
CO3	H	H	H	H	M	L	M	M	L	L	L	M
CO4	M	M	L	M	L	L	L	L	M	L	M	L
CO5	H	H	H	H	M	M	M	M	L	L	L	L

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				Theory	Laboratory	Tutorials	
I	II	Laboratory	01	00	03	00	48
Course No		Course Title				Pre Requisites	
MCA23L		Software Engineering Laboratory				Management Information	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [Test-1 + Test-2 + Observation book + Record + Viva : 15 + 15 + 05 + 05 +10]
Marks: 50

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to

- CO1:** Account for what is significant for a software engineering approach to software development and the principles behind it.
- CO2:** Make judgment about applicability of techniques in some project.
- CO3:** Easily adapt to work processes using software engineering techniques.
- CO4:** Apply software testing and quality assurance techniques at the module level, and understand these techniques at the system and organization level
- CO5:** The ability to work in one or more significant application domains and to manage the development of software system.

LIST OF EXPERIMENTS COVERED:**Case Studies**

1. Case Studies of Metaphor Use
2. Software Organizational Survey from
3. An Iteration Timetable of an Agile Team

4. Role-Related Measures.
5. Reflection on TDD , Measured TDD
6. Quality in Learning Environments
7. Size and Complexity Measures
8. Abstraction During Iteration
9. Book Writing, Globalization in Learning Environments, Teaching and Learning Principles,
10. Follow-the-Sun with Agile Development.
11. A Report of an Organizational Survey
12. Applying an Agile Process to a Transition Process

Based on case studies develop application.

Project Work

Objective: Understand Importance of SDLC approach & various processes.

Problem Description: Software Development Life cycle involve multiple phases like Requirement analysis, Design, Coding, Testing & Maintenance. In each phase certain activities are performed to deliver the deliverables or outcome eg. From Requirement Analysis phase outcome is SRS document which is input to the Design phase. Project group is assigned with a project and asked to perform the complete cycle of SDLC.

Following are some instruction related to the project work,

1. Project group has to collect the required information related to the assigned system/project.
2. Project group has to develop the project and deliver the deliverables on the timelines given by the Teacher.
3. On the completion of duration, each project group has to submit a project report. The teacher will evaluate the report.
4. The Implementation of project will be done Pseudo code
5. Report submission.

Work Tasks	Assigned Persons	Remarks
Requirement Gathering		

Requirement Analysis			
Object Oriented analysis			
Coding			
Testing			
Reviews and Check Lists			
Project Completed			

TEXT BOOKS / REFERENCES:

Text books:

Orit Hazzan and Yael Dubinsky, Agile Software Engineering, Springer 2009

Reference books:

1. Cockburn, Agile Software Development, Pearson Education India
2. Mike Cohn, Agile Estimating and Planning, Pearson Education, 2005
3. Michele Sliger, Stacia Broderick, The Software Project Manager's Bridge to Agility, Addison-Wesley Professional, 2008

ADDITIONAL LEARNING SOURCES:

1. www.allaboutagile.com/what-is-agile-10-key-principles/
2. <https://www.versionone.com/agile-101>

CO-PO MAPPING:

[illegible]

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Laboratory	01	00	03	00	48

Course No	Course Title	Pre Requisites
MCA24L	Operating System and Linux Laboratory	---

COURSE ASSESSMENT METHOD:

1. Internal Assessment [Test-1 + Test-2 + Observation book + Record + Viva : 15 + 15 + 05 + 05 +10] Total Marks: 50

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Understand and implement basic services and functionalities of the operating system using system calls.

CO2: Use modern operating system calls and synchronization libraries in software/ hardware interfaces.

CO3: Understand the benefits of thread over process and implement synchronized programs using multithreading concepts.

CO4: Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority.

CO5: Implement memory management schemes and page replacement schemes.

LIST OF EXPERIMENTS COVERED:

1. Execution of various file/directory handling commands.
2. Simple shell script for basic arithmetic and logical calculations.
3. Shell scripts to check various attributes of files and directories.
4. Shell scripts to perform various operations on given strings.
5. Shell scripts to explore system variables such as PATH, HOME etc.
6. Shell scripts to check and list attributes of processes.
7. Execution of various system administrative commands.
8. Write awk script that uses all of its features.
9. Use sed instruction to process /etc/passwd file.
10. Write a shell script to display list of users currently logged in.
11. Write a shell script to delete all the temporary files.
12. Write a shell script to search an element from an array using binary searching.
13. Write a C program to simulate the following non-preemptive CPU scheduling algorithms to find turnaround time and waiting time.
 - a) FCFS b) SJF c) Round Robin d) Priority
14. Write a C program to simulate multi-level queue scheduling algorithm considering the following scenario. All the processes in the system are divided into two categories – system processes and user processes. System processes are to be given higher priority than user processes. Use FCFS scheduling for the processes in each queue.
15. Write a C program to simulate the following file allocation strategies.
 - a) Sequential b) Indexed c) Linked
16. Write a C program to simulate the MVT and MFT memory management techniques.
17. Write a C program to simulate the following contiguous memory allocation techniques
 - a) Worst-fit b) Best-fit c) First-fit
18. Write a C program to simulate paging technique of memory management.
19. Write a C program to simulate the following file organization techniques
 - a) Single level directory b) Two level directory c) Hierarchical
20. Write a C program to simulate Bankers algorithm for the purpose of deadlock avoidance
21. Write a C program to simulate disk scheduling algorithms

a) FCFS b) SCAN c) C-SCAN

22. Write a C program to simulate page replacement algorithms

a) FIFO b) LRU c) LFU

23. Write a C program to simulate page replacement algorithms

a) Optimal

24. Write a C program to simulate producer-consumer problem using semaphores

25. Write a C program to simulate the concept of Dining-Philosophers problem.

TEXT BOOKS/REFERENCES:

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne: Operating System Principles, 8th edition, Wiley India, 2009.
2. William Stallings, "Operating System Internals and Design Principles" Pearson, 6th edition.

REFERENCES:

1. Dhananjay M. Dhamdhare, "Operating Systems – A Concept – Based Approach", Tata McGraw – Hill, 3rd Edition, 2012.
2. Harvey M Deital: Operating systems, 3rd Edition, Pearson Education, 1990.
3. Chakraborty, "Operating Systems" Jaico Publishing House, 2011

ADDITIONAL RESOURCES:

1. https://www.tutorialspoint.com/operating_system/
2. <http://www.scoopworld.in/search/label/CSE>

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	M	M	M	M	M	H	L	L	H
CO2	H	M	M	H	M	L	M	H	H	H	H	M
CO3	M	M	M	H	M	L	H	H	M	H	M	M
CO4	M	M	M	H	H	M	H	M	M	M	M	M
CO5	M	M	M	H	H	H	L	L	L	M	H	H
CO6	H	H	M	H	M	H	M	L	L	H	H	H

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				Theory	Laboratory	Tutorials	
I	II	Laboratory	01	00	03	00	48
Course No		Course Title				Pre Requisites	
MCA25L		Relational Database Management System Laboratory				Data Structures	

COURSE ASSESSMENT METHOD:

Internal Assessment [Test-1+ Test-2 + Observation book + Record + Viva: 15 + 15 + 05 + 05 +10 = 50 Marks]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to :

- CO 1:** Analyse the concepts of data models and modeling notations
- CO 2:** Use of SQL, algebraic expressions/ operations on relational database
- CO 3:** To introduce the concepts of transactions and transaction processing
- CO 4:** Design the queries to handle all the basic and advanced operations on RDBMS
- CO 5:** Design of applications which handles the operations involved in RDBMS

List of Programs:

1. Consider the following relations:

Student (snum: integer, sname: string, major: string, level: string, age: integer)

Class (name: string, meets at: string, room: string, d: integer)

Enrolled (snum: integer, cname: string)

Faculty (fid: integer, fname: string, deptid: integer)

The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class. Level is a two character code with 4 different values (example: Junior: JR etc)

Write the following queries in SQL. No duplicates should be printed in any of the answers.

- a. Find the names of all Juniors (level = JR) who are enrolled in a class taught by Prof. XYZ
- b. Find the names of all classes that either meet in room R128 or have five or more Students enrolled.
- c. Find the names of all students who are enrolled in two classes that meet at the same time.
- d. Find the names of faculty members who teach in every room in which some class is taught.
- e. Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five.

2. The following relations keep track of airline flight information:

Flights (no: int, from: string, to: string, distance: int, Departs: time, arrives: time, price:real)

Aircraft (aid: integer, aname: string, cruisingrange: integer)

Certified (eid: integer, aid: integer)

Employees (eid: integer, ename: string, salary: integer)

Note that the Employees relation describes pilots and other kinds of employees as well; certified for some aircraft, and only pilots are certified to fly.

Write each of the following queries in SQL.

- a. Find the names of aircraft such that all pilots certified
- b. Find the names of aircraft such that all pilots certified to operate have salaries more than Rs.80, 000.
- c. For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruisingrange of the aircraft for which she or he is certified
- d. Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to Frankfurt.

- e. For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average salary of all pilots certified for this aircraft.
- f. Find the names of pilots certified for some Boeing aircraft.
- g. Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.

3. Consider the following database of student enrollment in courses & books adopted for each course.

STUDENT (regno: string, name: string, major: string, bdate:date)

COURSE (course #:int, cname:string, dept:string)

ENROLL (regno:string, course#:int, sem:int, marks:int)

BOOK _ ADOPTION (course# :int, sem:int, book-ISBN:int)

TEXT (book-ISBN:int, book-title:string, publisher:string, author:string)

- a. Create the above tables by properly specifying the primary keys and the foreign keys.
- b. Enter at least five tuples for each relation.
- c. Demonstrate how you add a new text book to the database and make this book be adopted by some Department.
- d. Produce a list of text books (include Course #, Book-ISBN, Book-title) in the alphabetical order for Courses offered by the 'CS' department that use more than two books.
- e. List any department that has all its adopted books published by a specific publisher.
- f. Generate suitable reports.
- g. Create suitable front end for querying and displaying the results.

4. The following tables are maintained by a book dealer.

AUTHOR (author-id:int, name:string, city:string, country:string)

PUBLISHER (publisher-id:int, name:string, city:string, country:string)

CATALOG (book-id:int, title:string, author-id:int, publisher-id:int, category-id:int, year:int, price:int)

CATEGORY (category-id:int, description:string)

ORDER-DETAILS (order-no:int,book-id:int, quantity:int)

- a. Create the above tables by properly specifying the primary keys and the foreign keys.

- b. Enter at least five tuples for each relation.
- c. Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after 2000.
- d. Find the author of the book which has maximum sales.
- e. Demonstrate how you increase the price of books published by a specific publisher by 10%.
- f. Generate suitable reports.
- g. Create suitable front end for querying and displaying the results.

5. Consider the following database for a banking enterprise

BRANCH(branch-name:string, branch-city:string, assets:real)

ACCOUNT(accno:int, branch-name:string, balance:real)

DEPOSITOR(customer-name:string, accno:int)

CUSTOMER(customer-name:string, customer-street:string, customer-city:s

LOAN(loan-number:int, branch-name:string, amount:real)

BORROWER(customer-name:string, loan-number:int)

- a. Create the above tables by properly specifying the primary keys and the foreign keys
- b. Enter at least five tuples for each relation
- c. Find all the customers who have at least two accounts at the Main branch.
- d. Find all the customers who have an account at all the branches located in a specific city.
- e. Demonstrate how you delete all account tuples at every branch located in a specific city.
- f. Generate suitable reports also suitable front end for querying and displaying the results.

TEXT BOOKS / REFERECES

TEXT BOOKS :

1. “Database System Concepts”, A.Silberschatz, Henry.F.Korth, S.Sudharshan, 6th Edition.
2. “Database Systems”, Ramez Elmasri, Shamkant.B.Navathe, 6th Edition.

REFERENCE BOOKS:

1. “Database Management Systems”, Raghu Ramakrishnan and J Gehrke 3rd Edition
2. “An Introduction to Database System” C.J.Date , AKannan, S..Swamynathan 8th Edition

ADDITIONAL LEARNING SOURCES:

1. www.tutorialspoint.com/sql/sql-rdbms-concepts.htm
2. nptel.ac.in/courses/106106093/6
3. msdis.missouri.edu/resources/gis_advanced/pdf/relational.pdf

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	H	M	L	K	L	M	M	M	M
CO2	H	H	M	H	M	L	M	L	M	M	M	M
CO3	H	H	H	H	M	L	M	L	L	M	L	L
CO4	H	M	M	M	L	L	L	L	L	M	L	L
CO5	H	L	M	H	L	L	M	M	M	L	M	L

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Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Theory	01	00	02	00	32
Course No		Course Title				Prerequisites	
MCA26L		Soft Skills Laboratory				--	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: Test1+Test2 + Observation book+ Record + Viva-voce] Marks: 50
[15+15+5+5+10]

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Understand basic principles of communication.

CO2: Understand importance of listening and develop good communication skills.

CO3: Maintain privacy and Ethics in software development.

CO4: Understand good leadership strategies.

CO5: Understand the different roles of the management and relationship between them.

LIST OF CASE STUDIES COVERED:

Here students are expected perform either as an individual or as team on the case studies given. Presenting the topics, participating in group discussion and should able to

1. Exhibiting leadership skills
2. Exhibiting knowledge on ethical issues learnt
3. Demonstrating team work.

Case studies may include :

1. Creating a Culture of Learning : Law Firm Case Study
2. To hone the communication skills and to ensure that learning and professional growth would become part of the firm's culture, rather than just an occasional "training event."
3. Facilitation Skills : Insurance & Financial Services Case Study
4. Partnering in the Classroom : Technology Consulting Case Study
5. Executive Coaching : Investment Banking Case Study

Leadership Development :Education Case Study

Each case studies would contain the following :

1. Flexibility
2. Empathy
3. Transparency
4. Compassion
5. Communication
6. Decisiveness
7. Conflict resolution
8. Clear vision
9. Passion
10. Protection
11. Understanding
12. Problem solving
13. Negotiation

TEXT BOOKS/ REFERENCES:

Text books:

1. Technical communication principles and practices, Meenakshi Raman and Sangeeta Sharma.Oxford University press 2004.
2. Lussier/Achua : Effective Leadership, 3rd Edition, Thomson Education , India edition, 2010.
3. George Reynolds: Ethics in Information Technology, 2nd Edition, Thomson Course Technology, 2007.

Reference books:

1. Diana Winstanley : Personal Effectiveness , 1st Edition, Excel books, 2009.
2. Northouse, P. G. (2013). (6th ed.) Leadership: Theory and Practice. Thousand Oaks:CA: Sage Publications.

CO - PO MAPPING:

CO - PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	H	M	M	M	M	M	M	H	M	M	M
CO2	H	M	M	H	M	M	H	H	M	M	L	L
CO3	M	M	M	M	M	H	H	M	H	H	M	L
CO4	H	M	M	H	M	M	M	M	M	M	L	M
CO5	H	H	H	H	M	M	H	M	M	M	L	L

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru,****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	III	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
MCA310	Web programming	Programming concepts

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

- CO1:** Understand and apply basic design and usability principals when creating content for the internet
- CO2:** Demonstrate practical skills in workflows and methods used to create websites within a professional environment
- CO3:** Make informed and critical decisions regarding client development using Modules.
- CO4:** Design and implement reasonably sophisticated server-side applications using one or more suitable technologies.
- CO5:** Have the knowledge to critically analyze and evaluate web applications.
Construct websites using a variety of skills and techniques.

TOPICS COVERED

UNIT 1 -HTML5

10 Hours

A web standards approach, Your first Plunge into HTML5, New Structural Elements, A richer approach to Marking Up Content, Rich Media

UNIT 2 – Introduction

12 Hours

JavaScript you need to know, JavaScript Primer, Including Scripts on a Page, Statements, Functions, Parameters and Return Values, Types and Variables, Primitive Types, Strings, numbers, undefined null, javascript operators, working with objects, enumerating properties, control flow, conditional statements, working with arrays, JSON, The basics Angular JS, Framework, Introduction to MVC, Design patterns, model view controller.

UNIT 3 – Filters and Modules

10 Hours

Introduction to filters, Built in filters, Angular JS modules, Directives, the basic of directives, angular socks, Event handling directives, creating custom directive, the restrict option, the template option, the link option, Working with forms, HTML Forms Overview, Angular JS Forms, validating forms.

UNIT 4–Services and Server Communication

10 Hours

Using Services, Server Communication, Handling Returned Data, Organizing Views, Using URL Routes, AngularJS Animation, Applying Animations, Deployment Considerations, Configuration, Testing, Error Handling, Working with forms, services and server communication, Organizing Views, Angular animation, Deployment considerations.

UNIT 5– PHP

10 Hours

Getting up and running with PHP, introducing PHP,first PHP script,Learning the language,language basics,decisions and loops,strings, Arrays, Functions, objects.

TEXT BOOKS / REFERENCES:

Text books:

1. Christopher Murphy, Richardclark, OliStudholme, Divys Manian, Beginning HTML5 and CSS3, Apress Publication,2012
2. Grant, Andrew ,Beginning AngularJS, Apress Publication,2014
3. Matt Doyle, Beginning PHP 5.3,Wiley Publisher,2010

Reference books:

Chris Bates: Web Programming Building Internet Applications, 3rd Edition, Wiley India, 2007

ADDITIONAL LEARNING SOURCES:

1. www.w3schols.com
2. www.afterhoursprograming.com

CO-PO MAPPING:

[illegible]

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	III	Theory	04	04	00	00	52
Course No		Course Title				Pre Requisites	
MCA 320		Intelligent Algorithms				ADA	

COURSE ASSESSMENT METHOD:

. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]

. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course students will be able to:

CO1: Know in more depth some important design and analysis techniques for algorithms.

CO2: Apply such techniques to solve new problems that may arise in various applications.

CO3: Have some practice in recognizing connections between algorithmic problems and reducing them to each other.

CO4: Explain more complex algorithms and proofs in written form.

CO5: Understand some pieces of current research on algorithms.

TOPICS COVERED:**UNIT: 1 - Review of Analysis Techniques:****12 Hours**

Growth of Functions: Asymptotic notations; Standard notations and common functions; Recurrences and Solution of Recurrence equations- The substitution method, The recurrence – tree method, The master method; Amortized Analysis: Aggregate, Accounting and Potential Methods.

UNIT: 2 - Graph Algorithms:**10 Hours**

Bellman - Ford Algorithm; Single source shortest paths in a DAG; Johnson's Algorithm for sparse graphs; Flow networks and Ford-Fulkerson method; Maximum bipartite matching.

UNIT: 3 - String-Matching Algorithms and Randomized Algorithms:**10 Hours**

Naïve string Matching; Rabin - Karp algorithm; String matching with finite automata; Knuth-Morris-Pratt algorithm; Boyer – Moore algorithms. Randomizing deterministic algorithms, Monte Carlo and Las Vegas algorithms.

UNIT: 4 - Intelligent Web:**10 Hours**

Examples of intelligent web applications; Basic elements of intelligent applications; What applications can benefit from intelligence?; How can I build intelligence in my own application?; Machine learning, data mining, and all that. Eight fallacies of intelligent applications. Searching : Searching with Lucene; Why search beyond indexing?; Improving search results based on link analysis; Improving search results based on user clicks; Ranking Word, PDF, and other documents without links; Large-scale implementation issues; Is what you got what you want? Precision and recall.

UNIT:5 - Creating Suggestions and Recommendations:**10 Hours**

An online music store: the basic concepts; How do recommendation engines work?; Recommending friends, articles, and news stories; Recommending movies on a site such as Netflix.com; Large-scale implementation and evaluation issues.

Text Book/References:**Text Books:**

1. T. H Cormen, C E Leiserson, R L Rivest and C Stein: Introduction to Algorithms, 2nd Edition, Prentice-Hall of India, 2002.
2. Kenneth A. Berman, Jerome L. Paul: Algorithms, Cengage Learning, 2002.
3. Haralambos Marmanis and Dmitry Babenko, Algorithms of the Intelligent Web, Manning

Publications, 2009.

Reference Books:

1. Ellis Horowitz, Sartaj Sahni, S.Rajasekharan: Fundamentals of Computer Algorithms, University Press, 2007.

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO12
CO1	H	H	H	M	M	L	M	M	L	L	M	L
CO2	H	M	L	M	M	L	L	L	L	M	M	M
CO3	H	H	H	H	M	L	M	M	L	L	L	M
CO4	M	M	L	M	L	L	L	L	M	L	M	L
CO5	H	H	H	H	M	M	M	M	L	L	L	L

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru,****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	III	Theory	04	04	00	00	52
Course No		Course Title				Pre Requisites	
MCA330		Object-Oriented Modeling and Design				Software Engineering	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO1:** Show the importance of systems analysis and design in solving complex problems.
- CO2:** An ability to perform analysis, design and implementation of a proposed software system based on the analysis techniques using advanced static/dynamic UML models.
- CO3:** An ability to analyze and develop domain and application of software.
- CO4:** An ability to translate UML models into code using an OO programming language and understanding the related OOD techniques such as design by contract, refactoring, and test driven design as well as an ability to understand new/existing OO frameworks.
- CO5:** The ability to work in one or more significant application domains and to manage the development of software system.

TOPICS COVERED:**UNIT 1- Introduction to Modeling Concepts****10 Hours**

What is Object Orientation? What is OO development? OO themes; Evidence for usefulness of OO development; OO modeling history. Modeling as Design Technique: Modeling; abstraction; The three models. Class Modeling and Advanced Class Modeling. Object and class concepts; Link and associations concepts; Generalization and inheritance; A sample class model; Navigation of class models; Practical tips. Advanced object and class concepts; Association ends; N-array associations; Aggregation; Abstract classes; Multiple inheritance; Metadata; Reification; Constraints; Derived data; Packages; Practical tips

UNIT 2 -State Modeling and Advanced State Modeling

10 Hours

State Modeling: Events, States, Transitions and Conditions; State diagrams; State diagram behavior; Practical tips. Advanced State Modeling: Nested state diagrams; Nested states; Signal generalization; Concurrency; A sample state model; Relation of class and state models; Practical tips. Interaction Modeling and Advanced Interaction Modeling Interaction Modeling: Use case models; Sequence models; Activity models. Use case relationships; Procedural sequence models; Special constructs for activity models.

UNIT:3-Process Overview, System Conception

10 Hours

Process Overview: Development stages; Development life cycle. System Conception: Devising a system concept; elaborating a concept; preparing a problem statement. Domain Analysis and Application Analysis. Overview of analysis; Domain class model; Domain state model; Domain interaction model; Iterating the analysis. Application Analysis: Application interaction model; Application class model; Application state model; adding operations.

UNIT 4-System Design and Class Design

12 Hours

Overview of system design; Estimating performance; Making a reuse plan; Breaking a system in to sub-systems; Identifying concurrency; Allocation of sub-systems; Management of data storage; Handling global resources; Choosing a software control strategy; Handling boundary conditions; Setting the trade-off priorities; Common architectural styles; Architecture of the

ATM system as the example. Class Design: Overview of class design; Bridging the gap; Realizing use cases; Designing algorithms; Recursing downwards, Refactoring; Design optimization; Reification of behavior; Adjustment of inheritance; Organizing a class design; ATM example.

UNIT 5-Implementation Modeling:

10 Hours

Fine-tuning Classes, Fine-tuning Generalizations, Realizing Associations, Testing. Patterns
What is a pattern and what makes a pattern? Pattern categories; Relationships between patterns; Pattern description. Design Patterns Introduction, structural decomposition, Organization of work, Model View Controller; Communication Patterns: Forwarder-Receiver; Client-Dispatcher-Server; Publisher-Subscriber; Management Patterns: Command processor; Whole Part, Master Slave, View Handler;

TEXT BOOKS / REFERENCES:

Text books:

1. Michael Blaha, James Rumbaugh: Object-Oriented Modeling and Design with UML, 2nd Edition, Pearson Education / PHI, 2005. (Chapters 1 to 15)
2. Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal: Pattern-Oriented Software Architecture, A System of Patterns, Volume 1, John Wiley and Sons, 2006. (Chapters 1, 3)

Reference books:

1. Grady Booch et al: Object-Oriented Analysis and Design with Applications, 3rd Edition, Pearson, 2007.
2. Mark Priestley: Practical Object-Oriented Design with UML, 2nd Edition, Tata McGraw-Hill, 2003.
3. K. Barclay, J. Savage: Object-Oriented Design with UML and JAVA, Elsevier, 2008.
4. Booch, G., Rumbaugh, J., and Jacobson, I.: The Unified Modeling Language User Guide, 2nd Edition, Pearson, 2005.
5. Simon Bennett, Steve McRobb and Ray Farmer: Object-Oriented Systems Analysis and Design Using UML, 2nd Edition, Tata McGraw-Hill, 2002.

6. Rumbaugh, Blaha, Premierhani, Eddy, Lorensen; Object Oriented Modeling and Design, PHI Latest Edition

ADDITIONAL LEARNING SOURCES:

1. <https://nscnetwork.files.wordpress.com/2011/09/object-oriented-modeling-and-design.pdf>
2. <https://www-public.tem-tsp.eu/~gibson/Teaching/CSC7322/L7-UML.pdf>

CO-PO MAPPING:

[illegible]

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	III	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
MCA340	Computer Networks	--

COURSE ASSESSMENT METHOD:

. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]

. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO1:** Understand the basic concepts, principles and techniques of data communications along with the layers of OSI and TCP/IP model.
- CO2:** Independently understand the concept of links, nodes and data transmission issues in the network.
- CO3:** Capability to understand wired LANs: Ethernet, IPv4 addresses and performance of the network-layer.
- CO4:** Understand the services of TCP and UDP.
- CO5:** Ability to understand the basic concepts of Application-Layer Paradigms and standard client-Server protocols

TOPICS COVERED:

UNIT 1 - Basics of Data Communications and Physical Layer**10 Hours**

Data Communications: Components, Data Representation, Data Flow, Networks; Network Criteria, Physical Structures, Network Types: LAN, WAN, Switching, Network Models: Protocol Layering: Principles of Protocol Layering, Logical Connections, TCP/IP Protocol Suite: Layered Architecture, Layers in the TCP/IP Protocol Suite, Encapsulation and Decapsulation, Addressing, Multiplexing and Demultiplexing, The OSI Model; OSI versus TCP/IP, Lack of OSI Model's Success, Introduction to Physical Layer, Data and Signals, Periodic Analog Signals, Digital Signals, Transmission Impairment, Data Rate Limits, Performance, Switching: Circuit-Switched Networks, Packet Switching, Datagram Networks, Virtual Circuit Networks.

UNIT 2 - Data Link Layer**10 Hours**

Introduction to Data-Link Layer, Link-Layer Addressing: Address Resolution Protocol (ARP), Error Detection and Correction: Introduction, Types of Errors, Redundancy, Detection versus Correction, Coding, Block coding: Error Detection, Cyclic Code: Cyclic Redundancy Check, Polynomials, Cyclic Code Analysis and its Advantages, Checksum, Forward Error Correction: Using Hamming Distance, Using XOR, Chunk Interleaving.

UNIT 3 - LANs and Network Layer**10 Hours**

Ethernet Protocol, Standard Ethernet: Characteristics, Addressing, Access Method, Efficiency of Standard Ethernet, Implementation, Changes in the Standard, Fast Ethernet (100 MBPS): Access Method, Physical Layer, 10 Gigabit Ethernet, Introduction to Network Layer, Network-Layer Services: Packetizing, Routing and Forwarding, Packet Switching: Datagram Approach, Virtual-Circuit Approach, Network Layer Performance: delay Throughput, Packet loss, Congestion Control, IPv4 addresses.

UNIT 4 - Transport Layer**10 Hours**

Introduction to Transport-Layer: Transport-Layer Services; Transport-Layer Protocols: Port Numbers, User Datagram Protocol: User Datagram, UDP Services, UDP Applications, Transmission Control Protocol: TCP Services, TCP Features, Segment, A TCP Connection, State Transition Diagram, Windows in TCP, Flow Control, Error Control, TCP Congestion Control, TCP Timers.

UNIT 5 - Application Layer and Standard Client-Server Protocols**12 Hours**

Introduction to Application Layer, Services, Application-Layer Paradigms, Client-Server Programming: Application Programming Interface, Using Services of the Transport Layer, Iterative Communication using UDP, Iterative Communication using TCP, Concurrent Communication, World Wide Web and HTTP: FTP: Two Connections, Control Connection, Data Connection, Security for FTP, E-Mail: Architecture, Web-Based Mail, TELNET: Local versus Remote Logging, Secure Shell (SSH): Components, Applications, Domain Name System (DNS): Name Space, DNS in the Internet, Resolution, Caching, Resource Records, DNS Messages, Registrars, DDNS, Security of DNS.

TEXT BOOKS / REFERENCES:

Text books:

1. B. A. Forouzan, Data Communications and Networking, 5th Edition, McGraw Hill Education (India) Private Limited, 2013.

Reference books:

1. William Stallings, Data and Computer Communications, 10th Edition, Pearson, 2013.
2. Larry L. Peterson and Bruce S. David: Computer Networks – A Systems Approach, 5th Edition, Elsevier, 2011.
3. Andrew S. Tanenbaum, Computer Networks, Fourth Edition, PHI, 2008.
4. Fred Halsall, Data Communications, Computer Networks and Open Systems, 4th Edition, Pearson Education, 2005.

ADDITIONAL LEARNING SOURCES:

1. www.nptel.ac.in/courses
2. <http://freevideolectures.com/Course/2276/Computer-Networks>

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	L	L	M	L	L	L	L	M	L	L	L
CO2	L	M	M	M	H	L	L	L	M	H	L	L
CO3	H	H	H	H	M	M	L	L	L	L	L	L
CO4	H	H	H	H	M	M	L	L	L	L	L	L
CO5	L	H	L	L	H	M	L	L	L	L	L	L

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JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	III	Theory (Stream)	05	03	00	02	65
Course No		Course Title				Pre - Requisites	
MCA351		Computer Vision and Pattern Recognition				--	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO 1: Understand CV, PR terminology & applications in various fields.

CO 2: Know the concept of Probability theory, Baye's theorm & Bayesian belief networks

CO 3: Understand how patterns are represented, feature extraction, selection and data reduction algorithms.

CO 4: Understand SVMs, Neural Networks Architectures & methods for hybrid classifiers.

CO 5: Know the concept of clustering and its importance in PR and build an OCR system for handwritten characters.

TOPICS COVERED:**UNIT-1 Introduction to Computer Vision, Image Formation, PR & Probability 12Hours**

A brief history of computer vision; Geometric primitives and transformations; Photometric image formation; The digital camera; Machine perception, an example; Pattern Recognition System; The Design Cycle; Learning and Adaptation; Probabilities of Events; Random Variables; Joint Distributions and Densities; Moments of random variables.

UNIT-2 Representation & Nearest Neighbour Based Classifiers 10 Hours

Data Structures for Pattern Representation; Representation of Clusters; Proximity Measures; Size of Patterns Abstractions of the Data Set; Feature Extraction; Feature Selection; Evaluation of Classifiers; Evaluation of Clustering. Nearest Neighbour Algorithm; Variants of the NN Algorithm; Use of the Nearest Neighbour Algorithm for Transaction Databases; Efficient Algorithms ; Data Reduction; Prototype Selection.

UNIT-3 Bayes Classifier & Decision Trees 10 Hours

Bayes Theorem; Minimum Error Rate Classifier; Estimation of Probabilities; Comparison with the NNC; Naive Bayes Classifier; Bayesian Belief Network; Introduction to Decision Trees; Decision Trees for Pattern Classification; Construction of Decision Trees; Splitting at the Nodes; Overfitting and Pruning; Example of Decision Tree Induction.

UNIT-4 Support Vector Machines & Combination of Classifiers 10 Hours

Introduction to SVM; Learning the Linear Discriminant Function; Neural Networks; SVM for Classification; Methods for Constructing Ensembles of Classifiers; Methods for Combining Classifiers

UNIT-5 Clustering & An Application: Handwritten Digit Recognition**10 Hours**

Importance of Clustering; Hierarchical Algorithms; Partitional Clustering; Clustering Large Data Sets; Description of the Digit Data; Pre-processing of Data; Classification Algorithms; Selection of Representative Patterns; Results.

TUTORIALS:

1. Simple feature extraction techniques to understand pattern recognition system.
2. Concept of Probability theory, Baye's theorem & Bayesian belief networks.
3. Nearest Neighbour Algorithm, Variants of NN, Case study to Transaction Database.
4. Naïve Bayes Classifier, Bayesian Belief Network, Pattern Classifiers based on decision trees.
5. Implementation of SVM and Neural Network Architectures.
6. Design and development of clustering approaches and recognition system for handwritten characters.

TEXT BOOKS/ REFERENCES:**Text Books:**

1. Richard Szeliski, Computer Vision: Algorithms and Applications, Springer, 2010.
2. M.N. Murthy and V. Susheela Devi, Pattern Recognition: An Algorithmic Approach, Springer, 2011.

References:

1. Richard O. Duda, Peter E. Hart, and David G. Stork: Pattern Classification, 2nd Edition, Wiley-Interscience, 2001.
2. Earl Gose, R. Johnsonbaugh and S. Jost, Pattern Recognition and Image Analysis, PHI, 2009.

ADDITIONAL LEARNING SOURCES:

1. www.journals.elsevier.com/pattern-recognition/

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	M	M	L	M	M	L	L	M	L
CO2	H	M	L	M	M	L	L	L	L	M	M	M
CO3	H	H	H	H	M	L	M	M	L	L	L	M
CO4	M	M	L	M	L	L	L	L	M	L	M	L
CO5	H	H	H	H	M	M	M	M	L	L	L	L

Department of Master of Computer Applications [MCA]

Introduction to Data Warehouse. A Multidimensional Data Model, Data Warehouse Architecture,

Data Warehouse Implementation, Data Cube Technology, From Data warehousing to Data Mining. The need for data warehousing, paradigm shift, business problem definition, operational and informational data stores, characteristics. Overview of client/server architecture, server specialization in client/server computing environments, server functions, server hardware architecture, system considerations, risc versus cisc, multiprocessor systems.

Unit 2 - Data Warehousing Components

10 Hours

Overall Architecture, data warehouse database, sourcing, acquisition, cleanup and transformation tools, metadata, access tools, data marts, data warehouse administration and management. Business Considerations, design considerations, technical considerations, implementation considerations, benefits of data warehousing.

Unit 3 - Mapping the data warehouse

10 Hours

Relational database technology for data warehouse, types, database architectures for parallel processing, parallel RDBMS features, alternative technologies, parallel dbms vendors, data layouts for best access, multidimensional data models, bitmapped indexing, complex data types.

Unit 4 - Data Extraction, Cleanup and Transformation Tools

12 Hours

Tool requirements, vendor approaches, access to legacy data, vendor solutions, transformation engines. Meta data: defined, meta data interchange initiative, metadata repository, metadata management, implementation examples, meta data trends. Need for OLAP, OLAP Guidelines, Categorization of OLAP Tools.

Unit 5 - Business Analysis

08 Hours

Tool Categories, Need for applications, cognos impromptu, applications, methodology, business intelligence market definition, situation overview, future outlook, essential guidance.

Tutorials:**Case Studies:**

1. Data Warehousing Solution for One of Europe's Largest Financial Services Groups.
2. Data Warehousing for a Health Benefits Company
3. Data warehousing solution for banking system.
4. Data warehousing solutions for tax fraud with advanced analytics.
5. Data warehousing solutions for international satellite TV service provider.
6. Data warehousing solutions for Correlating data across the business.
7. Business Reporting & Customer Information Datamart Architecture Setup & Roll-out for a global technology company.
8. Global Planning Data Automation.
9. COTS-Anti Money Laundering.
10. Management Information System for Trade Finance.

TEXT BOOKS / REFERENCES:**Text books:**

1. Alex Berson, Stephen J smith : Data Warehousing, Data Mining, & OLAP, Tata Mcgraw-Hill, 2012.
2. Gajendra Sharma: Data Mining, Data Warehousing and OLAP, Katson Books, 2010.
3. Jiawei Han and Micheline Kamber: Data Mining - Concepts and Techniques, 2nd Edition, Morgan Kaufmann Publisher, 2012.

Reference books:

1. Paulraj Ponnaiah : Data Warehousing fundamentals for IT professionals, wiley student publishers, second edition , 2014.
2. Ralph Kimball, Margy Ross : The data warehouse toolkit, third edition , wiley publishers, 2012.

ADDITIONAL LEARNING SOURCES:

1. <https://www.coursera.org/specializations/data-warehousing>.
2. www.knowledge-management-tools.net/data-warehousing.htm.
3. www.slideshare.net/2cdude/data-warehousing.
4. <https://www.edx.org/course/delivering-relational-data-warehouse-microsoft-dat216x>.

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	L	M	H	L	M	L	M	L	M	M
CO2	H	H	H	H	H	L	M	L	H	L	H	H
CO3	H	H	L	H	H	L	M	L	H	L	H	H
CO4	H	H	L	H	M	L	L	L	M	L	M	M
CO5	H	H	L	M	M	L	L	L	M	L	M	M

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

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				Theory	Laboratory	Tutorials	
II	III	Theory (Stream)	05	03	00	02	65
Course No		Course Title				Pre Requisites	
MCA353		Enterprise Resource Planning				MIS, SE	

COURSE ASSESSMENT METHOD:

. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]

. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO1 : Understand the concept of ERP and benefits.

CO2 : Understand the related technologies of ERP.

CO3 : Understand ERP implementation concepts.

CO4 : Understand the different business modules of ERP.

CO5 : Understand the present and future developments of ERP.

TOPICS COVERED:**UNIT 1 - Introduction****10 Hours**

Enterprise—An Overview, Business Processes, Introduction to ERP, Basics ERP Concepts, Justifying ERP Investments, Risks of ERP, Benefits of ERP.

UNIT 2 - ERP and Technology**10 Hours**

ERP and Related Technologies, Business Intelligence (BI) and Business Analytics (BA), E-Commerce and E-Business, Business Process Reengineering (BPR), Data Warehousing and Data Mining, On-line Analytical Processing (OLAP).

UNIT 3 - ERP and Technology**10 Hours**

Product Life Cycle Management (PLM), Supply Chain Management (SCM), Customer Relationship Management (CRM), Geographic Information System (GIS), Advanced Technology and ERP Security.

UNIT 4 - ERP Implementation**10 Hours**

To be or not to be..., Implementation Challenges, ERP Implementation (Transition) Strategies, ERP Implementation Life Cycle, Pre Implementation Tasks: Getting Ready, Requirements Definition, Implementation Methodologies, ERP Development Methods, Process Definition, Contracts with Vendors, Consultants and Employees, Training and Education, Data Migration, Project Management and Monitoring, Post-Implementation Activities, Success and Failure Factors of an ERP Implementation

UNIT 5 - The Business Modules**12 Hours**

Business Modules of an ERP Packages, Financials, Manufacturing (Production), Human Resource Management, Plant Maintenance, Materials Management, Quality Management, Marketing, Sales, Distribution and Services.

TEXT BOOKS / REFERENCES:**Text books:**

1. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, 14 Aug 2014.

Reference books:

1. Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, “Concepts in Enterprise Resource Planning”, Thomson Learning, 2001.
2. Vinod Kumar Garg and N.K .Venkata Krishnan, “Enterprise Resource Planning –concepts and Planning”, Prentice Hall, 1998.
3. Jose Antonio Fernandez, “The SAP R /3 Hand book”, Tata McGraw Hill, 2006.

TUTORIALS:

Developing Following Applications.

Using any Database Systems.

1. Financial System.
2. Manufacturing System.
3. Human Resource Planning.
4. Plant Maintenance.
5. Materials Management System.
6. Quality Management System.
7. Marketing, Sales, & Distributing System etc..

ADDITIONAL LEARNING SOURCES:

1. <http://www.netsuite.com/portal/resource/articles/erp/what-is-erp.shtml>
2. <https://www.managementstudyguide.com/enterprise-resource-planning-1-articles.htm>

CO - PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO	M	M	M	M	L	M	M	M	M	M	L	L
CO	M	M	M	M	L	M	M	M	M	M	L	L
CO	M	M	M	M	L	M	M	M	M	M	L	L
CO	M	M	M	M	L	M	M	M	M	M	L	L
CO	M	M	M	M	L	M	M	M	M	M	L	L

JSS Science and Technology University, Mysuru
Department of Master of Computer Applications [MCA].

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	III	Laboratory	01	00	03	00	48
Course No		Course Title				Pre Requisites	
MCA31L		Web Programming Laboratory				Programming concepts	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [Test-1 + Test-2 + Observation book + Record + Viva : 15 + 15 + 05 + 05 +10] Marks: 50

COURSE OUTCOMES:

Upon successful completion of this course, students able to,

- CO1:** Understand and apply basic design and usability principals when creating content for the internet
- CO2:** Demonstrate practical skills in workflows and methods used to create websites within a professional environment.
- CO3:** Make informed and critical decisions regarding client development using Modules.
- CO4:** Design and implement reasonably sophisticated server-side applications using one or more suitable technologies.
- CO5:** Have the knowledge to critically analyze and evaluate web applications. Construct websites using a variety of skills and techniques.

LIST OF EXPERIMENTS COVERED:

HTML

- Develop a program to create links to other HTML documents or web resources.
- Develop a program to insert images into the HTML document.
- Develop a program to create ordered, unordered, definition, nested list.

4. Program on creating an image –map-An image with clickable regions.

AngularJS

1. Program to evaluate expression.
2. Program to evaluate expression using variables.
3. Program to display first name and Last name.
4. Program to evaluate expression with numbers.
5. Program to evaluate expression with objects.
6. Program to evaluate expression with arrays.
7. Program to using a new directive as element.
8. Program to read a static JSON file.
9. Program to display a table with CSS
10. Program to read data from MYSQL database.

PHP

1. Programs on PHP Scripts.
2. Program on decision and loops.
3. Program on strings and arrays.
4. Program on functions.
5. Program on objects.

TEXT BOOKS / REFERENCES:

Text books:

1. Christopher Murphy, Richard Clark, Oli Studholme, Divys Manian, Beginning HTML5 and CSS3, Apress Publication, 2012
2. Grant, Andrew, Beginning AngularJS, Apress Publication, 2014
3. Matt Doyle, Beginning PHP 5.3, Wiley Publisher, 2010

Reference books:

Chris Bates: Web Programming Building Internet Applications, 3rd Edition, Wiley India, 2007

ADDITIONAL LEARNING SOURCES:

<http://php.net/manual/>

CO-PO MAPPING:

[illegible]

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	III	Laboratory	01	00	03	00	48

Course No	Course Title	Prerequisites
MCA32L	Intelligent Algorithms Laboratory	ADA

COURSE ASSESSMENT METHOD:

Internal Assessment [Test-1+Test-2+Observation book + Record + Viva : 15 + 15 + 05 + 05 +10=50marks]

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Know in more depth some important design and analysis techniques for algorithms.

CO2: Apply such techniques to solve new problems that may arise in various applications.

CO3: Have some practice in recognizing connections between algorithmic problems and reducing them to each other.

CO4: Explain more complex algorithms and proofs in written form.

CO5: Understand some pieces of current research on algorithms.

LIST OF EXPERIMENTS COVERED:

1. Design and develop to implement the Bellman-Ford Algorithm and determine its performance.

2. Design and develop to implement Johnson's Algorithm
3. Implement Linear modular equation.
4. Implement Monte Carlo algorithm.
5. Implement Naïve string Matching Algorithm.
6. Implement Rabin - Karp algorithm.
7. Develop string matching with finite automata.
8. Design and develop Knuth-Morris-Pratt algorithm and Boyer – Moore algorithms.

TEXT BOOKS/ REFERENCES :

Text Books:

1. T. H Cormen, C E Leiserson, R L Rivest and C Stein: Introduction to Algorithms, 2nd Edition, Prentice-Hall of India, 2002.
2. Kenneth A. Berman, Jerome L. Paul: Algorithms, Cengage Learning, 2002.
3. Haralambos Marmanis and Dmitry Babenko, Algorithms of the Intelligent Web, Manning Publications, 2009.

ADDITIONAL LEARNING SOURCES:

1. <http://nptel.ac.in/algorithms>

CO-PO Mapping:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	M	M	L	M	M	L	L	M	L
CO2	H	M	L	M	M	L	L	L	L	M	M	M
CO3	H	H	H	H	M	L	M	M	L	L	L	M
CO4	M	M	L	M	L	L	L	L	M	L	M	L
CO5	H	H	H	H	M	M	M	M	L	L	L	L

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru,****Department of Master of Computer Applications [MCA].**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	III	Laboratory	01	00	03	00	48
Course No		Course Title				Pre Requisites	
MCA33L		Object-Oriented Modeling and Design Laboratory				Software Engineering	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [Test-1 + Test-2 + Observation book + Record + Viva : 15 + 15 + 05 + 05 +10] Marks: 50

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to

- CO1:** Show the importance of systems analysis and design in solving complex problems.
- CO2:** An ability to perform analysis, design and implementation of a proposed software system based on the analysis techniques using advanced static/dynamic UML models.
- CO3:** An ability to analyze and develop domain and application of software.
- CO4:** An ability to translate UML models into code using an OO programming language and understanding the related OOD techniques such as design by contract, refactoring, and test driven design as well as an ability to understand new/existing OO frameworks.
- CO5:** The ability to work in one or more significant application domains and to manage the development of software system.

LIST OF EXPERIMENTS COVERED:

The student has to draw the necessary UML diagrams using any suitable UML Drawing Tool and implement in Java OR C++ OR C# a program to demonstrate the Design Pattern specified by the Examiner. For Analysis and Design models, diagrams such as Use-case, Class Diagram,

Sequence/Collaboration Diagram Should be drawn with suitable scenario, activity diagram, component diagram & deployment diagram. Generation of Test cases using ascertain functions

1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Software personnel management system
8. Credit card processing
9. E-book management system
10. Recruitment system
11. Foreign trading system
12. Conference Management System
13. BPO Management System

TEXT BOOKS / REFERENCES:

Text books:

1. Michael Blaha, James Rumbaugh: Object-Oriented Modeling and Design with UML, 2nd Edition, Pearson Education / PHI, 2005. (Chapters 1 to 15)
2. Grady Booch et al: Object-Oriented Analysis and Design with Applications.

Reference books:

1. Mark Priestley: Practical Object-Oriented Design with UML, 2nd Edition, Tata McGraw-Hill, 2003.
2. K. Barclay, J. Savage: Object-Oriented Design with UML and JAVA, Elsevier, 2008.
3. Booch, G., Rumbaugh, J., and Jacobson, I.: The Unified Modeling Language User Guide, 2nd Edition, Pearson, 2005.
4. Simon Bennett, Steve McRobb and Ray Farmer: Object-Oriented Systems Analysis and Design Using UML, 2nd Edition, Tata McGraw-Hill, 2002

ADDITIONAL LEARNING SOURCES:

1. <https://nscnetwork.files.wordpress.com/2011/09/object-oriented-modeling-and-design.pdf>
2. <https://www-public.tem-tsp.eu/~gibson/Teaching/CSC7322/L7-UML.pdf>

CO-PO MAPPING:

[illegible]

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	III	Laboratory	01	00	03	00	48
Course No		Course Title				Pre Requisites	
MCA34L		Computer Networks Laboratory				Computer Networks	

COURSE ASSESSMENT METHOD:

Internal Assessment [Test-1 + Test-2 + Observation book + Record + Viva: 15 + 15 + 05 + 05 +10] Marks: 50

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO1:** Understand the basic concepts, principles and techniques of data communications along with the layers of OSI and TCP/IP model.
- CO2:** Independently understand the concept of links, nodes and data transmission issues in the network.
- CO3:** Capability to understand wired LANs: Ethernet, IPv4 addresses and performance of the network-layer.
- CO4:** Understand the services of TCP and UDP.
- CO5:** Ability to understand the basic concepts of Application-Layer Paradigms and standard client-Server protocols

LIST OF EXPERIMENTS COVERED:

1. Write a TCL script to simulate the network described below

Consider a small network with five nodes n0, n1, n2, n3, n4, forming a star topology. The node n4 is at the center. Node n0 is a TCP source, which transmits packets to node n3 (a TCP sink) through the node n4. Node n1 is another traffic source, and sends UDP packets to node n2 through n4. The duration of the simulation time is 10 seconds.

Write a Tcl script (in the text area below) to simulate this scenario. Once you have written your simulation script, click on the "Run" button to execute it. You can verify your code by clicking on the "View Solution" button at the bottom of the page.

2. Write a TCL script to simulate a file transfer with ns2

Consider a client and a server. The server is running a FTP application (over TCP). The client sends a request to download a file of size 10 MB from the server. Write a script to simulate this scenario. Let node #0 be the server and node #1 be the client. TCP packet size is 1500 B. Assume typical values for other parameters.

Note: This simulation require transfer of a **fixed** size file. Therefore, time required for the transfer would be constant for a given bandwidth of a link. To verify this, determine the time that would roughly be required for the transfer. Then look at the bottom of the trace file and verify whether there is any transmission beyond the time calculated. To verify that the client has downloaded the entire file, plot the "Bytes Received " curve for node #1. The y-axis is in Kbits. Convert it to MB and verify whether it approximates the specified file size. TCP headers would effectively increase the count of received bytes at node # 1.

3. Setting up a local area network with ns2

In this exercise you will be simulating a CSMA/CD based LAN with ns2. Consider the LAN with seven nodes to be an isolated one i.e. not connected to the Internet. Node # 0 in the LAN act as a UDP traffic source, and node # 6 is the destination node. Assume CBR traffic to be flowing between the nodes. The simulation lasts for 25 seconds.

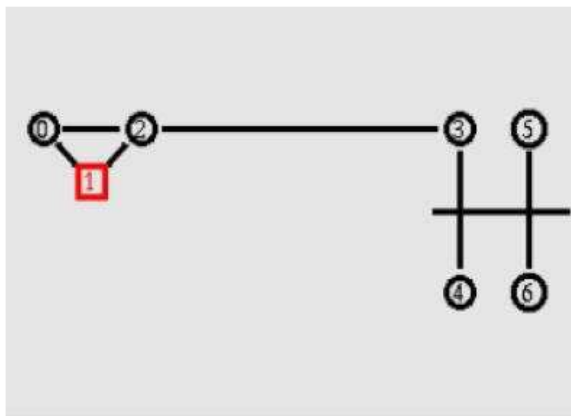
In Ethernet a packet is broadcasted in the shared medium, and only the destination node accepts the packet. Other nodes simply drop it. What should be the number of hops a packet from node #0 to node # 6 travel? Verify this from the "Hop Count" plot.

Additional Task:

Suppose the above LAN is to be connected to the Internet. Add node # 7 into the network so that it act as the gateway. Connect node # 0 and # 7 with a 1 Mb wired link. Move the UDP source to node # 7. How the hop count should get affected in this case? Verify from the plot.

4. Simulating link errors

Consider the following network diagram

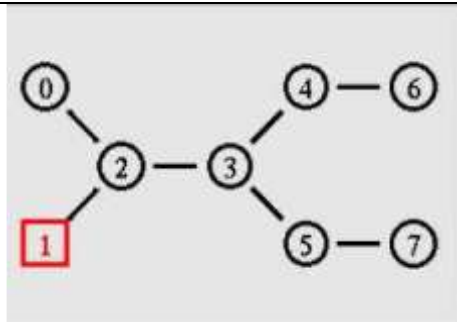


Here node # 2 act as a router. Any traffic to or from the LAN passes through it. Consider node #1 running a FTP server, and node # 5 is downloading a file of size 4 MB. However, the link between node # 2 and # 3 is fault. It drops packets with a fixed probability of 0.2. Implement a link error model to reflect this.

It may be noted here that the file download time will be more than the we had in exercise # 2 of experiment # 1. Try different values of the simulation time to ensure that the file has been entirely transferred. Is the plot of bytes received a linear curve or non-linear? Why? Presence of link errors cause one or more packets to be retransmitted. Verify this from the "Packet Retransmissions" plot.

5. Measuring Network Performances**Bottleneck in the network**

Consider a dumbbell topology with eight nodes as shown as in the following figure.



Consider nodes# 2 and 3 to be two routers connecting two different networks. When the bandwidth of the link 2-3 is much lower than the sum of bandwidths of the other links in the network, it act as a bottleneck.

Assume node # 0 running a FTP application (over TCP) and sending data to node # 6. Node # 1 is sending CBR data node # 7. Assume all the links except 2-3 has a bandwidth of 1 Mb, propagation delay of 10ms and queue type as DropTail. (All are duplex links).

Tasks:

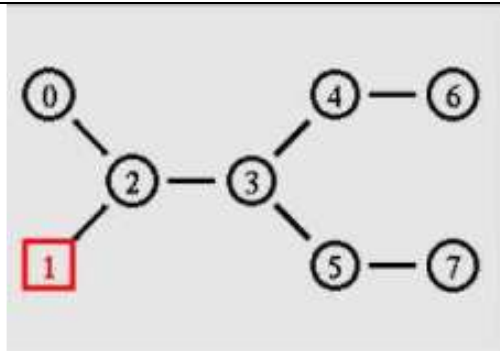
- The link 2-3 has a propagation delay of 10 ms. Vary it's bandwidth from 0.5 Mb to 2.5 Mb in steps of 0.25Mb.
- Compute the throughput for node # 3 in each case
- Plot the throughput vs. bandwidth data in the "Custom Plot" section below

Based on the above plots, suggest what should be the recommended bandwidth of the link 2-3. Now, plot the end-to-end delay between nodes 0 and 6 for the above chosen values of link 2-3 bandwidth. Revisit your previous answer (i.e. optimum bandwidth of link 2-3) based on these graphs.

Measuring Network Performances

6. Bandwidth sharing between TCP and UDP

Consider the dumbbell topology from our previous exercise:



Node # 0 is a TCP source, and the corresponding sink is at node # 6. Node # 1 is a UDP source (CBR traffic) with a null agent attached to node # 7. These two traffic flows through the common link 2-3. The aim of this exercise is to examine how TCP and UDP share the bandwidth between themselves when the rate of CBR traffic is changed.

Set the TCP packet size to 1460 B. The UDP and CBR packet sizes are 1500 B. All the links in the network have same bandwidths (say, 4 Mb), delay and queue types.

Part 1:

- Set the initial rate of CBR traffic to 0.5 Mb. Run the simulation, and plot the "Bytes Received" by node #s 4 and 5 (sinks for TCP and UDP traffic)
- Now, increment the rate up to 4 Mb, the link bandwidth, in steps of 0.5 Mb. Run the simulation and plot the graphs again.

How does the graphs change after each run? In particular, what's the nature of the graphs when the rate of CBR traffic is 50% of the bandwidth?

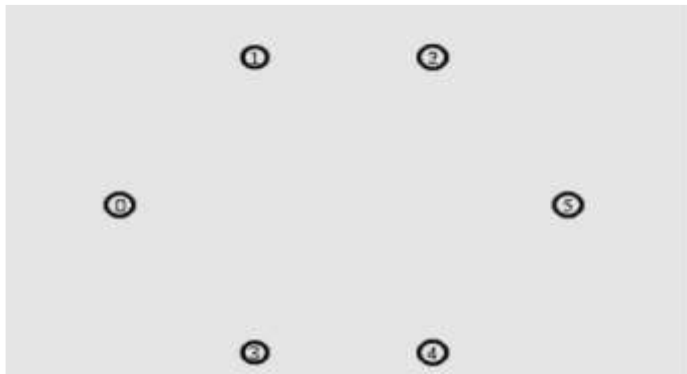
Part 2: Behaviour of UDP

- Reduce the bandwidth of the link 2-3 to say, 2 Mb. Repeat the above steps and observe the graphs in this case.

From the graphs plotted observe how UDP occupies a larger portion of the bandwidth. How Does the behaviour change for other variations of TCP (Newreno, Vegas)?

7. Write a TCL script to simulate the following scenario with ns2 simulator.

Consider six nodes, (as shown in the figure below) moving within a flat topology of 700m x 700m.



The initial positions of nodes are 0 (150,300) ,1 (300,500),2 (500,500),3 (300,100),4(500,100) and 5(650,300) respectively.A TCP connection is initiated between node 0 (source) and node 5 (destination) through node 3 and node 4 i.e the route is 0-3-4-5.

At time $t = 3$ seconds the FTP application runs over it.

After time $t=4.0$ sec, node 3 (300,100) moves towards node 1 (300,500) with a speed of 5.0m/sec

and after some time the path break, then the data transmit with a new path via node 1 and node 2 i.e the new route 0-1-2-5.

The simulation lasts for 60 secs. In the above said case both the route has equal cost.

Use DSR as the routing protocol and the IEEE 802.11 MAC protocol.

Now Analyze the trace file and determine when the use of second route commence, and

Plot the number of packets received by each node over the entire time duration of the simulation

8. Simulate a wired network and demonstrate Distance Vector Routing algorithm.

9. Simulate a network which will create congestion in the network. With the trace file created identify the points at which congestion occurs by writing sed / awk scripts. Also write a mechanism to correct/control the congestion.

Note : Network Free and open source software simulators like NS2 / NS3 could be used. If NS2 is used tcl scripting should be introduced . If NS3 is used c++ with python has to be introduced during first two or three weeks of the labs.

TEXT BOOKS / REFERENCES:

Text books:

1. B. A. Forouzan, Data Communications and Networking, 5th Edition, McGraw Hill Education (India) Private Limited, 2013.

Reference books:

1. William Stallings, Data and Computer Communications, 10th Edition, Pearson, 2013.
2. Larry L. Peterson and Bruce S. David: Computer Networks – A Systems Approach, 5th Edition, Elsevier, 2011.
3. Andrew S. Tanenbaum, Computer Networks, Fourth Edition, PHI, 2008.
4. Fred Halsall, Data Communications, Computer Networks and Open Systems, 4th Edition, Pearson Education, 2005.

ADDITIONAL LEARNING SOURCES:

1. www.nptel.ac.in/courses
2. <http://freevideolectures.com/Course/2276/Computer-Networks>

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	L	L	M	L	L	L	L	M	L	L	L
CO2	L	M	M	M	H	L	L	L	M	H	L	L
CO3	H	H	H	H	M	M	L	L	L	L	L	L
CO4	H	H	H	H	M	M	L	L	L	L	L	L
CO5	L	H	L	L	H	M	L	L	L	L	L	L

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	IV	Theory	04	04	00	00	52
Course No		Course Title				Pre Requisites	
MCA410		Python Programming				OOPS Concepts	

COURSE ASSESSMENT METHOD:

. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]

. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1: Understand and comprehend the basics of python programming.

CO2: Apply knowledge in real time applications.

CO3: Understands about files and its applications.

CO4: Apply object-oriented programming concepts to develop dynamic interactive Python applications

CO5: Demonstrate MVC architecture with respect to Django framework

TOPICS COVERED:**UNIT 1 - Introduction to Python****10 Hours**

Python Basics: Data Types, Operators, Input/Output Statements, Creating Python Programs, Python Flow Control statements: Decision making statements, Indentation, Conditionals, loops, break, continue, and pass statements. Strings, lists, Tuples, Dictionaries

UNIT 2 - Python Functions**10 Hours**

Defining functions, DOC strings, Function parameters: default, keyword required and variable length arguments, key-word only parameters, local and global variables, pass by reference versus value, Anonymous functions, Recursion. Functional Programming:

Mapping, Filtering and Reduction, Lambda Functions, List Comprehensions.

UNIT 3 - Object Oriented Programming**10 Hours**

Definition and defining a class, Constructor, Destructor, self and del keywords, Access to Attributes and Methods, getattr and setattr attributes, Data Attributes and Class Attributes, Data Hiding, Inheritance, Static Members. Regular Expressions: Defining Regular Expressions and String Processing.

UNIT 4 - File Handling and Python GUI Programming**10 Hours**

File object attributes, Read and Write into the file, Rename and Delete a File, Exceptions Handling: Built-in Exceptions and User defined Exceptions GUI Programming, Introduction to Python GUI Programming, Tkinter Programming, Tkinter widgets, Events and Bindings

UNIT 5 - Working with Django**12 Hours**

Rendering Templates into HTML and Other Formats, Understanding Models, Views, and Templates, Separating the Layers (MVC) - Models, Views, Templates, Overall Django Architecture, Defining and Using Models, Using Models, Templates and Form Processing, Setting up the Database, Using a Database Server, Using SQLite, Creating the Tables

TEXT BOOKS / REFERENCES:**Text books:**

1. Timothy A. Budd: Exploring Python, Tata McGraw-Hill, 2011.

2. Jeff Forcier, Paul Bissex, Wesley Chun: Python Web Development with Django, Addison-Wesley, 2008.

Reference books:

1. Ascher, Lutz: Learning Python, 4th Edition, O'Reilly, 2009.
2. Wesley J Chun: Core Python Applications Programming, Pearson Education, 3rd Edition, 2013.
3. Paul Gries, Jennifer Campbell, Jason Montojo , Practical Programming: An introduction to Computer Science Using Python, second edition, Pragmatic Bookshelf.
4. Allen Downey , Jeffrey Elkner , Learning with Python: How to Think Like a Computer Scientist Paperback –, 2015

ADDITIONAL LEARNING SOURCES:

1. <http://www.network-theory.co.uk/docs/pytut/>
2. <http://docs.python.org/tutorial/>
3. <http://zetcode.com/tutorials/pythontutorial/>
4. <http://www.sthurlow.com/python/> <http://www.tutorialspoint.com/python/>
5. <http://www.djangoproject.com/>
6. <http://www.djangobook.com/>

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	L	L	M	L	L	L	L	M	L	L	L
CO2	L	M	M	M	H	L	L	L	M	H	L	L
CO3	H	H	H	H	M	M	L	L	L	L	L	L
CO4	H	H	H	H	M	M	L	L	L	L	L	L
CO5	L	H	L	L	H	M	L	L	L	L	L	L

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semest er
				Theory	Laboratory	Tutorials	
II	IV	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
MCA420	Data and Web Mining	DBMS

COURSE ASSESSMENT METHOD:

Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events].

Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Interpret the basic concepts, principles and techniques of data mining.

CO2: Define knowledge discovery and data mining; recognize the key areas and issues in data mining.

CO3: Apply the techniques of clustering, classification, association finding, feature selection and visualization of real world data.

CO4: Determine whether a real world problem has a data mining solution.

CO5: Apply evaluation metrics to select data mining techniques.

TOPICS COVERED:**UNIT 1 - Introduction****10 Hours**

Data Mining, Functionalities, Data Cleaning, Data Integration and Transformation, Data Reduction. Data Mining Primitives, languages, and system Architectures, A Data Mining Query Language. Data Mining Applications, Trends in Data Mining.

UNIT 2 - Mining Association Rules in Large Data Bases**10 Hours**

Association Rule Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transactional Databases.

UNIT 3 - Classification, Prediction and Cluster Analysis**12 hours**

Issues regarding Classification and Prediction, Classification by Decision tree induction, Bayesian Classification, Classification by Back propagation, Classification based on the concepts from association rule mining, Other classification methods, Prediction. What is Cluster Analysis? Types of data in Cluster Analysis: A Categorization of Major Clustering Methods. Partitioning Methods, Hierarchical Methods, Outliner Analysis.

UNIT 4 - Web Mining, Search and Link Analysis**10 Hours**

Text and Web Page pre-Processing, Inverted Index and its Compression, Latent Semantic Indexing, Web search, Meta Search: combining Multiple Rankings, Combination Using Similarity Scores, Web Spamming, Link Analysis, Social Network Analysis Co-Citation and Bibliographic coupling, Page Rank HITS, Community discovery.

UNIT 5 - Social Network analysis, Mining Multimedia and World wide web**10 Hours**

What is social network, Characteristics of social networks, Mining social networks, Similarity search in multimedia data, Multi dimensional analysis of multimedia data, classification and

prediction of multimedia data, mining associations in multimedia data. Mining webpage layout structure, Mining multimedia data on the web, Automatic classification of web documents, Web usage mining.

TEXT BOOKS / REFERENCES:

1. Jiawei Han, Micheline Kamber, “Data Mining Concepts and Techniques”, Morgan Kauf Mann Publishers.2012
2. Arun.K.Poojari, “Warehousing and Mining”, PHI 2010.
3. Liu. B, “Web Data Mining, Exploring Hyperlinks, Contents and Usage Data”, Springer, 2012.

ADDITIONAL LEARNING SOURCES:

1. web.cse.ohio-state.edu/~srini/674/part1.ppt.
2. www.cse.iitb.ac.in/~dbms/Data/Talks/datamining-intro-IEP.
3. <http://facweb.cs.depaul.edu/mobasher/classes/ect584/syllabus.html>
4. <https://www.cs.uic.edu/~liub/WebMiningBook.html>

CO - PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	H	M	M	H	H	H	M	M	M
CO2	H	M	M	H	M	M	H	M	M	M	L	L
CO3	M	M	M	H	M	H	H	M	H	M	L	L
CO4	H	M	M	H	M	M	M	M	H	M	L	L
CO5	H	H	M	H	M	M	H	M	M	H	L	L

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	IV	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
MCA430	Software Architecture	Software Engineering

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Total Marks: 50 [10* 5].
2. Semester End Exam [Total Marks:100 Marks, Duration: 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

- CO1 :** Understand the need and importance of software architectures.
- CO2 :** Achieve system qualities like performance, security, and maintainability.
- CO3 :** Learn the system requirements and Choose a single or set of appropriate architectures based on the requirement.
- CO4 :** Evaluate the selected architecture for feasibility, Manage complexity, and Achieve reusability.
- CO5 :** Understand and achieve different tactics and Document the architectures.

TOPICS COVERED:

UNIT 1 - Introduction, Architectural Styles**12 Hours**

The Architecture Business Cycle: Where do architectures come from? Software processes and the architecture business cycle; What makes a “good” architecture? What software architecture is and what it is not; Other points of view; Architectural patterns, reference models and reference architectures; Importance of software architecture; Architectural structures and views.

Architectural styles; Pipes and filters; Data abstraction and object-oriented organization; Event-based, implicit invocation; Layered systems; Repositories; Interpreters; Process control; Other familiar architectures; Heterogeneous architectures.

UNIT 2 - Understanding and Achieving Quality Attributes**10 Hours**

Functionality and architecture; Architecture and quality attributes; System quality attributes; Quality attribute scenarios in practice; Other system quality attributes; Business qualities; Architecture qualities.

Achieving Quality: Introducing tactics; Availability tactics; Modifiability tactics; Performance tactics; Security tactics; Testability tactics; Usability tactics; Relationship of tactics to architectural patterns; Architectural patterns and styles.

UNIT 3 - Architectural Patterns – From Mud to Structures, Distributed Systems**12 Hours**

Introduction: From mud to structure: Layers, Pipes and Filters, Blackboard. Distributed Systems: Broker; Interactive Systems: MVC, Presentation-Abstraction-Control.

UNIT 4 - Adaptable Systems & Other systems**08 Hours**

Adaptable Systems: Microkernel; Reflection. Structural decomposition: Whole – Part; Organization of work: Master – Slave; Access Control: Proxy.

UNIT 5 - Designing and Documenting Software Architecture

10 Hours

Architecture in the life cycle; Designing the architecture; Forming the team structure; Creating a skeletal system. Uses of architectural documentation; Views; Choosing the relevant views; Documenting a view; Documentation across views.

TEXT BOOKS / REFERENCES:

Text books:

1. Len Bass, Paul Clements, Rick Kazman: Software Architecture in Practice, 3d Edition, Pearson Education, 2013.
2. Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal: Pattern-Oriented Software Architecture, A System of Patterns, Volume 1, John Wiley and Sons, 2012.
3. Mary Shaw and David Garlan: Software Architecture -Perspectives on an Emerging Discipline, Prentice Hall of India, 2010.

Reference books:

1. Richard N. Taylor, Nenad Medvidovic and Eric M. Dashofy: Software Architecture: Foundations, Theory, and Practice, Wiley- India 2012.

ADDITIONAL LEARNING SOURCES:

1. <http://www.sei.cmu.edu/architecture/>

2. <http://handbookofsoftwarearchitecture.com/>
3. <https://leanpub.com/software-architecture-for-developers/read>
4. <http://www.hillside.net/patterns/>

CO-PO MAPPING:

	P	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	H	H	H	H	M	M	M	H	M
CO2	H	M	H	M	M	M	H	L	M	M	M	M
CO3	H	M	H	M	M	M	H	H	M	M	M	M
CO4	H	M	M	M	M	M	H	L	M	M	M	H
CO5	M	H	H	H	H	H	H	M	H	M	H	H

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	IV	Theory	04	04	00	00	52
Course No		Course Title				Pre Requisites	
MCA440		Cryptography and Network Security				Computer Networks	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO 1:** Explore the need for computer security concepts.
- CO 2:** Understand the principles and techniques of symmetric key encryption and public key encryption.
- CO 3:** Describe the requirement and implementation of message authentication codes.
- CO 4:** Explore Pretty Good Privacy in Secured Electronic Mailing and Key Management.
- CO 5:** Understand Web Security, Secure Electronic Transaction, Intruder detection and

UNIT 1 – Introduction and Classical Encryption Technique**9 Hours**

Computer Security Concepts, OSI Security Architecture, Security Attacks, Security Services, Security Mechanism, Model for Network Security. Symmetric Cipher Model, Substitution Techniques, Transposition Techniques.

UNIT 2 - Block Ciphers, Public Key Cryptography and Key Management**11 Hours**

Traditional Block Cipher Structure, The Data Encryption Standard, A DES Example, The strength of DES, Block Cipher Design Principles, AES Structure, AES Transformation Functions, AES Key Expansion, An AES Example, Principles of Public Key Cryptosystem, The RSA Algorithm, Key Management, Diffie Hellman Key Exchange.

UNIT 3 - Cryptographic Hash Functions, Message Authentication Codes**12 Hours**

Applications of Cryptographic Hash Functions, Message Authentication, Digital Signatures, Two Simple Hash Functions, Requirements and Security, Security Requirements for Cryptographic Hash Functions, Brute-Force Attacks, Cryptanalysis, Hash Functions Based on Cipher Block Chaining, Secure Hash Algorithm (SHA), SHA-3, Message Authentication Requirements, Message Authentication Functions, Requirements for Message Authentication Codes, Security of MACs.

UNIT 4 – Electronic Mail Security and IP Security**10 Hours**

Pretty Good Privacy (PGP), S/MIME, IP Security Overview; IP Security Architecture; Authentication Header; Encapsulating Security Payload; Combining Security Associations.

UNIT 5 - User Authentication Protocols and Entity Authentication**10 Hours**

Web Security Considerations; Secure Socket Layer (SSL) and Transport Layer Security (TLS); Secure Electronic Transaction (SET), Intruders, Intrusion Detection, Firewall Design Principles- Characteristics, Types of Firewall and Firewall Configuration.

TEXT BOOKS / REFERENCES:**Text books:**

1. William Stallings, “Cryptography and Network Security – Principles and Practices”, 6th Edition, Pearson Education, 2014.
2. Behrouz A. Forouzan and Debdeep Mukhopadhyay: “Cryptography and Network Security”, 2nd Edition, Tata McGraw-Hill, 2014

Reference books:

1. Atul Kahate, “Cryptography and Network Security” 2nd Edition, Tata McGraw-Hill Publishing Company, 2010.
2. Network Security Private Communication in a public world, Charlie Kaufman, Radia Perlman & Mike Speciner, Prentice Hall of India Private Ltd., New Delhi, 2011.
3. Network Security Essentials Applications and Standards, William Stallings, Pearson Education, New Delhi, 2010.
4. Network Security Complete Reference by Roberta Bragg, Mark Phodes-Ousley, Keith Strassberg Tata McGraw-Hill, 2009.

OTHER REFERENCES:

1. <https://mrjacse.wordpress.com/2012/01/06/cryptography-network-security-ebooks/>
2. www.williamstallings.com/Crypto/Crypto4e.html

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	H	H	H	H	M	M	M	H	M
CO2	H	M	H	M	M	M	H	L	M	M	M	M
CO3	H	M	H	M	M	M	H	H	M	M	M	M
CO4	H	M	M	M	M	M	H	L	M	M	M	H
CO5	M	H	H	H	H	H	H	M	H	M	H	H

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru****Department of Master of Computer Applications [MCA]**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	IV	Theory (Stream)	0	04	0	0	65

Course No	Course	Pre Requisites
MCA 451	Artificial Intelligence and Robotics	-

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO 1:** Understand different types of AI agents.
- CO 2:** Know various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms).
- CO 3:** Understand the fundamentals of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving.
- CO 4:** Know how to build simple knowledge-based systems.
- CO 5:** Ability to apply knowledge representation, reasoning, and machine learning techniques to real-world problems.

TOPICS COVERED:

UNIT: 1 – Introduction to AI, Informed Search and Exploration**10 Hours**

Intelligent Agents: Agents and environment; Rationality; the nature of environment; the structure of agents. Problem-solving: Problem solving agents; Example problems; Searching for solution; uninformed search strategies.

Informed search strategies; Heuristic functions; On-line search agents and unknown environment.

UNIT: 2 - Constraint Satisfaction, Adversarial Search, Logical Agents:**10 Hours**

Constraint satisfaction problems; Backtracking search for CSPs. Adversarial search: Games; Optimal decisions in games; Alpha-Beta pruning. Knowledge-based agents; The wumpus world as an example world; Logic; propositional logic Reasoning patterns in propositional logic; Effective propositional inference; Agents based on propositional logic.

UNIT: 3 - First-Order Logic, Inference in First-Order Logic:**12 Hours**

Representation revisited; Syntax and semantics of first-order logic; Using first-order logic; Knowledge engineering in first-order logic. Propositional versus first-order inference; Unification and lifting; Forward chaining; Backward chaining; Resolution.

UNIT: 4 - Knowledge Representation and Learning, AI: Present and Future:**10 Hours**

Ontological engineering; Categories and objects; Actions, situations, and events; Mental events and mental objects; The Internet shopping world; Reasoning systems for categories; Reasoning with default information; Truth maintenance systems.

Learning: Forms of Learning; Inductive learning; Learning decision trees; Ensemble learning; Computational learning theory. AI: Present and Future: Agent components; Agent architectures; Are we going in the right direction? What if AI does succeed? Game theory.

UNIT: 5 – Introduction to Robotics :**10 Hours**

Introduction; Robot Hardware: sensors and Effectors; Robotic Perception: localization, mapping, other types of perception; Planning to Move: configuration space, cell decomposition methods and skeletonization methods; Planning uncertain movements: robust methods; Moving: dynamics and control, potential field control and reactive control; Robotic Software: architectures, subsumption architecture , three-layer architecture and robotic programming languages ; Application domains.

TUTORIALS:

1. Program to design tic-tac-toe game.
2. Program for breadth first and depth first search.
3. Program to N-Queens Problem.
4. To implement max-min problem.
5. To implement simulated Annealing Algorithm.
6. Write a program to implement A* program.
7. To implement Hill-Climbing Algorithm.

Text Book / References:

Text Book:

1. Stuart Russel, Petr Norvig: Artificial Intelligence A Modern Approach, 2nd Edition, Pearson Education, 2003.

References:

1. Elaine Rich, Kevin Knight: Artificial Intelligence, 2nd Edition, Tata McGraw Hill, 1991.
2. Nils J. Nilsson: Principles of Artificial Intelligence, Elsevier, 1980.

CO-PO MAPPING:

		PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
	CO1	H	H	H	M	M	L	M	M	L	L	M	L
	CO2	H	M	L	M	M	L	L	L	L	M	M	M
	CO3	H	H	H	H	M	L	M	M	L	L	L	M
	CO4	M	M	L	M	L	L	L	L	M	L	M	L
	CO5	H	H	H	H	M	M	M	M	L	L	L	L

JSS MAHAVIDYAPEETHA**JSS Science and Technology University, Mysuru ,
Department of Master of Computer Applications [MCA].**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	IV	Theory [Stream]	05	03	00	02	65
Course No		Course Title				Pre Requisites	
MCA452		NoSQL				RDBMS	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to :

- CO1:** Understand the meaning, need, challenges of NoSQL
- CO2:** Able to explore more about storage modes in database
- CO3:** Gain knowledge about performing transactions and more about CURD
- CO4:** Implement and manage data specific to MongoDB and CouchDB
- CO5:** Explore the usage and ordering of Bulk data in the real time environment.

TOPICS COVERED:

UNIT 1 – An Overview and Characteristics of NoSQL

10 Hours

Introduction to NoSQL : An Overview of NoSQL , Defining NoSQL, History, What NoSQL is and what it is not, Why NoSQL?, List of NoSQL Databases. Characteristics of NoSQL: Application, RDBMS approach, Challenges, NoSQL approach.

UNIT 2 – NoSQL Storage Types

12 Hours

Modifying and managing NOSQL, Data stores, Indexing and ordering datasets (MongoDB/ CouchDB / Cassandra) NoSQL Storage Types : Storage types, Column-oriented databases, Document store, key-value store, graph store, multi-storage type databases, comparing the models.

UNIT 3 – Advantages and Drawbacks

10 Hours

Advantages and Drawbacks : Transactional application, Computational application, Web-scale application. Performing CURD operations : Creating records, accessing data, updating and deleting data.

UNIT 4 - Querying SQL

10 Hours

Querying NoSQL stores : similarities between NoSQL and MongoDB query features. Managing data stores and managing evolutions.

UNIT 5 – Indexing and Ordering

10 Hours

Indexing and ordering data sets: Essential concepts behind database index, indexing and ordering in MongoDB, indexing and ordering in CouchDB, Comparative Study of NoSQL Products Comparison: Technical comparison, Implementation language, Engine types, Speed, Features, Limits, Bulk operations, Bulk read, Bulk insert, Bulk update, Bulk delete, Query options.

TUTORIAL

Case Study

1. Application definition, Requirement analysis, Implementation using MongoDB, Features and constraints.
2. Database design, Database queries, Database modeling, Schema definition, Writing queries.
3. Queries for a single entity, simple result, Queries for a single entity, Aggregate, Queries for a one to one relationship.
4. Queries for a one to many relationship, Queries for a many to many relationship, Miscellaneous queries.
5. Pagination, Limiting items in an array in result set.
6. Plug-in and dynamic data support, Model refinements.
7. Reference using non-ID property, Demoralizations and document embedding.
8. Complete document embedding and Partial document embedding.
9. Bucketing, Cache document approach, Miscellaneous changes.

TEXT BOOKS / REFERENCES:

TEXT BOOKS :

1. Shanshank Tiwari “Professional NOSQL”, WROX Press, 2011
2. Pramod.J.Sadalage and Martin Fowler, “NoSQL Distilled : A Brief guide to the emerging world of polygot persistence”, Pearson Education corporation, I Edition, 2014.

Reference Books :

1. The definitive guide to MONGODB, The NOSQL Database for cloud and desktop computing, Apress 2010.

ADDITIONAL LEARNING SOURCES:

1. <https://www.mongodb.com/nosql-explained>
2. <http://www.dbta.com/Editorial/Trends-and-Applications/NoSQL-for-the-Enterprise-80198.aspx>
3. <http://www.oracle.com/technetwork/database/databasetechnologies/nosql/db/overview/index.html>

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	M	M	M	H	H	H	M	H	H
CO2	H	H	L	H	H	M	M	M	L	M	H	H
CO3	H	H	L	M	H	M	H	H	L	M	H	H
CO4	H	H	M	H	H	L	M	M	M	M	H	H
CO5	H	H	H	L	L	H	H	H	H	M	H	H

JSS Science and Technology University, Mysuru
Department of Master of Computer Applications [MCA]

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	IV	Theory (Stream)	05	03	00	02	65
Course No		Course Title				Pre Requisites	
MCA453		Business Intelligence				ERP	

COURSE ASSESSMENT METHOD:

. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO1:Understand the basic BI and its business and technical needs

CO2:Understand the defining the requirements and architectural framework of the BI.

CO3:Understand the different components of the BI framework.

CO4:Understand the BI design concepts.

CO5:Understand the advanced BI analytics the techniques.

TOPICS COVERED:

UNIT 1-The Business Demand for Data, Information, and Analytics

10 Hours

Just One Word:Data, Welcome to the Data Deluge, Data Volume, Variety, and Velocity, Taming the Analytics Deluge, The Importance of Analytics, Analytics Challenge, Analytics Strategy, Too Much Data, Too Little Information, The Difference Between Data and Information, The Role of BI in Creating Actionable Information, The Information Backbone, Data Capture versus Information Analysis, The Roles of BI and Operational Systems, Operational BI Blurs the Lines, Where Data

Warehousing Fits in, The Five Cs of Data, Common Terminology from Our Perspective, References.

Justifying BI: Building the Business and Technical Case: Why Justification is Needed, Building the Business Case, Review Organization's Business Initiatives and Processes, Solicit BI Sponsorship, Enlist BI Stakeholders, Identify Business Processes Affected by BI, Document Business Benefits, Determine Business Value (Tangible Benefits), Business the Technical Case, Technology and Product Short Lists, Convincing Business People, Convincing the Technologists, Assessing Readiness, Data and Data Quality, Expertise and Experience, Organizational and Cultural Change, Financial and Resource Commitment, Creating a BI Road Map, Developing Scope, Preliminary Plan and Budget, Project Scope, Project Plan, Project Budget, Calculating Benefits and ROI, Obtaining Approval, Common Justification Pitfalls, Overzealous Business Sponsor, CIO is Sole Sponsor, Intangible or Too High-Level Benefits, Confusion Between BI Technology and Business Value.

UNIT 2-Defining Requirements-Business, Data and Quality

10 Hours

The Purpose of Defining Requirements, Goals, Deliverables, Roles, BI Team Participants, Business Participants, Other IT Participants, Defining Requirements Workflow, Business Requirements, Data (and Data Quality) Requirements, Functional Requirements, Regulatory/Compliance Requirements, Technical Requirements, Reverse Engineering (When Necessary), Putting It All Together, Prioritizing Requirements, Interviewing, Preparation for Interviews, Conducting the Interviews, Reviewing Interview Content, Interview Follow-ups, Documenting Requirements.

Architecture Framework: The Need for Architectural Blueprints, Architectural Framework, Information Architecture, Data Architecture, The Rise of the Enterprise Data Warehouse, Data Warehousing Replaces the Data Warehouse, Technical Architecture, Business Intelligence, Data Warehouse and BI Data Stores, Data Integration, Source Systems, BI Technology Keeps Evolving, Product Architecture, Metadata, What is It?, What to do About It, Security and Privacy, Getting Started, Implementing the Plan, Avoiding Accidents with Architectural Planning, The Signs of Accidental Architectural Planning, Recovering from an Accidental Architecture, Do Not Obsess over the Architecture.

UNIT 3-Information Architecture

10 Hours

The Purpose of an Information Architecture, Data Integration Framework, DIF Information Architecture, Data Preparation, Data Franchising, BI and Analytics, Data Management, Metadata Management, Operational BI versus Analytical BI, Shift All Reporting to the Application-Specific

Environment, Shift All Reporting to the DW-Based BI Environment, Blend Application-Specific and DW BI Environments, Master Data Management, Identify the Data, Find the Problem Areas, Assess a Solution.

Data Architecture: The Purpose of a Data Architecture, History, Prehistory, In the Beginning, Data Warehousing Goes Public, The Data Mart, Multiple Data Marts, Operational Data Store(ODS), Federated DWs, BI Accidental Architecture, Hub-and-Spoke, Data Architectural Choices, Data Categories, Selecting a Data Architecture, The Same But Different, Analytical Data Architecture(ADA), Data Integration Workflow, Data Integration Workflow—Hub-and-Spoke, Data Workflow of the System of Integration(SOI), Data Workflow of the System of Analysis(SOA), Data Workflow—Rise of EDW Again, Operational Data Store, The Relational for an ODS, ODS Reexamined, ODS is Dead, Long Live ODS, References.

UNIT 4-Technology & Product Architectures

10 Hours

Where are the Product and Vendor Names?, Evolution Not Revolution, Technology Platforms, Enterprise Applications, Data Management, Technology Architecture, Business Intelligence and Analytics, Information Access and Data Integration, Databases, Product and Technology Evaluations, BI Product Vendors, Dazed and Confused, Technology and Product Evaluations, Product Migration.

Business Intelligence Applications: BI Content Specifications, Revise BI Applications List, BI Personas, Casual Consumers, Analyst, Power Users, Data Scientists, BI Design Layout—Best Practices, Focus on the Purpose, Design Layout, Data Design for self-Services BI, The Last Data Preparation Step, When Inconsistency is Reintroduced, OLAP Cubes and In-Memory Columnar Databases, Matching types of analysis to Visualizations, Comparative Analysis, Time-series or Trending Analysis, Contribution Analysis, Correlation Analysis, Geographic Data, Distribution Analysis.

UNIT 5-BI Design and Development

12 Hours

BI Design, BI User Interface(UI) Standards, Create Privacy, Security and Access Standards, Designing Each BI Application, BI Development, Prototyping Lifecycle, BI Application Development Tasks, BI Application Testing.

Advanced Analytics: Advanced Analytics Overview and Background, The Window to the Future, Don't Ignore the Past, Advanced Analytics in Action, Predictive Analytics and Data Mining, Setting

Up a Predictive Analytics or Data Mining Program, Tasks for Developing and Using Models, Selecting Tools, Architecture for Predictive Analytics and Data Mining, Techniques for Predictive Analytics and Data Mining, Resources and Skills, Roadblocks to Success, Analytical Sandboxes and Hubs, Analytical Sandboxes, Analytical Hubs, Hub and Sandbox Design Principles, Hub and Sandbox Architecture Options, Advice for Hubs and Sandboxes, Big Data Analytics, Scope, The Program, Hybrid Architecture, The Big Data Team, Big Data Analytics Worst Practices, Data Visualization, Why Data Visualization is Needed, Why Data Visualization is Not, References.

TUTORIALS:

1. Case study on requirement specification.
2. Defining a requirement workflow.
3. Writing technical requirement specification.
4. Prioritizing the requirements.
5. Writing a BIE roadmap.
6. Writing & Defining scope objectives & outcomes.
7. Writing a plan & budget.
8. Writing Data Management techniques.
9. Creating data marts & operational data stores.
10. Creating OLAP Cubes.

TEXT BOOKS / REFERENCES:

Text books:

1. “Business Intelligence Guidebook: From Data Integration to Analytics” Book by Rick Sherman, 1st Edition, 2014.

Reference books:

1. Business Intelligence Roadmap: The Complete Project Lifecycle for Decision-Support Applications by Larissa T. Moss and ShakuAtre, February 25th 2003.
2. Successful Business Intelligence, Second Edition: Unlock the Value of BI & Big

3. DataHardcover– Import, 1 Nov 2013.
4. Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die, Revised and UpdatedPaperback– 22 Feb 2016.

ADDITIONAL LEARNING SOURCES:

1. <https://thebipalace.com/>
2. <https://www.analyticsvidhya.com/learning-paths-data-science-business-analytics-business-intelligence-big-data/tableau-learning-path/>

CO - PO MAPPING:

[illegible]

JSS Science and Technology University, Mysuru

Department of Master of Computer Applications [MCA]

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	IV	Theory	02	02	00	00	26

Course No	Course Title	Prerequisites
MCA460	Foreign Language (French/German/Japanese)]	---

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events].
2. Semester End Exam [50 Marks, 2 Hours]

COURSE OUTCOMES:

TOPICS COVERED:

TEXT BOOKS/ REFERENCES:

JSS Science and Technology University, Mysuru
Department of Master of Computer Applications [MCA]

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	IV	Laboratory	01	00	03	00	48
Course No		Course Title				Pre Requisites	
MCA41L		Python Programming Laboratory				OOPS Concepts	

COURSE ASSESSMENT METHOD:

Internal Assessment [Test-1 + Test-2 + Observation book + Record + Viva: 15 + 15 + 05 + 05 +10] Marks: 50

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO1:** Understand and comprehend the basics of python programming.
- CO2:** Apply knowledge in real time applications.
- CO3:** Understands about files and its applications.
- CO4:** Apply object-oriented programming concepts to develop dynamic interactive Python applications
- CO5:** Demonstrate MVC architecture with respect to Django framework

LIST OF EXPERIMENTS COVERED:

1. Data Types and Data Structures :

Introduction to Python: - using the Python interpreter, Python built-in types, Arithmetic in Python, Program input and Program output, Variables and assignment. Strings and string operations, List basics, List operations, Dictionaries, Dictionary basics and Tuples,
(a) Simple programs using elementary data items, lists, dictionaries and tuples.

2. Control Structures:

Control Statements:-if statements, while statement, for statements, functions, formal arguments, variable-length arguments, Exceptions, detecting and handling exceptions.

- (a) Programs using conditional branches, loops.
- (b) Programs using functions
- (c) Programs using exception handling

3. Classes ,files and modules

Introduction to Classes and Objects:-classes, class attributes, instances, instance attributes, binding and method invocation, inheritance, polymorphism, Built-in functions for classes and instances.

Files and input/output, reading and writing files, methods of file objects, using standard library functions, dates and times

- (a) Programs using classes and objects
- (b) Programs using inheritance
- (c) Programs using polymorphism
- (d) Programs to implement file operations.
- (e) Programs using modules.

4. Database and web programming

Python database application programmer's interface (DB- API), connection and cursor objects, Type objects and constructors, python database adapters. Creating simple web clients, introduction to CGI, CGI module, building CGI applications, python web application frameworks: django.

- (a) Programs using python database API.
- (b) Programs for creating simple web pages.
- (c) Programs for creating dynamic and interactive web pages using forms.

5. Development of sample web applications using python.

Sample applications may include

- i) Web based polling

- ii) Social networking site
- iii) Online transaction system
- iv) Content management system

TEXT BOOKS / REFERENCES:

Text books:

1. Timothy A. Budd: Exploring Python, Tata McGraw-Hill, 2011.
2. Jeff Forcier, Paul Bissex, Wesley Chun: Python Web Development with Django,
3. Addison-Wesley (e-book), 2008.

Reference books:

1. Ascher, Lutz: Learning Python, 4th Edition, O'Reilly, 2009.
2. Wesley J Chun: Core Python Applications Programming, Pearson Education, 3rd Edition, 2013.
1. Paul Gries, Jennifer Campbell, Jason Montojo , Practical Programming: An introduction to Computer Science Using Python, second edition, Pragmatic Bookshelf.
2. Allen Downey , Jeffrey Elkner , Learning with Python: How to Think Like a Computer Scientist Paperback –, 2015

ADDITIONAL LEARNING SOURCES:

<http://www.network-theory.co.uk/docs/pytut/>

<http://docs.python.org/tutorial/>

<http://zetcode.com/tutorials/pythontutorial/>

<http://www.sthurlow.com/python/> <http://www.tutorialspoint.com/python/>

<http://www.djangoproject.com/>

<http://www.djangobook.com/>

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO	PO	PO1	PO1	PO12
CO1	H	L	L	M	L	L	L	L	M	L	L	L
CO2	L	M	M	M	H	L	L	L	M	H	L	L
CO3	H	H	H	H	M	M	L	L	L	L	L	L
CO4	H	H	H	H	M	M	L	L	L	L	L	L
CO5	L	H	L	L	H	M	L	L	L	L	L	L

JSS Science and Technology University, Mysuru
Department of Master of Computer Applications [MCA]

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	IV	Laboratory	01	00	03	00	48

Course No	Course Title	Pre Requisites
MCA42L	Data and Web Mining Laboratory	RDBMS, ADA

COURSE ASSESSMENT METHOD:

1. Internal Assessment [Test-1 + Test-2 + Observation book + Record + Viva : 15 + 15 + 05 + 05 +10]
Marks: 50

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

- CO1:** To understand the fundamental processes, concepts and techniques of data mining and warehousing.
- CO2:** To develop an appreciation for the inherent complexity of the data-mining and warehousing tasks.
- CO3:** To Analyze the Advance programming skills relevant to the data-mining and warehousing task.
- CO4:** Will make students Understanding of contemporary data-mining and warehousing systems.
- CO5:** To understand the concepts, strategies, and methodologies related to the design and construction of data mining.

LIST OF CASE STUDIES COVERED:

The following are the list of algorithms where, the students are going to trace the steps of the

algorithm using advanced programming and demonstrate the flow of the algorithm.

1. Apriori Algorithm.
2. Partition algorithm.
3. DIC Algorithm.
4. FP-Tree Algorithm.
5. Update algorithm.
6. Border algorithm.
7. Decision Tree Algorithm.
8. K-medoids Algorithm.
9. K-means Algorithm.
10. Generalized Sequential Patterns.
11. KNN Algorithm.
12. K-mean Clustering Algorithm.
13. Apriori Influential Algorithm.

TEXT BOOKS / REFERENCES:

1. Jiawei Han, Micheline Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann Publishers.2012
2. Arun.K.Poojari, "Warehousing and Mining", PHI 2010
3. Liu. B, "Web Data Mining, Exploring Hyperlinks, Contents and Usage Data", Springer, 2012.

ADDITIONAL LEARNING SOURCES:

1. web.cse.ohio-state.edu/~srini/674/part1.ppt.
2. www.cse.iitb.ac.in/~dbms/Data/Talks/datamining-intro-IEP.

CO - PO MAPPING:

TOPICS COVERED:

- 1 Students are expected to build an application by using the concepts learned earlier like
- 2 Standard procedures of software engineering,
- 3 Languages such as Java, Python, PHP etc.
- 4 Database like MySQL, Oracle, MS SQL etc. and
- 5 Their areas of interest like machine Learning, Networking, Business applications etc.

ADDITIONAL LEARNING SOURCES:

1. http://www.ibm.com/developerworks/websphere/library/techarticles/0306_perks/perks2.html
2. <https://hedleyproctor.com/software-development-best-practices/>
3. <http://www.comentum.com/guide-to-web-application-development.html>
4. http://www.tutorialspoint.com/developers_best_practices/
5. <https://www.sans.org/reading-room/whitepapers/application/framework-secure-application-design-development-842>
6. [https://msdn.microsoft.com/en-us/library/aa260844\(v=vs.60\).aspx](https://msdn.microsoft.com/en-us/library/aa260844(v=vs.60).aspx)
7. https://www.owasp.org/index.php/OWASP_Secure_Coding_Practices_-_Quick_Reference_Guide
8. <http://www.computerworld.com/article/2572077/app-development/best-practices-for-software-development-projects.html>

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	M	H	H	H	H	H	H	M	M	M	H	M
CO2	H	M	H	M	M	M	H	L	M	M	M	L
CO3	H	M	H	M	M	M	H	L	M	M	M	L
CO4	H	M	M	M	M	M	H	L	M	M	M	L
CO5	M	H	H	H	H	H	H	M	H	M	H	H

JSS Science and Technology University, Mysuru

Department of Master of Computer Applications [MCA]

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	IV	Laboratory	01	00	03	00	48
Course No		Course Title				Pre Requisites	
MCA44L		Cryptography and Network Security Laboratory				Computer Networks	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [Test-1 + Test-2 + Observation book + Record + Viva: 15 + 15 + 05 + 05 +10] Marks: 50

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO 1:** Explore the need for computer security concepts.
- CO 2:** Understand the principles and techniques of symmetric key encryption and public key encryption.
- CO 3:** Describe the requirement and implementation of message authentication codes.
- CO 4:** Explore Pretty Good Privacy in Secured Electronic Mailing and Key Management.
- CO 5:** Understand Web Security, Secure Electronic Transaction, Intruder detection and Firewalls

LIST OF EXPERIMENTS COVERED:

1. Implementation of Caesar Cipher technique
2. Implementation of Shift or Additive Cipher Technique
3. Implementation of Poly-alphabetic Cipher Technique
4. Implement the Playfair Cipher
5. Implement the Pure Transposition Cipher
6. Implement DES Encryption and Decryption
7. Implement the AES Encryption and decryption
8. Implement RSA Encryption Algorithm
9. Implementation of Diffie Hellman Key Exchange
10. Implementation of Hash Functions

11. Implementation of Digital Signature

12. Test and understand the function of different Firewalls.

Note: Students may use any programming languages like C, C++ or Java etc. for implementation of experiments

TEXT BOOKS / REFERENCES:

Text books:

1. William Stallings, “Cryptography and Network Security – Principles and Practices”, 6th Edition, Pearson Education, 2014.
2. Behrouz A. Forouzan and Debdeep Mukhopadhyay: “Cryptography and Network Security”, 2nd Edition, Tata McGraw-Hill, 2014.

Reference books:

1. Atul Kahate, “Cryptography and Network Security” 2nd Edition, Tata McGraw-Hill Publishing Company, 2010.
2. Network Security Private Communication in a public world, Charlie Kaufman, Radia Perlman & Mike Speciner, Prentice Hall of India Private Ltd., New Delhi, 2011.
3. Network Security Essentials Applications and Standards, William Stallings, Pearson Education, New Delhi, 2010.
4. Network Security Complete Reference by Roberta Bragg, Mark Phodes-Ousley, Keith Strassberg Tata McGraw-Hill, 2009.

ADDITIONAL LEARNING SOURCES:

1. <https://mrjacse.wordpress.com/2012/01/06/cryptography-network-security-ebooks/>
2. www.williamstallings.com/Crypto/Crypto4e.html

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO	M	H	H	H	H	M	M	M	H	H	H	H
CO	H	H	H	H	H	H	H	L	H	M	M	M
CO	H	H	H	H	H	H	H	L	H	M	M	H
CO	H	H	H	H	H	H	M	M	H	M	H	H
CO	H	H	H	M	H	H	H	M	H	M	H	H

JSS Science and Technology University, Mysuru
Department of Mater of Computer Applications [MCA]

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
III	V	Theory	04	04	00	00	52
Course No		Course Title				Pre Requisites	
MCA510		.NET Technologies				OOPS,Java	

COURSE ASSESSMENT METHOD:

Internal Assessment [5 Events: 3 Written Tests, 2 Events] Total Marks: 50 [10* 5].

Semester End Exam [Total Marks:100 Marks, Duration: 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

- CO1 :** Understand the concept of .NET framework and basics of C# .NET.
- CO2 :** Create Console Applications using the C#.NET.
- CO3 :** Develop Web Applications using the ASP.NET
- CO4 :** Understand the ASP.NET web form, state management and error handling mechanism
- CO5 :** Access and manipulate data in a database by using Microsoft ADO.NET

TOPICS COVERED:

UNIT 1 –Introduction to .NET and Basics of C#.NET

12 Hours

The .NET Framework: The Evolution of Web Development-HTML and HTML Forms, Server-Side Programming, Client-Side Programming. The .NET Framework - C#, VB, and the .NET Languages, The Common Language Runtime, The .NET Class Library, Visual Studio. The .NET Languages, C#

Language Basics, Case Sensitivity, Commenting, Statement Termination, Blocks, Variables and Data Types-Assignment and Initializes, Strings and Escaped Characters, Arrays, Enumerations, Variable Operations- Advanced Math, Type Conversions. Object-Based Manipulation- String, DateTime and TimeSpan Types, The Array Type. Conditional Logic-The if, switch Statement. Loops- The for, foreach, while loop, Methods-Parameters, Method Overloading, Optional and Named Parameters, Delegates.

UNIT 2 – C#.NET Types, Objects, and Namespaces

10 Hours

The Basics About Classes-Static Members, A Simple Class, Building a Basic Class-Creating an Object, Adding Properties, Automatic Properties, Adding a Method, Adding a Constructor, Adding an Event, Testing the Product Class. Value Types and Reference Types-Assignment Operations, Equality Testing, Passing Parameters by Reference and by Value, Reviewing .NET Types. Understanding Namespaces and Assemblies-Using Namespaces, Importing Namespaces, Assemblies. Advanced Class Programming-Inheritance, Static Members, Casting Objects, Partial Classes, Generics.

UNIT 3 - Developing ASP.NET Applications

10 Hours

Visual Studio: Creating Websites-Creating an Empty Web Application, Websites and Web Projects, The Hidden Solution Files, The Solution Explorer, Adding Web Forms, Designing a Web Page-Adding Web Controls, The Properties Window, and The Anatomy of a Web Form-The Web Form Markup, The Page Directive, The Doctype, The Essentials of XHTML. Writing Code-The Code-Behind Class, Adding Event Handlers, Outlining, IntelliSense, Code Formatting and Coloring, Visual Studio Debugging-The Visual Studio Web Server, Single-Step Debugging, Variable Watches, The Anatomy of an ASP.NET Application-ASP.NET File Types, ASP.NET Application Directories. Introducing Server Controls-HTML Server Controls, Converting an HTML Page to an ASP.NET Page, View State, The HTML Control Classes, Adding the Currency Converter Code, Event Handling, Error Handling

UNIT 4 – ASP.NET Web Form Basics, State Management & Error Handling

10 Hours

ASP.NET Configuration- The web.config File, Nested Configuration, Storing Custom Settings in the web.config File, The Website Administration Tool (WAT), Web Controls-Basic Web Control Classes, The Web Control Tags, Web Control Classes, List Controls, Table Controls, Web Control Events and

AutoPostBack, A Simple Web Page. The Problem of State-View State, Transferring Information Between Pages, Cookies, Session State, Session State Configuration, Application State, An Overview of State Management Choices. Error Handling, Logging, and Tracing-Common Errors, Exception Handling-The Exception Class, The Exception Chain, Handling Exceptions, Throwing Your Own Exceptions, Logging Exceptions, Page Tracing.

UNIT 5 – ADO.NET Fundamentals

10 Hours

Understanding Databases, Configuring Your Database-SQL Server Express, Browsing and Modifying Databases in Visual Studio, The *sqlcmd* Command-Line Tool. SQL Basics - Running Queries in Visual Studio, The Select, Update, Insert, Delete statement. The Data Provider Model: Direct Data Access-Creating a Connection, The Select Command, The DataReader, Putting It All Together, Updating Data. Disconnected Data Access-Selecting Disconnected Data, Selecting Multiple Tables, Defining Relationships. Introducing Data Binding-Types of ASP.NET Data Binding, How Data Binding Works, Single-Value Data Binding, Repeated-Value Data Binding, Data Source Controls.

TEXT BOOKS / REFERENCES:

Text books:

1. Matthew MacDonald. Beginning ASP.NET 4 in C# 2010, APRESS, 2010

Reference books:

1. Joseph Mayo. Visual studio 2010 - A beginners guide – BPB Publications 2010
2. Greg Buczec: ASP.Net Developer's Guide, Tata McGraw Hill Edition 4th Edition, 2005.
3. Pro ASP.NET 4 in C# 2010, MacDonald and Freeman

ADDITIONAL LEARNING SOURCES:

1. <https://msdn.microsoft.com/en-us/library/4w3ex9c2.aspx>

2. <http://www.asp.net/>
3. <http://www.aspfree.com/>
4. <http://www.devx.com/dotnet>
5. asp.net-tutorials.com/localization/local-and-global-resources/
6. https://www.tutorialspoint.com/asp.net/asp.net_ado_net.htm
7. www.w3schools.com/asp/ado_intro.asp
8. <https://www.tutorialspoint.com/soa/index.htm>

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	M	H	H	H	H	H	H	M	M	M	H	M
CO2	H	M	H	M	M	M	H	L	M	M	M	L
CO3	H	M	H	M	M	M	H	L	M	M	M	L
CO4	H	M	M	M	M	M	H	L	M	M	M	L
CO5	M	H	H	H	H	H	H	M	H	M	H	H

JSS Science and Technology University, Mysuru
Department of Master of Computer Applications [MCA]

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
III	V	Theory	04	04	00	00	52
Course No		Course Title				Pre Requisites	
MCA520		Mobile Applications				OOPS, Computer Networks	

COURSE ASSESSMENT METHOD:

- . Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
- . Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be to:

- CO1:** Gain broad understanding of the discipline of Mobile Application Development using J2ME Technology.
- CO2:** Develop User Interface for a J2ME application
- CO3:** Manage data on both service-side components and client-side applications and Address Portability and Compatibility issues between PDA'S and Cell phones.
- CO4:** Implement the design using Android SDK.
- CO5:** Implement the design using Objective C and iOS

TOPICS COVERED:

Unit 1 - J2ME Overview, Architecture and Development Environment **12 Hours**

Java 2 micro edition and the world of java, inside J2ME, J2ME and wireless devices. small

computing technology: wireless technology , radio data networks, microwave technology, mobile radio Networks, messaging, personal digital assistants.

J2ME architecture, small computing device requirements, run time environment, midlet programming, java language for J2ME, J2ME software development kits, hello world J2ME style, multiple midlets in a midlet suite, J2ME wireless toolkit.

Unit 2 - J2ME Best Practices and Patterns

10 Hours

The reality of working in a J2ME world, best practices commands, items, and event processing: J2ME user interfaces , display class, the palm OS emulator, C command class, item class, exception handling. high level display screens: screen class, alert class, form class, item class, list class, text box class, ticker class. low-level display canvas:

The Canvas, User Interactions, Graphics, Clipping Regions, Animation.

Unit 3 - Record Management System

10 Hours

Record storage, writing and reading records, record enumeration, sorting records, searching records, record listener. JDBC objects: The concept of JDBC, JDBC driver types, JDBC packages, overview of the JDBC process, database connection, statement objects, result set, transaction processing, metadata, data types, exception.

Unit 4 - Technology-I Android-12

10 Hours

Introduction – establishing the development environment – android architecture – activities and views – interacting with UI – persisting data using SQLite – packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wifi – Integration with social media applications.

Unit 5 - Technology-II IOS-12

10 Hours

Introduction to objective C – iOS features – UI implementation – Touch frameworks – Data persistence using Core Data and SQLite – Location aware applications using Core Location and

Map Kit – Integrating calendar and address book with social media application – Using Wifi - iPhone marketplace.

TEXT BOOKS / REFERENCES:

Text Books:

1. James Keogh , J2ME The Complete Reference , Tata McGrawHill.
2. Charlie Collins, Michael Galpin and Matthias Kappler, “Android in Practice”, DreamTech, 2012.
3. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, “Beginning iOS.

Reference Books:

1. Michael Juntao Yuan, Enterprise J2ME, Developing Mobile Java Applications Pearson Education , 2011.
2. Sing Li, Jonathan B. Knudsen, Beginning J2ME: From Novice to Professional, Third Edition, Apress, 2015.
3. Development: Exploring the iOS SDK”, Apress, 2013.

ADDITIONAL LEARNING SOURCES:

1. <http://developer.android.com/develop/index.html>.

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	H	L	L	M	L	M	M	H	H
CO2	H	H	H	H	L	L	M	L	M	L	H	H
CO3	H	H	H	H	L	L	M	L	M	L	H	H
CO4	H	H	H	H	L	L	M	L	M	M	H	H
CO5	H	H	H	H	L	L	M	L	M	M	H	H

JSS Science and Technology University, Mysuru,
Department of Master of Computer Applications [MCA].

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
III	V	Theory	04	04	00	00	52
Course No		Course Title				Pre Requisites	
MCA530		Software Testing and Practices				Software Engineering	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO1:** Understand the Basics and Test software in structured, organized ways
- CO2:** Apply modern software testing processes in relation to software development and project management
- CO3:** Create test strategies and plans, design test cases, prioritize and execute them
- CO4:** Manage incidents and risks within a project
- CO5:** Contribute to efficient delivery of software solutions and implement improvements in the software development processes and expose to need and mode of agile testing

TOPICS COVERED:

UNIT 1- Basics of Software Testing

12 Hours

Humans, Errors and Testing, Software Quality; Requirements, Behavior and Correctness, Correctness Vs Reliability; Testing and Debugging; Test Metrics; Software and Hardware

Testing; Testing and Verification; Defect Management; Execution History; Test Generation Strategies; Static Testing; Test Generation from Predicates.

Basic Principles, Test case selection and Adequacy

Sensitivity, Redundancy, Restriction, Partition, Visibility and Feedback, Test Specification and cases, Adequacy Criteria, Comparing Criteria

UNIT 2- A perspective on Testing, Examples

8 Hours

Basic definitions, Test cases, Insights from a Venn diagram, Identifying test cases, Error and fault taxonomies, Level of testing, Examples: Generalized pseudocode, The triangle problem, theNextDate function, The commission problem, The SATM (Simple Automation Teller Machine) problem, The currency converter, Saturn windshield wiper.

UNIT 3 - Boundary value, Equivalence class and Decision table based testing

8 Hours

Boundary value analysis, Robustness testing, Worst-case testing, special value testing, Examples, Random testing, Equivalence classes, Equivalence test cases for triangle problem, Next Date function and commission problem, Guidelines and observations, Decision tables, Test cases for triangle problem.

UNIT 4 - Path Testing, Data flow testing, Levels and Integration Testing

12 Hours

DD Paths, Test coverage metrics, Basis path testing, guidelines and observations, Definition Use testing, Slice based testing, Guidelines and observations. Traditional view of testing levels, Alternative life cycle models, the SATM systems, separating integration and system testing, Guidelines and observations.

UNIT 5 - Fault Based Testing

12 Hours

Assumptions in fault-based testing, Mutation Analysis, Fault-based Adequacy Criteria; Variations on mutation Analysis; From Test case specification to Test Cases, Scaffolding,

Generic vs specific Scaffolding, Test Oracles, Self checks as oracles, Capture and Replay.

Agile Testing

Definition and description, how is it different from traditional testing, ten principals for testers, business-facing the test that support the testing.

TEXT BOOKS / REFERENCES:

TEXT BOOKS :

1. AdithyaP.Mathur “ Foundations of Software Testing – Fundamental Algorithms and Techniques”, Pearson Education India, 2011
2. MauroPezze, Michael Young, Software testing and Analysis- Process, Principles and Techniques”, Wiley India, 2012
3. Paul C Jourgensen, “Software Testing A Craftmans Approach”, Aueredach publications, 3rd edition, 2011
4. Lisa Crisping, Janet Gregory, “Agile Testing : A Practical Guide for Testers and Agile Team”, The Addison Wesley Signature Series, 2009.

REFERENCE BOOKS:

1. KshirasagaraNaik, PriyadarshiTripathy: Software Testing and Quality Assurance, Wiley India 2012
2. M.G.Limaye: Software Testing-Principels, Techniques and Tools – McGrawHill, 2009
3. Brain Marick: The Craft of Software Testing, Pearson Education India, 2008
4. Ron Patton: Software Testing, 2nd Edition, Pearson Education, India, 2013

ADDITIONAL LEARNING SOURCES:

1. <http://www.softwaretestinghelp.com/agile-scrum-methodology-for-development-and-testing/>
2. <http://crbtech.in/Testing/agile-model-software-testing/>
3. <https://www.getzephyr.com/test-management/agile-model-in-software-testing>

4. <http://www.mountangoatsoftware.com/>

5. <http://www.testingexperience.com/>

6. <http://www.infoq.com/>

<http://www.qasymphony.com/>

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CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	M	M	M	H	H	H	M	H	H
CO2	H	H	H	H	H	M	M	M	H	M	H	H
CO3	H	L	H	M	H	M	H	M	H	M	H	L
CO4	H	L	H	M	H	M	L	M	H	M	H	M
CO5	H	M	H	L	H	H	L	L	H	M	H	H

JSS Science and Technology University, Mysuru

Department of Master of Computer Applications [MCA]

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
III	V	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
MCA540	Cloud Computing	Computer Networks

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

CO1: Understand the architecture of Cloud Computing.

CO2: Understand and use the service models and Deployment.

CO3: Work on any real cloud service.

CO4: Understand the service Management and Security of Cloud.

CO5: Understand the Computing Paradigms and Cloud Computing.

Topics Covered:

UNIT 1- Introduction to Cloud Computing

11 Hours

Defining Cloud Computing, Cloud types, The NIST model, The Cloud Cube Model, Deployment models, Service models, Examining the Characteristics of Cloud Computing, paradigm shift, Benefits of cloud computing, Disadvantages of cloud computing, Assessing the role of open standards.

Assessing the Value Proposition: Measuring the Cloud's Value, Early adopters and new application, The laws of clouconomics, Cloud computing obstacles, Behavioral factors relating to cloud adoption, Measuring cloud computing costs, Avoiding Capital Expenditures, Right-sizing, Computing the total cost of ownership, Specifying service level agreements, Defining licensing models. Understanding Cloud Architecture: Exploring the cloud computing stack, Composability, Infrastructure, Platforms. Virtual Appliances, Communication Protocols, Applications, Connecting to the Cloud, The Jolicloud Netbook OS, Chromium OS: The browser as an Operating System.

UNIT 2- Understanding Service and Application by Type

10 Hours

Defining Infrastructure as a service (IaaS), Defining Platform as a Service (PaaS), Defining Software as a Service (SaaS), Defining Identity as a Service (IDaaS), and Defining Compliance as a Service (CaaS). Understanding Abstraction and Virtualization: Using Virtualization technologies, Load Balancing and Virtualization, Understanding Hypervisors, Understanding Machine Imaging, Porting Applications. Capacity Planning: Capacity Planning, Defining Baseline and Metrics, Network Capacity, Scaling.

UNIT 3 - Exploring Platform as a Service

10 Hours

Defining Services, Using PaaS Application Frameworks Using Google Web Services: Exploring Google Applications, Surveying the Google Application Portfolio, Exploring the Google Toolkit, Working with the Google App Engine. Managing the Cloud: Administrating the Clouds, Cloud Management Products, Emerging Cloud Management Standards.

UNIT 4 - Understanding Cloud Security

10 Hours

Securing the cloud, Securing data, Establishing identity and Presence. Moving Application to the Cloud: Application in the Cloud, Applications and cloud APIs. Working with cloud-based storage: Measuring the digital universe, Provisioning Cloud Storage, Exploring Cloud Backup Solutions, Cloud Storage Interoperability.

UNIT 5: Using Webmail Services**10 Hours**

Using Webmail Services: Exploring the cloud Mail Services, Working with syndication services. Communicating with the cloud: Exploring instant messaging, Exploring collaboration technologies, Using social networks. Working with Mobile Devices: Defining the Mobile Market, Using Smart phones with the Cloud.

Text Books/ References:**Text Books:**

1. Barrie Sosinsky “Cloud Computing Bible” 2011 by Wiley Publishing, Inc.

Reference Books:

1. Cloud Computing Principles and Paradigms by Rajkumar Buyya 2011, Published by John Wiley & Sons
2. Cloud Computing Theory and Practice by Dan C. Marinescu, 2013, Published by Morgan Kaufmann.

Additional Resource :

1. <https://cloudacademy.com/ebooks>
2. www.freebookcentre.net › Networking Books

CO-PO MAPPING

	P01	PO2	PO	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	H	H	H	L	M	H	H	L	H	L	L	M
C02	M	M	M	M	M	H	H	L	H	M	L	M
C03	L	M	M	H	H	H	M	H	M	H	M	M
C04	L	H	M	M	H	M	M	H	M	H	H	M
C05	H	H	M	H	L	L	M	M	M	M	H	H

JSS Science and Technology University, Mysuru
Department of Master of Computer Applications [MCA]

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
III	V	Theory (Stream)	05	03	00	02	65
Course No		Course Title				Pre Requisites	
MCA551		Soft Computing				CVPR/AIR	

COURSE ASSESSMENT METHOD:

- . Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
- . Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

- CO1 :** Learn various soft computing frame work.
- CO2 :** Familiarize with design of various neural networks.
- CO3 :** Explore to fuzzy logic.
- CO4 :** Learn genetic programming concepts.
- CO5 :** Explore hybrid systems of soft computing.

TOPICS COVERED:

UNIT 1 - Introduction

10 Hours

Artificial neural network: Introduction, characteristics- learning methods – taxonomy – Evolution of neural networks- basic models – important technologies – applications. Fuzzy logic: Introduction – crisp sets- fuzzy sets – crisp relations and fuzzy relations: Cartesian product of relation – classical relation, fuzzy relations, tolerance and equivalence relations, non-iterative fuzzy sets. Genetic algorithm- Introduction – biological background – traditional optimization and search techniques – Genetic basic concepts.

UNIT 2 - Neural Networks**10 Hours**

McCulloch-Pitts neuron – linear separability – hebb network – supervised learning network: perceptron networks – adaptive linear neuron, multiple adaptive linear neuron, BPN, RBF, TDNN-associative memory network: auto-associative memory network, hetero-associative memory network, BAM, hopfield networks, iterative autoassociative memory network & iterative associative memory network – unsupervised learning networks: Kohonenself organizing feature maps, LVQ – CP networks, ART network.

UNIT 3 - Fuzzy Logic**10 Hours**

Membership functions: features, fuzzification, methods of membership value assignments-Defuzzification: lambda cuts – methods – fuzzy arithmetic and fuzzy measures: fuzzy arithmetic – extension principle – fuzzy measures – measures of fuzziness -fuzzy integrals – fuzzy rule base and approximate reasoning : truth values and tables, fuzzy propositions, formation of rules-decomposition of rules, aggregation of fuzzy rules, fuzzy reasoning-fuzzy inference systems-overview of fuzzy expert system-fuzzy decision making.

UNIT 4 – Genetic Algorithm**10 Hours**

Genetic algorithm and search space – general genetic algorithm – operators – Generational cycle – stopping condition – constraints – classification genetic programming – multilevel optimization – real life problem- advances in GA.

UNIT 5 – Hybrid Soft computing Techniques and Applications**12 Hours**

Neuro-fuzzy hybrid systems – genetic neuro hybrid systems – genetic fuzzy hybrid and fuzzy genetic hybrid systems – simplified fuzzy ARTMAP – Applications: A fusion approach of multispectral images with SAR, optimization of traveling salesman problem using genetic algorithm approach, soft computing based hybrid fuzzy controllers.

TUTORIALS:

Solving simple programs using MATLAB in the following areas:

1. FUZZY Logic techniques.
2. Neural networks techniques.
3. Genetic Algorithm techniques.
4. Hybrid Soft Computing Techniques.

TEXT BOOKS / REFERENCES:**Text books:**

1. J.S.R.Jang, C.T. Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI / Pearson Education,2004.
2. S.N.Sivanandam and S.N.Deepa, “Principles of Soft Computing”, Wiley India Pvt Ltd, 2011.

Reference books:

1. S.Rajasekaran and G.A.Vijayalakshmi Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis & Applications”, Prentice-Hall of India Pvt. Ltd., 2006.
2. David E. Goldberg, “Genetic Algorithm in Search Optimization and Machine Learning” Pearson Education India, 2013.

ADDITIONAL LEARNING SOURCES:

1. http://www.myreaders.info/html/soft_computing.html
2. <http://www.soft-computing.de/>

CO - PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	M	M	M	M	M	L	L	L	L	L	L	L
CO2	M	M	M	M	M	L	L	L	L	L	L	L
CO3	M	M	M	M	M	L	L	L	L	L	L	L
CO4	M	M	M	M	M	L	L	L	L	L	L	L
CO5	M	M	M	M	M	L	L	L	L	L	L	L

JSS Science and Technology University, Mysuru
Department of Master of Computer Applications [MCA]

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
III	V	Theory (Streams)	05	03	00	02	65
Course No		Course Title				Pre Requisites	
MCA552		Big Data Analytics				Data Warehousing and No SQL	

COURSE ASSESSMENT METHOD:

. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]

. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be

CO1: Understand the significance, structure and sources of Big data.

CO2: Asses avenues for analytical scalability.

CO3: Comprehend stream computing and applications.

CO4: Apply the different clustering techniques.

CO5: Use different Frame works and Visualization techniques.

TOPICS COVERED:

UNIT 1 - Introduction to Big Data

12Hours

What is big data? Is the "big" part or the "data" art more important? How is big data different? How is big data more of the same? Risks of big data -why you need to tame big data -the structure of big data- exploring big data, most big data doesn't matter- filtering big data effectively -mixing big data with traditional data- the need for standards-today's big data is not tomorrow's big data. Web data: the original big data -web data overview -what web data reveals -web data in action? A cross-section of big data sources and the value they hold.

UNIT 2 : Data Analysis**08 Hours**

Evolution of analytic scalability – convergence – parallel processing systems – cloud computing – grid computing – map reduce – enterprise analytic sand box – analytic data sets – analytic methods – analytic tools – cognos – microstrategy - pentaho. Analysis approaches – statistical significance – business approaches – analytic innovation – traditional approaches – iterative

UNIT 3 - Mining Data Streams**10 Hours**

Introduction to streams concepts, stream data model and architecture, stream computing, sampling data in a stream, filtering streams, counting distinct elements in a stream, estimating moments, counting oneness in a window, decaying window, realtime analytics platform(rtap) applications, case studies, real time sentiment analysis, stock market predictions.

UNIT 4 - Frequent Item sets and Clustering**10 Hours**

Mining frequent itemsets - market based model – apriori algorithm – handling large data sets in main memory – limited pass algorithm – counting frequent itemsets in a stream – clustering techniques – hierarchical – k- means – clustering high dimensional data – clique and proclus – frequent pattern based clustering methods – clustering in non-euclidean space – clustering for streams and parallelism.

UNIT 5 : Frameworks and Visualization**10 Hours**

Mapreduce – hadoop, hive, mapr – sharding – nosql databases - s3 - hadoop distributed file systems – visualizations - visual data analysis techniques, interaction techniques; systems and applications.

TUTORIALS

Case Studies:

1. Medicare and Medicaid Services : Integrity of health care data and secure payment processing.
2. Tesco PLC.
3. American Express Co.
4. Mobile Telecom Harnesses Big Data with Combined Actuate and Hadoop Solution.
5. Re-engineering a Telecom Market Share Analytical Application.
6. Telco Case Study: Vodafone and Argyle Data on using big data to combat fraud.
7. MTS India relies on HP Vertica in a highly competitive telecom market.
8. McLaren's Formula One racing team : real time car sensor data during car races.

TEXT BOOKS / REFERENCES:

Text books:

1. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics, John Wiley & sons, 2013.
2. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 2014

Reference books:

1. Paul Zikopoulos, Chris Eaton, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data: Analytics for Enterprise Class Hadoop and Streaming Data, McGraw Hill Professional, 2012.
2. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, Pete Warden, Big Data Glossary, O'Reilly.
3. Chuck Lam, "Hadoop in Action", Dreamtech Press.

ADDITIONAL LEARNING SOURCES:

https://www.tutorialspoint.com/big_data_tutorials.html.

<https://www.lynda.com/Big-Data-training-tutorials/2061-0.html>.

https://www.tutorialspoint.com/hadoop/hadoop_big_data_overview.html.

<https://bigdatauniversity.com>.

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	M	H	H	H	M	M	M	L	L	M	H	H
CO2	H	H	H	M	M	M	M	L	L	M	H	M
CO3	H	H	M	H	M	M	M	L	L	M	H	M
CO4	H	H	M	H	H	M	L	L	M	L	H	M
CO5	H	H	H	M	H	M	L	L	M	L	M	M

JSS Science and Technology University, Mysuru.

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Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
III	V	Theory (Stream)	05	03	00	02	65
Course No		Course Title				Pre Requisites	
MCA553		Software Project Management and Practices				MIS,SE,ST,ERP,BI	

COURSE ASSESSMENT METHOD:

. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1: Understand software project basics & approaches.

CO2: Understand to initiation techniques.

CO3: Understand project planning & scheduling.

CO4: Understand Project execution & execution control.

CO5: Understand how to close the project & agile project management.

TOPICS COVERED:

UNIT 1 -Software Project Basics

10 Hours

Introduction, Types of Software Projects, Classifications of Software Projects, Based on Software Development Life Cycle, Approach Driven, Maintenance, Web Application, Agile Development, Conclusion

Approaches to Software Project Management: Alignment of Software Engineering Methodology with

Project Management Methodology, The Ad Hoc Methods-Based Approach, The Process-Driven Approach, So, What Is the Right Approach?, The Ad Hoc Approach, The Process-Driven Approach, But Is a Process-Driven Approach the Right Choice?, In a Process-Driven Approach: What Process and How Much?

Software Project Acquisition: From an External Client, The Request for Proposal, The Proposal, Negotiation, Contract Acceptance, From an Internal Client, The Feasibility Study, Preparing the Proposal, Finalizing the Proposal, Reference.

UNIT2 -Software Project Initiation

10 Hours

Introduction, Initiation Activities, Project Management Office-Level Activities, Identifying the Software Project Manager, Preparing/Handing Over the Project Dossier to the Software Project Manager, Coordinating Allocation of Project Resources, Assisting the Software Project Manager in Obtaining Necessary Service Level, Agreements from Departments in the Organization, Assisting the Software Project Manager with the Project Kickoff Meeting, Software Project Manager-Level Activities, Ensuring that Project Specifications Are Complete, Reviewing Estimates and Revisions/Updates of Estimates, Identifying Necessary Resources and Raising Requests, Preparing Project Plans, Setting Up the Development Environment, Arranging for Project-Specific Skill Training, Organizing the Project Team, Training the Project Team on the Project Plans, Conducting a Project Kickoff Meeting, Arranging for a Phase-End Audit, Common Pitfalls in Project Initiation, Identifying the Wrong Software Project Manager, Identifying Inappropriate Resources, Incurring Delays in Software Project Initiation Activities.

UNIT3 -Software Project Planning

10 Hours

Introduction, Planning Defined, Plans Prepared in Software Project Management, The Project Management Plan, Resources, Skill Sets, Computer Systems, Project Management Method, The Configuration Management Plan, Naming Conventions, Change Management, The Quality Assurance Plan, The Schedule Plan, The Induction Training Plan, The Risk Management Plan, The Build Plan, The Deployment Plan, The User Training Plan, The Handover Plan, The Software Maintenance Plan, The Documentation Plan, Roles in Planning.

Scheduling: Introduction, The Initial Work Breakdown Structure, A Work Breakdown Structure with

Predecessors Defined, A Work Breakdown Structure with Initial Dates, A Work Breakdown Structure with Resource Allocation, Scheduling in Practice, Graphic Representation of a Schedule

UNIT 4 -Software Project Execution

10 Hours

Introduction, Work Management, Work Registers, De-allocation, Configuration Management, Information Artifacts, Code Artifacts, Configuration Registers, Configuration Management Tools, Quality Management, Verification Techniques, Validation Techniques, Product Testing, Allocation of Quality Assurance Activities, Productivity Management, Stakeholder Expectations Management, Product Integration Management.

Software Project Execution Control: Introduction, Aspects of Control in Project Execution, Scope Control, Cost Control, Schedule/Progress Control, Quality Control, Effort Control, Productivity Monitoring, Control Mechanisms, Progress Assessment: Earned Value Analysis.

UNIT 5 - Software Project Closure

12 Hours

Introduction, Identifying Reusable Code Components, Documenting the Best Practices, Documenting the Lessons Learned, Collecting/Deriving and Depositing the Final Project Metrics in the Organizational Knowledge Repository, Conducting Knowledge-Sharing Meetings with Peer Software Project Managers, Depositing Project Records with the Project Management Office, Depositing Code Artifacts in the Code Repository, Conducting the Project Postmortem, Releasing the Software Project Manager, Closing the Project, The Role of the Organization in Project Closure, The Project Management Office, The Configuration Control Board, The Systems Administration Department, Reference.

Agile Project Management: Introduction, Project Management Roles, Agile Project Management Characteristics, Metaphor, Teamwork and Collaboration, Guiding Principles, Open Information, Use a Light Touch, Monitoring and Adjustment, The Nuts and Bolts of Agile Project Management, Planning the Work, Controlling the Work, Process Improvement, Reference.

TUTORIALS:

Writing Cases for the following.

1. Writing requirement Proposal.
2. WritingNegotiationProposal.
3. Writing Feasibility Study Proposal.
4. Software Project Planning Proposal.
5. Software Project Execution Control Proposal.
6. WritingSchedules.
7. Software Project Closure

TEXT BOOKS / REFERENCES:**Text books:**

1. “Mastering Software Project Management: Best Practices, Tools and Techniques”, MuraliChemuturi, Thomas M. Cagley, J. Ross Publishing, 2010,

Reference books:

1. “IT Project MAnagement – On track from Start to Finish”, Book by Joseph Phillips, 2002.
2. “Managing the unmanageable” by Mantle and Lichty, 2012.
3. Making Things Happen: Mastering Project Managementby Scott Berkun, 2008.

ADDITIONAL LEARNING SOURCES:

1. https://www.tutorialspoint.com/software_engineering/software_project_management.htm
2. <http://searchsoftwarequality.techtarget.com/tutorials/Software-Project-Management-Process>

CO - PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	M	M	M	L	M	M	M	L	M	L	L	M
CO2	M	M	M	M	M	L	M	M	M	L	M	L
CO3	M	M	M	M	M	L	M	M	L	L	M	L
CO4	M	M	M	L	M	M	L	L	M	L	M	M
CO5	M	H	H	L	M	M	L	L	M	L	M	M

JSS Science and Technology University, Mysuru

Department of Master of Computer Applications [MCA]

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
III	V	Laboratory	01	00	03	00	48
Course No		Course Title				Pre Requisites	
MCA51L		.NET Technologies Laboratory				OOPS,Java,HTML	

COURSE ASSESSMENT METHOD:

Internal Assessment [5 Events: 2 Practical Tests, Viva-voce + Record + Observation]	Marks: 50 [15+15+10+5+5]
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COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO1 :** Understand Enterprise Application Architecture and J2EE, and develop Database applications using JDBC.
- CO2 :** Understand the concept of Server side applications using Servlets and develop server side applications.
- CO3 :** Understand JSP and write applications using JSP
- CO4 :** Design and develop components using Java Beans and understand Annotations
- CO5 :** Apply the concept of middle & Data Based application layers for an enterprise application using Enterprise Java Beans (EJB) and learn to develop the Server Side Component Models.

LIST OF PROGRAMS TO BE COVERED:

C# Programs:

1. Write a console application that obtains four int values from the user and displays the product.

2. If you have two integers stored in variables var1 and var2, what Boolean test can you perform to see if one or the other (but not both) is greater than 10?
3. Write an application obtains two numbers from the user, and displays them, but rejects any input where both numbers are greater than 10 and asks for two new numbers.
4. Write a console application that places double quotation marks around each word in a string.
5. Write an application that uses two command-line arguments to place values into a string and an integer variable, respectively. Then display these values
6. Write an application that receives the following information from a set of students:
Student Id, Student Name, Course Name, Date of Birth:
The application should also display the information of all the students once the data is Entered. Implement this using an Array of Structures.
7. Write programs using conditional statements and loops:
 - a) Generate Fibonacci series
 - b) To Check Prime Numbers
 - c) Generate Prime Numbers till the given numbers
 - d) Check the given number is palindrome
 - e) Find sum of digits of a number.
8. Write a program to declare class 'Distance' have data members dist1,dist2 ,dist3. Initialize the two data members using constructor and store their addition in third data member using function and display addition.
9. Write a program using function overloading to swap two integer numbers and swap two float numbers
10. Write a program to implement single inheritance
11. Define a class 'salary' which will contain member variable Basic, TA, DA, HRA. Write a program using Constructor with default values for DA and HRA and calculate the salary of employee.
12. Program to implement the following multiple inheritance using interface
13. Write a program to implement multilevel inheritance
14. Write a program to create a delegate called TrafficDel and a class called TrafficSignal

with the delegate methods to display appropriate operations for RED, YELLOW and GREEN signals.

15. Write a program to accept a number from the user and throw an exception if the number is not an even number
16. Create an application that allows the user to enter a number in the textbox named 'getnum'. Check whether the number in the textbox 'getnum' is palindrome or not. Print the message accordingly in the label control named lbldisplay when the user clicks on the button 'check'.
17. Create an application which will ask the user to input his name and a message, display the two items concatenated in a label, and change the format of the label using radio buttons and check boxes for selection, the user can make the label text bold, underlined or italic and change its color. include buttons to display the message in the label, clear the text boxes and label and exit.
18. List of employees is available in listbox. Write an application to add selected or all records from listbox (assume multi-line property of textbox is true).

ASP.NET Programs:

1. Write a ASP.NET code snippet for displaying "*Hello World!*".
2. Write a simple ASP.NET program to display the following Web Controls:
 - a) A button with text "click me". The button control must be in the center of the form.
 - b) A label with a text hello
 - c) A checkbox. The form name must be Web Controls.
3. Write a program that displays a button in green color and it should change into yellow when the mouse moves over it.
4. Create a static web page of your choice and add different controls populated with data using ASP.NET

ASP.NET, C#.NET & ADO.NET Programs

1. Create a ASP.NET web form for User Login with fields, Usr_Name, Password and create appropriate messages for valid and invalid login. Use ASP.NET, C#.NET &

ADO.NET with MySQL as DB.

2. Create a student registration system with following fields; Stud_ID, Stud_Name, Course_Name, Age, Place, Blood group, Fees_Paid. Use ASP.NET, C#.NET, ADO.NET and MySQL as database.
3. Create an Employee Salary generation system with fields Emp_ID, Emp_Name, Emp_DOB, Emp_DOJ, Designation, Department, Place. Use ASP.NET, C#.NET and ADO.NET with MySQL as DB
4. Create an Inventory Management System with fields; Item_ID, Item_Name, Min_Qty, Max_Qty, ReOrd_Qty, Exp_Date, Price. Create a web application which should receive & issue items and display appropriate message for reaching minimum, maximum & reorder level quantity and also list out the expired items. Use ASP.NET, C#.NET, ADO.NET with MySQL as Database.

TEXT BOOKS / REFERENCES:

Text Books:

1. Matthew MacDonald. Beginning ASP.NET 4 in C# 2010, APRESS, 2010

Reference Books:

2. Joseph Mayo. Visual studio 2010 - A beginners guide – BPB Publications 2010
3. Greg Buczek: ASP.Net Developer's Guide, Tata McGraw Hill Edition 4th Edition, 2005.
4. Pro ASP.NET 4 in C# 2010, MacDonald and Freeman

ADDITIONAL LEARNING SOURCES:

1. <https://msdn.microsoft.com/en-us/library/4w3ex9c2.aspx>
2. <http://www.asp.net/>
3. <http://www.aspfree.com/>
4. <http://www.devx.com/dotnet>
5. asp.net-tutorials.com/localization/local-and-global-resources/
6. https://www.tutorialspoint.com/asp.net/asp.net_ado_net.htm

7. www.w3schools.com/asp/ado_intro.asp
8. <https://www.tutorialspoint.com/soa/index.htm>

CO - PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	H	H	H	H	M	M	M	H	M
CO2	H	M	H	M	H	M	H	L	M	M	M	L
CO3	H	M	H	M	H	M	H	L	M	M	M	L
CO4	H	M	M	M	H	M	H	L	M	M	M	L
CO5	H	H	H	H	H	H	H	M	H	M	H	H

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Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
III	V	Laboratory	04	04	00	03	48
Course No		Course Title				Pre Requisites	
MCA52L		Mobile Applications Laboratory				Java	

COURSE ASSESSMENT METHOD:

Internal Assessment [Test-1 + Test-2 + Observation book + Record + Viva: 15 + 15 + 05 + 05 + 10]= Total 50 marks..

COURSE OUTCOMES:

Upon successful completion of this course, students will be

- CO1:** Gain broad understanding of the discipline of Mobile Application Development using J2ME Technology.
- CO2:** Develop User Interface for a J2ME application
- CO3:** Manage data on both service-side components and client-side applications and Address Portability and Compatibility issues between PDA'S and Cell phones.
- CO4:** Implement the design using Android SDK.
- CO5:** Implement the design using Objective C and iOS

TOPICS COVERED:

List of Experiments on J2ME Platform:

1. Installation of Java Wireless Toolkit (J2ME).
2. Working with J2ME Features:
 - Menu boxes.

- Event handlings.
 - Input checking.
 - Threads and high level UI.
 - High level UI.
3. Create a MIDP application, where the user can enter player name and points. The program saves the information to the record using RMS at MIDP device. Program should also print out the top 10 player list to the end user. You can use this class in your game if you made own class for saving and reading record sets.
 4. Working on Drawing and Images.
 5. Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array.
 6. Developing Networked Applications using the Wireless Toolkit
 7. Authentication with a Web Server.
 8. Login to HTTP Server from a J2ME Program.
 9. Web Application using J2ME.

List of Programs on Android and IOS:

1. Develop an application that uses GUI components, Font and Colours
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements Multi threading
8. Develop a native application that uses GPS location information.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.
11. Write a mobile application that creates alarm clock

TEXT BOOKS / REFERENCES:**Text Books:**

1. James Keogh , J2ME The Complete Reference , Tata McGrawHill.
2. Charlie Collins, Michael Galpin and Matthias Kappler, “Android in Practice”, DreamTech, 2012.
3. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, “Beginning iOS.

Reference Books:

1. Michael Juntao Yuan, Enterprise J2ME, Developing Mobile Java Applications Pearson Education , 2011.
2. Sing Li, Jonathan B. Knudsen, Beginning J2ME: From Novice to Professional, Third Edition, Apress, 2015.
3. Development: Exploring the iOS SDK”, Apress, 2013.

ADDITIONAL LEARNING SOURCES:

<http://developer.android.com/develop/index.html>.

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	H	L	L	M	L	M	M	H	H
CO2	H	H	H	H	L	L	M	L	M	L	H	H
CO3	H	H	H	H	L	L	M	L	M	L	H	H
CO4	H	H	H	H	L	L	M	L	M	M	H	H
CO5	H	H	H	H	L	L	M	L	M	M	H	H

JSS Science and Technology University, Mysuru,
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Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
III	V	Laboratory	01	00	03	00	48
Course No		Course Title				Pre Requisites	
MCA53L		Software Testing and Practices Laboratory				Software Engineering	

COURSE ASSESSMENT METHOD:

Internal Assessment [Test-1+ Test-2 + Observation book + Record + Viva: 15 + 15 + 05 + 05 +10 = 50Marks]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- CO1:** Understand the Basics and Test software in structured, organized ways
- CO2:** Apply modern software testing processes in relation to software development and project management
- CO3:** Create test strategies and plans, design test cases, prioritize and execute them
- CO4:** Manage incidents and risks within a project
- CO5:** Contribute to efficient delivery of software solutions and implement improvements in the software development processes and expose to need and mode of agile testing

TOPICS COVERED:

Testing Lab List of Experiments

Students are instructed to follow and use Agile Scrum Methodology to perform the following:

1. Write the test cases for any known application (e.g. Banking application)
2. Create a test plan document for any application (e.g. Library Management System)
3. Study of any testing tool (e.g. Win runner)

4. Study of any web testing tool (e.g. Selenium)
5. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
6. Study of any test management tool (e.g. Test Director)
7. Study of any open source-testing tool (e.g. Test Link)
8. Design and develop a program in a language of your choice to solve the triangle problem defined as follows :

Accept three integers which are supposed to be the three sides of triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Derive test cases for your program based on decision-table approach, execute the test cases and discuss the results

9. Design and develop a program in a language of your choice to solve the triangle problem defined as follows :

Accept three integers which are supposed to be the three sides of triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Derive test cases for your program based on boundary value analysis, execute the test cases and discuss the results

10. Design and develop a program in a language of your choice to solve the triangle problem defined as follows :

Accept three integers which are supposed to be the three sides of triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Derive test cases for your program based on equivalence class partitioning , execute the test cases and discuss the results

11. Develop code and run the program in any suitable language to solve the commission problem.

Analyze it from the perspective of boundary value, derive test cases, execute these test cases and discuss the test results Assumption price for lock=45.0, stock=30.0 and barrels=25.0 production limit could sell in a month 70 locks,80 stocks and 90 barrels commission on sales = 10 % <= 1000 and 15 % on 1000 to 1800 and 20 % on above 180

TEXT BOOKS / REFERENCES:

TEXT BOOKS :

1. AdithyaP.Mathur “ Foundations of Software Testing – Fundamental Algorithms and

Techniques”, Pearson Education India, 2011

2. MauroPezze, Michael Young, Software testing and Analysis- Process, Principles and Techniques, Wiley India, 2012
3. Paul C Jourgensen, “Software Testing A Craftmans Approach”, Aueredach publications, 3rd edition, 2011
4. Lisa Crispin, Janet Gregory, “Agile Testing : A Practical Guide for Testers and Agile Team”, The Addison Wesley Signature Series, 2009.

REFERENCE BOOKS:

1. KshirasagaraNaik, PriyadarshiTripathy: Software Testing and Quality Assurance, Wiley India 2012
2. Ron Patton: Software Testing, 2nd Edition, Pearson Education, India, 2013

ADDITIONAL LEARNING SOURCES:

<http://www.softwaretestinghelp.com/agile-scrum-methodology-for-development-and-testing/>

<http://crbtech.in/Testing/agile-model-software-testing/>

<https://www.getzephyr.com/test-management/agile-model-in-software-testing>

<http://www.mountangoatsoftware.com/>

<http://www.testingexperience.com/>

<http://www.infoq.com/>

<http://www.qasymphony.com/>

CO-PO MAPPING:

	P	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	H	H	H	M	M	M	H	H	H	M	H	H
CO2	H	H	H	H	H	M	M	M	H	M	H	H
CO3	H	L	H	M	H	M	H	M	H	M	H	L
CO4	H	L	H	M	H	M	L	M	H	M	H	M
CO5	H	M	H	L	H	H	L	L	H	M	H	H

JSS Science and Technology University, Mysuru
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Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
III	V	Laboratory	01	00	03	00	48

Course No	Course Title	Pre Requisites
MCA54L	Current Trends in IT Laboratory (Exploration and Presentation)	

COURSE ASSESSMENT METHOD:

Internal Assessment [5 Events: Exploration, Implementation and Presentation]
Total Marks: 50 [10* 5].

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to:

- CO1 :** Understand the exploration of different applications related to Cloud Computing, Big Data etc.
- CO2 :** Create a small application with their previous knowledge.
- CO3 :** Follow standards of Software engineering.
- CO4 :** Implement the application using different platforms.
- CO5 :** Present and document the application implementation by following standards

TOPICS COVERED:

Students are expected to build an application by using the latest trends topics in Information technology

1. Machine Intelligence applications, Cloud Computing, Big Data or any new trends in IT.
2. Different Programming Languages.
3. Database like MySQL, Oracle, MS SQL etc.

ADDITIONAL LEARNING SOURCES:

1. <http://www.managementstudyguide.com/emerging-trends-in-information-technology.html>
2. <http://www.itbusinessedge.com/slideshows/show.aspx?c=87336>
3. <http://www.hangthebankers.com/top-10-information-technology-trends-2016/>
4. <http://www.networkcomputing.com/storage/10-hot-technology-trends-2016/520323524>
5. <http://www.gocorptech.com/news-events/it-solutions-news-current-trends-of-information-technology/>
6. http://www.csc.com/innovation/insights/135754-it_trends_to_watch_in_2016
7. <http://www.forbes.com/sites/gartnergroup/2016/01/15/top-10-technology-trends-for-2016/#2c60155d5ae9>

CO-PO MAPPING:

	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO1	PO1	PO12
CO1	M	H	H	H	H	H	H	M	M	M	H	M
CO2	H	M	H	M	M	M	H	L	M	M	M	L
CO3	H	M	H	M	M	M	H	L	M	M	M	L
CO4	H	M	M	M	M	M	H	L	M	M	M	L
CO5	M	H	H	H	H	H	H	M	H	M	H	H