

MCA CURRICULUM & SYLLABUS

KALASALINGAM UNIVERSITY

(KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION)

(Under Section 3 of the UGC Act 1956)

Anand Nagar, Krishnankoil-626126

Srivilliputtur(via); Virudhunagar(Dt.), Tamil Nadu, INDIA

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MCA CURRICULUM & SYLLABUS

2018

MCA CURRICULUM & SYLLABUS

Kalasalingam University

(Kalasalingam Academy of Research and Education)

VISION

To be Centre of Excellence of International Repute in Education and Research.

MISSION

To produce Technically Competent Socially Committed Technocrats and Administrators through Quality Education and Research

MCA CURRICULUM & SYLLABUS

DEPARTMENT OF COMPUTER APPLICATIONS

VISION

To be a Center of Excellence in education and research in the field of Computer Applications to produce high quality competitive software professionals for the national growth.

MISSION

To produce socially committed technocrats to meet the Industrial challenges or an administrator in the field of Information Technology with adequate technical knowledge and skills through quality education and research.

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PROGRAMME EDUCATION OBJECTIVES (PEO)

- PEO1:** The students will be successful software professionals to compete the industry needs.
- PEO2:** To promote students awareness on ethical and professional responsibilities and ability to relate computer applications to broader social context for the growth of nation.
- PEO3:** The students will utilize professional skills and new innovations in research through sustained learning.
- PEO4:** The students will achieve peer recognition to become an administrator in various sectors of IT Industry through analytical design and implementation skills.

PROGRAMME OUTCOMES (PO)

- PO1:** Ability to apply knowledge of mathematical, algorithmic and computing principles to solve real time problems
- PO2:** Ability to identify, formulate, analyze and interpret data by applying critical thinking to solve complex problems in relevant domain disciplines.
- PO3:** Ability to design and evaluate solutions for computing systems to meet the industry requirement as per needs and specification which undergoes various phases of software development.
- PO4:** Ability to use research based knowledge and apply research methods to investigate the complex problems to provide valid conclusion.
- PO5:** Ability to create, select and apply modern tools and techniques to analyze and develop a software system.
- PO6:** Ability to adapt professional ethics and cyber regulations in computing practices.
- PO7:** Ability to recognize the need of independent learning for the continual development as a computing professional in the context of technological change.
- PO8:** Ability to apply the computing and management principles to develop managerial skills in multi-disciplinary environments.
- PO9:** Ability to communicate effectively about complex computing problems to the society through reports, documentation and presentations.
- PO10:** Ability to apply the knowledge of computing solutions to the societal, health, safety, legal and environmental issues.
- PO11:** Ability to work as an individual or as a member in a diverse team in the software domain through innovative approaches.
- PO12:** Ability to identify and apply computing practices to succeed as an employee or an entrepreneurial pursuit

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S.No	Course Category	Credits (Proposed)
I	Programme Core	
	a) Core Courses (Includes Theory with Practical Component) - 15	50
	b) Laboratory Courses-10	20
	c) Project Work Major Project (12 Credits) Mini Project1 (2 Credits) Mini Project2–CSP (2 Credits) Mini Project 3-2 Credits	18
II	Supportive Courses (6)	23
III	Elective Courses (Programme Specific)-5	15
IV	Summer Industrial Training Programme	4
Total Credits		130

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DEPARTMENT OF COMPUTER APPLICATIONS

FIRST YEAR

I Semester

Subject Code	Subjects	C	
MAT18R4011	Mathematical Foundations of Computer Science	4	SC
MCA18R4001	Computer Organization and Architecture[TP]	4	CORE
MCA18R4002	Programming in C++	3	CORE
MCA18R4003	Software Engineering [TP]	4	CORE
MCA18R4004	Relational Database Management Systems	3	CORE
MCA18R4080	Programming in C++ Laboratory	2	CL
MCA18R4081	RDBMS Laboratory	2	CL
Total		22	

II Semester

Subject Code	Subjects	C	
MAT18R4012	Operations Research	4	SC
MCO18R4004	Accounting and Financial Management	4	SC
MCA18R4005	Data Structure and Algorithm	3	CORE
MCA18R4006	Operating Systems	3	CORE
MCA18R****	Elective-I	3	PSE
MCA18R4082	Data Structure Laboratory	2	CL
MCA18R4083	Linux Laboratory	2	CL
MCA18R4099	Summer Industrial Training Program	2	
Total		23	

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SECOND YEAR

III Semester

Subject Code	Subjects	C	
HSS18R6051	Communication Skills and Report Writing [TP]	4	SC
MCA18R5001	Advanced Java Programming	3	CORE
MCA18R5002	Data Communication and Networks [TP]	4	CORE
MCA18R5003	Visual Programming	3	CORE
MAT18R****	Elective- II	4	SC
MCA18R5080	Advanced Java Programming Laboratory	2	CL
MCA18R5081	Visual Programming Laboratory	2	CL
MCA18R5097	Mini Project - I	2	
Total		24	

IV Semester

Subject Code	Subjects	C	
MCA18R6105	Mobile Application Development	3	CORE
MCA18R5005	Web Programming	3	CORE
MCA18R5006	Data Warehousing and Data Mining [TP]	4	CORE
MCA18R****	Elective-III	3	PSE
MCA18R****	Elective-IV	3	PSE
MCA18R5082	Mobile Application Development Laboratory	2	CL
MCA18R5083	Web Programming Laboratory	2	CL
MCA18R5098	Mini Project – II Community Service Project	2	
MCA18R5099	Summer Industrial Training Program	2	
Total		24	

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THIRD YEAR- V Semester

Subject Code	Subjects	C	
MCA18R6001	Big Data Analytics	3	CORE
MCA18R6002	Cloud Computing [TP]	4	CORE
MCA18R6003	Game Programming	3	CORE
HSS18R008	Entrepreneurship Development	3	SC
MCA18R****	Elective-V	3	PSE
MCA18R****	Elective-VI	3	PSE
MCA18R6080	R Programming Laboratory	2	CL
MCA18R6081	Game Programming Laboratory	2	CL
MCA18R6098	Mini Project - III	2	
Total		25	

VI Semester

Subject Code	Subjects	C
MCA18R6099	Project Work	12
Total		12

Consolidated Credit

Semester	Credits
I	22
II	23
III	24
IV	24
V	25
VI	12
Total	130

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LIST OF ELECTIVE SUBJECTS

Sub Code	List of Electives	C
MCA18R4101	Computer Graphics and Multimedia	3
MCA18R4102	Management Information System	3
MCA18R4103	Client Server Technology	3
MAT18R5113	Graph theory	4
MAT18R5114	Numerical Methods	4
MAT18R5115	Probability and Combinatorics	4
MCA18R5101	Digital Image Processing	3
MCA18R5102	Information and Network Security	3
MCA18R5103	Soft Computing Techniques	3
MCA18R5104	Organizational Behavior	3
MCA18R5105	E-Commerce	3
MCA18R5106	Social Network Analysis	3
MCA18R6101	Green Computing	3
MCA18R6102	Natural Language Processing	3
MCA18R6103	Artificial Intelligence and its Applications	3
MCA18R6104	Internet of Things	3
MCA18R6105	Python Programming	3
MCA18R6106	Bioinformatics	3
MCA18R6107	Sentiment Analysis	3

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MAT18R0411	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	L	T	P	C
		4	0	1	4

Course Objective(s):

1. To understand the concepts of permutations, combination Mathematical induction.
2. To familiarize the students with the concept of walks, path, circuits, spanning Trees.
3. To grasp the concepts in Lattices and Boolean algebras.

Course Outcome(s):

After completing this course, the student will be able to:

1. understand the concepts of Permutations and Combinations.
2. study basics of Graph theory
3. discuss order relation and structures
4. understand fundamental theorem on homomorphism
5. study the concepts of finite state machines and monoids.

UNIT – I : Logic and Counting

Proposition and Logical Operation – Conditional Statements – Methods of Proof – Mathematical Induction – Mathematical Statements – Permutations – Combinations – Pigeonhole Principle.

UNIT – II : Graphs

Graphs –Graph Models – Subgraphs and Quotient graphs - Representing graphs and graph isomorphism - Euler Paths and circuits - Hamiltonian Paths and Circuits – Trees – Minimal Spanning Trees.

UNIT – III : Order relation and Structures

Partially Ordered Sets – Hasse Diagrams - Extremal Elements of Partially Ordered Sets – Lattices – Finite Boolean Algebras – Functions on Boolean Algebras – Circuits Design.

UNIT – IV : Groups

Properties of binary operations - Semi groups – Simple Problems - Isomorphism and Homomorphism – Fundamental homomorphism theorems - Groups.

UNIT – V : Modelling Computations

Languages – Representations of Special Grammars and Languages – Finite State Machines – Monoids, Machines and Languages – Machines and Regular Languages.

Text Book :

1. Bernard Kolman, Robert C. Busby and Sharon Cutler Ross, Discrete Mathematical Structures, PHI Learning Private Limited, New Delhi, 2010.

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Reference Books :

1. Tremblay J.P and Manohar R, Discrete Mathematical Structures with Applications to Computer Science , Tata McGraw Hill Publication Co. Ltd, New Delhi, 2008.
2. Judith Gersting L , Mathematical Structures for Computer Sciences, W. H. Freeman and Company, New York, 6th Edition, 2007.
3. Kenneth Rosen H, Discrete and Combinatorial Mathematics, 7th Edition , Tata McGraw Hill Publication Co. Ltd, New Delhi, 2012.
4. Ralph Grimaldi P, Discrete and Combinatorial Mathematics, Pearson Education,5th Edition, New Delhi, 2008.

MCA18R4001	COMPUTER ORGANIZATION AND ARCHITECTURE	L	T	P	C
		4	0	1	4

PREREQUISITE

Basic knowledge on fundamentals of computer.

COURSE OBJECTIVES

This course aims to introduce the students with the basic understanding of functional units of a computer and its working principles. Students can understand the concept of program as sequences of machine instructions and execution of instructions at machine level. Students can understand the machine representation of instructions and data, addressing techniques, CPU organization, memory organization and I/O organization

COURSE OUTCOMES

- CO1:** Understand the functional units of a computer of a computer and bus structures.
- CO2:** Understand the machine instructions and addressing modes
- CO3:** Analyze the design of adders, subtractor, multiplication of numbers and Micro programmed Control
- CO4:** Analyze the internal organization of RAM and ROM chips and hierarchical memory system including cache memories and virtual memory.
- CO5:** Analyze the design of standard I/O interfaces and understand the concept of pipelining.

BASIC COMPUTER SYSTEM

Computer Types - Functional Units-I/O, Memory, Control, Arithmetic and Login unit - Basic Operational Concepts - Bus Structures – Performance.

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MACHINE INSTRUCTIONS

Number representation – Memory locations and Addresses – Instructions and Instruction Sequencing - Addressing modes - Basic Input/Output Operations - Stacks and Queues –Subroutines - Additional instructions.

CENTRAL PROCESING UNIT

Arithmetic – Addition and subtraction of signed numbers - Design of Fast Adders – Multiplication of positive numbers – Booth algorithm - Fast Multiplication - Floating point numbers - Execution of a complete Instruction - Microprogrammed Control.

MEMORY MANAGEMENT

Basic concepts - Semiconductor RAM memories-Internal organization of Memory Chips – static memories – DRAMS – ROM - Cache Memories – Mapping functions, Replacement algorithms - Virtual Memories - Secondary Storage.

I/O ORGANIZATION

DMA – Bus arbitration – Buses - Interface Circuits – Serial and Parallel port - Standard I/O Interfaces – PCI bus, SCSI bus, USB – Interrupts – Pipelining – Basic concepts, Data and Instruction hazards.

TEXT BOOK

1. C. Hamacher, Z. Vranesic, S.Zaky, Computer Organization, 5th edition, Mcgraw Hill, 2002.

REFERENCES

1. William Stallings, Computer Organization and Architecture, 6th edition, PHI, 2003.
2. M. Moris Mano, Computer System Architecture, 3rd edition, PHI,1993.

Practical Component:

1. Implementation of Logic Gates , AND, OR, NOT, EX-OR, EX-NOR
Induction to 8085 Microprocessor
- 2 a) Addition of 2 - 8 bit numbers b) Subtraction of 2 - 8 bit numbers
- 3 a) Addition of 2 - 16 bit numbers b) Subtraction of 2 – 16 bit numbers
- 4 a) Multiplication of 2 - 8 numbers b) Division of 2 - 8 bit numbers
- 5 a) Ascending order b) Descending order
- 6 a) Fibonacci Series b) Sum of finite series

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MCA18R4002	PROGRAMMING IN C++	L	T	P	C
		4	0	0	3

PREREQUISITE

C Programming

COURSE OBJECTIVES

This course aims to make the students understand the concepts of Object Oriented Programming. It helps to gain Knowledge thorough advanced concepts like STL container classes .

COURSE OUTCOMES

CO1: Differentiate the functionalities of object oriented approach and procedure oriented language

CO2: Demonstrate the concepts of overloading and inheritance.

CO3: Demonstrate the concepts of polymorphism and file streams.

CO4: Design of Templates and Exception Handling

CO5:Ability to create programs using STL, container classes, lists and maps.

OOP PARADIGM

Programming paradigms-Procedural programming, Modularity, Exception handling, Data abstraction - User defined types-Concrete types, Abstract types, Virtual functions-Object oriented programming - Generic programming.

INTRODUCTION TO C++

Overview of C++ - Branching and looping, Functions - Inline function, Classes and objects - Friend functions, Friend classes, Static members – Arrays – Pointers – References - Dynamic allocation.

OVERLOADING

Function overloading - Overloading constructor functions, Copy constructors, Default arguments - Operator overloading - Member operator overloading, Overloading new and delete.

INHERITANCE & TEMPLATES

Inheritance - Base class - Access control - Virtual functions - Pure virtual functions – Templates - Generic functions, Applying generic functions, Generic classes - Exception handling

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I/O OPERATIONS and COLLECTIONS

C++ I/O Streams - File I/O STL - Overview, Container classes Vector, Lists, Maps, Algorithms using functions and objects, String class.

TEXT BOOK

1. Bjarne Stroustrup, "The C++ Programming language", Addison-Wesley, 2013.
2. Y.P. Kanetkar, "Let us C++", BPB publication, 2013.
3. Ashok kamthane, " Object Oriented Programming with ANSI and Turbo C++", Pearson Edu, 2013.

REFERENCES

1. Herbert Schildt, "The Complete Reference in C++", Tata McGraw Hill. Fourth Edition, 2003.
2. Robert Lafore, OOP in Turbo C++, 4th Edition , Addison Wesley, 2005.
3. Stanley Lippman, Jove Largie, C++ Primer, 5th Edition , Addison Wesley, 2006.

MCA18R4003	SOFTWARE ENGINEERING	L	T	P	C
		4	0	1	4

PREREQUISITE

Basic knowledge in software development process

COURSE OBJECTIVES

This course helps to understand theories, methods, and technologies applied for professional software development and explain its importance to discuss the concepts of software products and software processes.

COURSE OUTCOMES

- CO1: Understand the process to be followed in the software development life cycle
- CO2: Determine the steps to define, formulate and analyze a problem
- CO3: Ability to solve specific problems and manage a project
- CO4: Analyze, design, verify, validate, implement, apply, and maintain software systems and to Manage the development of software systems
- CO5: Analyze various risk and quality factors in software management

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PRODUCT AND PROCESS

Introduction - Some definitions, Quality and productivity factors - The software process – A generic view of process, Process models.

SYSTEM ANALYSIS AND DESIGN

System engineering - Analysis concepts, Principles and analysis modeling - Requirements engineering, Building the analysis model - Design concepts and principles – Design engineering - Types of design, User interface design. Case study - Perform system analysis

TESTING

Testing strategies – Test strategies for conventional and Object-Oriented software, Validation testing, System testing - Testing tactics – Software testing fundamentals, Black-box and white-box testing, Basis path testing, Control structure testing, Object-Oriented testing methods, Testing for specialized environments, architectures and applications. Case study – Developing test cases.

MANAGING SOFTWARE PROJECTS

Project management - Process and project metrics, Source code metrics - Project planning - Estimation, Project scheduling.

SOFTWARE MANAGEMENT

Risk management, Quality management, Change management. Case study – Estimation and Risk analysis.

PRACTICAL COMPONENTS (RATIONAL ROSE)

1. Develop Usecase diagrams,
2. Draw Activity diagrams, State chart diagrams,
3. Generate Class diagrams and relationships,
4. Draw Swim lane diagrams, Sequence diagrams,
5. Generate Collaboration diagrams.

TEXT BOOK

1. Roger Pressman, Software Engineering - A Practitioner's Approach, 7th Edition, Tata McGraw Hill, 2010

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REFERENCES

1. Richard Fairley, Software Engineering Concepts, Tata McGraw Hill, 4th Edition, 2005.
2. Wendy Boggs and Michael Boggs, Mastering UML with Rational Rose, Wiley, 1999.

MCA18R4004	RELATIONAL DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		4	0	0	3

PREREQUISITE

Knowledge about Data Base Management System.

COURSE OBJECTIVES

This course is intended to provide with an understanding of the current theory and practice of database management systems. This course provides a technical overview of database management systems. In addition to technical concerns, more general issues are emphasized which include data independence, integrity, security, recovery, performance, database design principles, and database administration.

COURSE OUTCOMES

CO1: Explain terms related to database design and management.

CO2 : Develop logical data models.

CO3: Understand the objectives of relational data and information management.

CO4: Construct SQL queries.

CO5: Understand the concept of Lock based protocols, Timestamp based protocols, Validation based Protocols.

AN OVERVIEW OF DATABASE SYSTEMS

Introduction – Database system applications, Database versus file systems, View of data, Data models, Database languages, Database users and administrators, Transaction management, Database system structure, Application architectures.

DATA MODELS

Entity – Relationship Model – Basic concepts, Constraints, Keys, Design issues, ER diagram, Weak entity sets, Extended ER features, Design of an ER database schema, Reduction of an ER schema to tables - Relational model - Structure of relational databases – The relational algebra – Extended relational algebra operations, Modification of database, Tuple relational calculus, Domain relational calculus.

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RELATIONAL DATABASES

SQL – Background, Basic structure, Set operations, Aggregate functions, Null values, Nested subqueries, Views, Complex queries, Modification of the database, Joined relations, DDL, Embedded SQL, Dynamic SQL, QBE – Integrity and security – Domain constraints, Referential integrity, Assertions, Triggers - Relational database design – First normal form, Pitfalls in relational database design, Functional dependencies, Decomposition, Desirable properties of decomposition, BCNF, Third normal form, Fourth normal form.

INDEXING AND QUERYING

Indexing and hashing – Basic concepts, Ordered indices, B+ tree index files, B tree index files – Static hashing, Dynamic hashing, Comparison of ordered indexing and hashing, Multiple key access - Query Processing – Overview, Measures of query cost, Selection operation, Sorting, Join operation - Query Optimization – Overview, Estimating statistics of expression results, Transformation of relational expressions, Choice of evaluation plans, Materialized views.

TRANSACTION, CONCURRENCY CONTROL AND RECOVERY MANAGEMENT

Transactions – Transaction concept, Transaction state, Implementation of atomicity and durability, Concurrent executions, Serializability, Recoverability, Implementation of isolation, Transaction definition in SQL, Testing for serializability - Concurrency control – Lock based protocols, Timestamp based protocols, Validation based protocols, Multiple granularity, Multiversion schemes, Deadlock handling, Insert and delete operations, Weak levels of consistency, Concurrency in index structures - Recovery system – Failure classification,

TEXT BOOKS

1. Silberschatz, Korth, Sudarshan, Database System Concepts, 6th Edition, McGraw Hill International Edition, 2010.
2. Date, C.J, An introduction to database systems, 8th Edition , Pearson Education, 2010.

REFERENCE

1. Elmasri, R., Navathe, S.B., Fundamentals of database systems, 5th Edition, Pearson Education 2009.

MCA18R4080	PROGRAMMING IN C++ LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE

Programming in C

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COURSE OBJECTIVES

The objective is to make the students learn clearly the problem solving with object oriented approach, understand the usage of class and objects, implement the concepts of inheritance and operator overloading.

COURSE OUTCOMES

CO1: Design of applications using constructors and destructors

CO2: Demonstrate to use the concepts of overloading.

CO3: Develop programs using inheritance, virtual functions and friend functions

CO4: Demonstrate the concepts of Exception handling.

CO5: Demonstrate the importance of implementing Files and templates.

LIST OF EXPERIMENTS

1. Programs using functions
2. Programs using constructor and destructor.
3. Creation of Classes and uses of different types of functions.
4. Count the number of objects created for a class using static member function.
5. Programs using function overloading and operator overloading.
6. Programs using inheritance.
7. Programs using friend function.
8. Programs using virtual function.
9. Programs using exception handling.
10. Programs using files.
11. Programs using function templates

MCA18R4081	RDBMS LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE

Basic understanding about computer, linear algebra and mathematical concepts.

COURSE OBJECTIVES

Upon successful completion of this Lab the student will be able to Create database objects, modifying database objects, Manipulate the data, retrieve the data from the database server, perform database operations in a procedural manner using pl/sql, perform database operations (create, update, modify, retrieve, etc..) using front-end tools like D2K, design and develop applications like library, academic system, etc.

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COURSE OUTCOMES

CO1: Design and implement a database schema for a given problem-domain

CO2: Normalize a database

CO3: Populate and query a database using SQL DML/DDI commands.

CO4: Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS

CO5: Programming PL/SQL including stored procedures, stored functions, cursors, packages.

LIST OF EXPERIMENTS

1. Programs for creation of tables using SQL.
2. Programs for manipulation of tables using SQL.
3. Programs for implementation of operations on Views using SQL.
4. Programs for implementation of various control structures using SQL.
5. Programs for implementation of functions using PL/SQL.
6. Programs for implementation of cursors using PL/SQL.
7. Programs for implementation of triggers using PL/SQL.
8. Programs for implementation of packages using PL/SQL.
9. Programs for implementation of procedures using PL/SQL.
10. Programs for creation of forms and reports using developer tools

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MAT17R0412	OPERATIONS RESEARCH	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES

This course aims to introduce students to use quantitative methods and techniques for effective decisions-making, model formulation, applications that are used in solving business decision problems and apply operations research to solve linear programming problem transportation problems, assignment problems, dynamic programming & Queuing theory.

COURSE OUTCOMES

CO1: Able to solve linear programming problems using graphical method and simplex method

CO2: Able to build and solve Transportation Models and Assignment Models.

CO3: Able to solve problems in Network models

CO4: Able to solve dynamic programming problem

CO5: Able to design and solve problems using queuing models

LINEAR PROGRAMMING PROBLEMS

Graphical solution of linear programming problems - LP solution space in equation form - Simplex method - Artificial starting solution.

TRANSPORTATION AND ASSIGNMENT PROBLEMS

Introduction to transportation and assignment problems - The transportation algorithm - The Assignment model.

NETWORK MODELS

Minimal spanning tree algorithm - Shortest route problem - Maximal flow model.

DYNAMIC PROGRAMMING

Elements of the dynamic programming model - Optimality principle - Examples of dynamic programming models and their solutions

QUEUING THEORY

Single and multiple server Markovian queuing models – Steady state system size probabilities – Little’s formula – Customer impatience – Priority queues – M/G/1 queuing system – P - K formula.

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TEXT BOOK

1. Taha, H.A., Operations Research: An Introduction, 8th Edition, Pearson Education, 2011.

REFERENCES

1. Natarajan, A.M., Balasubramani, P., Tamilarasi, A., Operations Research, Pearson Education, Asia, 4th edition, 2009.
2. Prem Kumar Gupta, Hira, D.S., Operations Research, 3rd Edition, Sultan Chand and Company Ltd, New Delhi, 11th edition, 2007.

MCO18R4004	ACCOUNTING AND FINANCIAL MANAGEMENT	L	T	P	C
		3	1	0	4

PREREQUISITE:

To have some knowledge in accounts

COURSE OBJECTIVES:

- To understand the concepts of Journal, Ledger and Trial balance.
- To know the methods of reconciliation in cash book and pass book balances.
- To identify profit or loss of the business concern.
- To know the various methods of preparing budgets.
- To understand the techniques of marginal cost.

COURSE OUTCOMES:

CO1: Understand the concepts of Journal, Ledger and Trial balance.

CO2: Know the methods of reconciling cash book and pass book balances.

CO3: Identifying profit or loss of the business concern.

CO4: Know the various methods of preparing budgets.

CO5: Understand the techniques of marginal cost.

INTRODUCTION OF ACCOUNTING

Meaning and Scope of Accounting – Functions of Financial Accounting - Principles – Concepts – Conventions - Rules of Debit and Credit - Journal, Posting of Ledger – Distinction between Journal and Ledger – Type of Cash book (Single Column, Double Column and Triple Column) - Trial balance

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BANK RECONCILIATION STATEMENT

Introduction of Bank Reconciliation Statement – Need for Bank Reconciliation Statement – Causes for difference between cash book and pass book – Advantages of BRS – Preparation of Bank Reconciliation Statement.

FINAL ACCOUNTS

Introduction - Preparation of Trading and Profit / Loss Account- Balance sheet with Adjustments. (Simple Problems only)

BUDGETS AND BUDGETARY CONTROL

Meaning – Objective of Budgetary Control – Merits and Demerits – Classification of Budget - Sales budget - Production budget - Cost of production budget - Flexible budgeting - Cash budget - Master budget - Zero base budgeting (Simple Problems only)

MARGINAL COSTING

Meaning and Definition of Marginal cost and Marginal Costing – Advantages and Disadvantages - Application of Marginal costing techniques -Break–even point — P/V Ratio – Margin of Safety - Sales required to earn a given profit. (Simple Problems only)

TEXT BOOK

1. T.S.Reddy and Y. Hari Prasad Reddy, Financial and Management Accounting, Margham Publications, Fourth edition (2008).

REFERENCES

1. S.N.Maheswari,Dr.Suneel K Maheshwari and CA Sharad. K. Maheshwari, Financial Accounting, Vikas Publishing House; Fifth edition (2012).
2. Iyengar S.P., Cost and Management Accounting, Sultan Chand and Co., 5th Edition 2010.

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MCA18R4005	DATA STRUCTURES AND ALGORITHMS	L	T	P	C	PR ER
		4	0	0	3	

EQUISITE

Basic Knowledge of Algorithm and Programming concepts in C++

COURSE OBJECTIVES

This course aims to introduce a number of popular data structures and algorithms along with the basic techniques in algorithm. Students can be able to understand the common data structures and algorithms, analyze the complexities of various algorithms, choose appropriate data structures and algorithms for problem solving.

COURSE OUTCOMES

CO1: Understand the concepts of abstract data type , arrays, stacks and queues.

CO2 Implement the concept of Binary search trees and expression trees

CO3: Demonstrate various operations of heap, shortest path algorithms and single source shortest path algorithms

CO4: Analyze various sorting and searching algorithms

CO5: Ability to know advanced data structures like AVL trees, splay trees and Red Black Trees

BASIC STRUCTURES

Introduction – General Rules for running time calculation – List ADT – Stacks – Queues

TREES

Trees – Binary trees - Binary tree Traversals – Expression trees – Threaded binary trees - Binary search trees

HEAPS AND GRAPHS

Priority queues – Binary Heaps - Graphs - Definition, Representation - Topological sort – Shortest Path Algorithms – Un Weighted Shortest path,Dijkstra’s Algorithms – Minimum spanning tree algorithms - Prim’s and Kruskal Algorithm

SORTING AND SEARCHING

Types of sorting - Internal sorting – Bubble sort, Selection sort, Insertion sort, Heap sort, Shell sort - External sorting – Multi-way merge – Searching - Linear search, Binary search – Hashing – Hash function , Separate chaining, Open Addressing.

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ADVANCED DATA STRUCTURES

AVL trees – Splay trees – Red Black trees – Deterministic skip tests – AA trees - Multidimensional data structures.

TEXT BOOK

1. Mark Allen Weiss, Data structures and Algorithm Analysis, 3rd Edition, Pearson Education, 2010.

REFERENCES

1. Langsam, Augenstein, Tenenbaum, Data structures using C and C++, 2nd Edition, Prentice Hall, 2009.
2. Aho, Hopcroft, Ullman, Data Structures and Algorithms, 5th Edition, Addison Wesley, 2008.

MCA18R4006	OPERATING SYSTEMS	L	T	P	C
		4	0	0	3

PREREQUISITE

Basic knowledge in Computer Science and Hardware.

COURSE OBJECTIVE

This course focuses on understanding the elements of operating system, synchronization, deadlocks and storage management.

COURSE OUTCOMES

CO1: Understand Operating System Structure, Operations and Services

CO2: Understand the Process Concept, Multithreaded Programming, Process Scheduling and Synchronization.

CO3: Apply the Concepts of Virtual Memory Management, Secondary Storage, I/O Systems and File Systems.

CO4: Evaluate the different Protection and Security Mechanisms for Operating System

CO5: Design and implement CPU Scheduling algorithms, Page Replacement Algorithms, Memory Allocation Algorithms, Disk Scheduling Algorithms

MCA CURRICULUM & SYLLABUS

AN OVERVIEW OF OPERATING SYSTEM AND ITS STRUCTURES

Introduction - Definition of OS, Mainframe system, Desktop systems, Multi processor system, Distributed, Clustered, Real time systems, Handheld systems, Operating system Structure, System components, Services, System calls, System programs, System design and implementation.

PROCESS MANAGEMENT

Processes – Concepts, Process scheduling, Operations on processes, Cooperating processes, Inter process communication - CPU scheduling - Scheduling concepts, Criteria, Scheduling algorithms, Multiprocessor scheduling, Real time scheduling, Algorithm evaluation - Threads – Overview, Multithreading models, Threading issues.

SYNCHRONIZATION AND DEADLOCKS

Process synchronization – Background, Critical section problem, Synchronization hardware, Semaphores, Classic problems of synchronization, Critical regions, Monitors – Deadlocks - System model, Characterization, Methods of handling deadlocks, Deadlock prevention, avoidance, Detection and recovery from deadlocks.

STORAGE MANAGEMENT

Memory management – Background, Swapping, Contiguous memory allocation, Paging, Segmentation, Segmentation with paging - Virtual memory – Background, Demand paging, Process creation, Page replacement, Allocation of frames, Thrashing –

FILE SYSTEM INTERFACE

File system interface – File concept, Access methods, Directory structure, File sharing, Protection - File system implementation - File system structure, File system implementation, Directory implementation, Allocation methods, Free space management.

TEXT BOOK

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne , Operating System Principles, 9th Edition, John Wiley and Sons (ASIA) Pvt. Ltd., 2013.

REFERENCE

1. Milankovic, M., Operating System Concepts and Design, 2nd Edition, McGraw Hill, 2009.

MCA CURRICULUM & SYLLABUS

MCA18R4082	DATA STRUCTURES LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE

Basic knowledge in Programming using C++

COURSE OBJECTIVES

This course aims to develop skills for designing and analyzing simple linear and non linear data structures. This course focuses on identifying and applying the suitable data structure for the real world applications to gain knowledge in practical applications of data structures.

COURSE OUTCOMES

- CO1:** Able to design stack and queue data structure
- CO2:** Capable to identify the appropriate data structure for given problem
- CO3:** Implement the concepts of linked list data structure
- CO4:** Develop programs using searching and sorting algorithms
- CO5:** Create binary tree and perform its operations

LIST OF EXPERIMENTS

1. Implementation of stack using array, pointer.
2. Implementation of queue using array, pointer.
3. Implementation of circular queue using array.
4. Implementation of singly, doubly and circularly linked lists.
5. Implementation of various sorting techniques
6. Implementation of sequential search and binary search.
7. Implementation of binary tree traversals.
8. Implementation of binary search tree operations.
9. Implementation of graph traversals
10. Implementation of topological sort

MCA CURRICULUM & SYLLABUS

MCA18R4083	LINUX LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE

Basic knowledge in linux commands.

COURSE OBJECTIVES

- To write shell scripts to solve problems.
- To implement some standard Linux utilities such as ls, cp etc using system calls.

COURSE OUTCOMES

CO1: Ability to understand the Linux environment.

CO2: Ability to perform the file management and multiple tasks using shell scripts in Linux Environment.

CO3: Work with shell script to automate different tasks as Linux administration.

CO4: Write shell scripts to automate various tasks.

CO5: Able to learn Linux process control.

LIST OF PROGRAMS

1. Working with Linux Commands
2. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
3. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
4. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
5. Write a shell script to list all of the directory files in a directory.
6. Write a shell script to find factorial of a given integer.
7. Write an awk script to count the number of lines in a file that do not contain vowels.
8. Write a C program to list for every file in a directory, its mode number and file name.

MCA CURRICULUM & SYLLABUS

HSS18R6051	COMMUNICATION SKILLS AND DOCUMENT WRITING	L	T	P	C
		4	0	1	4

PRE-REQUISITE

Basic understanding of spoken and written English

COURSE OBJECTIVE(S):

This course aims to understand the fundamental principles of effective business communication, to apply the critical and creative thinking abilities necessary for effective communication, to organize and express ideas in writing and speaking to produce messages suitably tailored for the topic, objective, audience, communication medium and context.

COURSE OUTCOME(S):

After completing this course, the student will be able to:

CO1 Gain proficiency in English knowledge for both professional and personal life.

CO2 Assist in learning technical aspects of communication for better performance in extra-curricular activities, recruitment process and prospective jobs.

CO3 Refine personality with a grip over advanced techniques of language.

CO4 Able to write business letters and e-mails without grammatical errors.

CO5 Able to face interviews and group discussions with confidence.

BASICS OF TECHNICAL COMMUNICATION

Introduction – The Process of Communication – Language as a Tool of Communication – Levels of Communication – The Flow of Communication – Communication Networks – The Importance of Technical Communication.

Practical Component: Experiments on Listening Skills

COMMUNICATION THROUGH DIALOGUES

Asking for and Giving an Opinion – Seeking and Giving Advice and Making Suggestions – Persuading and Dissuading People – Making a Complaint and Responding to One – Expressing Hopes, Wishes, Regrets and Concerns – Expressing Sympathy and Offering Condolences – Expressing Emotions – **Practical Component:** Situational Dialogues

WRITING PROFESSIONAL LETTERS, MEMOS, E-MAILS AND REPORTS

Understanding Professional Letter Writing – Writing Business Letters – Using Salutations – Closing Business Letters – Writing Routine Letters – Answering Request Letters – Writing Persuasive Letters – Memos – E-mails – Characteristics of a Report – Formats of Reports – Structure of Reports – Writing the Reports – Revising, Editing & Proofreading

Practical Component: Writing Letters, Job Application and Composing E-mails

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UNIT IV: INTERVIEWS AND GROUP DISCUSSIONS

Objectives of Interviews – Types of Interviews – Job Interviews – Organisational Group Discussion – Group Discussion as a Part of Selection Process – Meetings – Conferences

Practical Component: Mock Interview, Preparation of Resume

UNIT V: DEVELOPING A PROFESSIONAL WORK ETHIC

Demonstrating Work Ethics and Commitment – Being Dependable and Reliable – Time Management – Stress Management – Maintenance of Professional Work Space – Taking Advantage of Professional Opportunities – Earning Recognition

Practical Component: Preparing Reports

TEXT BOOK

1. T. Meenakshi Raman and Sangeeta Sharma. **Technical Communication: Principles and Practice.** New Delhi: Oxford, 2009.

REFERENCES:

1. Butterfield, Jeff. **Soft Skills for Everyone.** 5th edition, New Delhi, Cengage Learning India Private Limited, 2014.
2. P. Bhatnagar, **English for Competitive Examinations.** 3rd edition, New Delhi: Macmillan, 2009.
3. Kapoor, A. N. **A Guide to Business Correspondence and Communication Skills.** New Delhi: S. Chand, 2004 (Revised and Enlarged Edition).
4. SadanandKamlesh and SusheelaPunitha. **Spoken English: A Foundation Course. Part 2.** Mumbai: Orient Black Swan, 2009.

MCA CURRICULUM & SYLLABUS

MCA18R5001	ADVANCED JAVA PROGRAMMING	L	T	P	C
		4	0	0	3

PEREQUISITE

Java Programming

COURSE OBJECTIVES

The objective of this course is to provide the student with an expertise in advanced concepts in Java Programming. This includes both the Core Java and Advanced Java programming. After successful completion of the course, the student should be able to develop, design and maintain web-based enterprise applications effectively.

COURSE OUTCOMES

CO1: Develop Swing-based GUI

CO2: Update and retrieve the data from the databases

CO3: Develop distributed applications using RMI

CO4: Develop component-based Java software.

CO5: Design and develop server side programs in the form of servlets

BSAICS OF JAVA

Basic concepts of object oriented programming- Java and Internet – Java and www- Defining, Extending and implementing interfaces- Packages –JAVA API packages- creating packages-Accessing packages- Multithreaded Programming-creating threads- extending thread class- Implementing a Runnable interface- Inter thread communication- Byte Stream classes – Character stream classes -Managing Errors and Exceptions – Applet Programming – Graphics Programming.

EVENT HANDLING

The delegation event model- Event class-Event listener Interfaces-Handling Mouse events- Handling Keyboard Events- Window fundamentals- Working with Graphics

ADVANCED GUI DEVELOPMENT USING JAVA

Introduction-Simple GUI-Based Input/Output with JOptionPane- over viewing of Swing components-Displaying text and images in a window-Textfields and an introduction to Event Handling with nested class- JButton- JComboBox- JList-Mouse Event Handling-Layout Manager-TextArea.

MCA CURRICULUM & SYLLABUS

JDBC

Java Database Connectivity -JDBC Drivers – Statements - Caching Database Results - Storing Classes, Images and Other Large Objects - Controlling Transactions - Escaping Characters - Mapping Database Types - Mapping Date Types- Remote Method Invocation

SERVLET AND JSP

Servlet Overview and Architecture-Setting up the Apache Tomcat server- Handling HTTP get Request- Handling HTTP Post Request- Java server page overview-First JSP example- Scripting-Standard Action-Directives.

TEXT BOOK

1. Deitel, “Java How to Program”, 6th Edition, . PHI,2005.
2. Herbert Schildt,” The Complete Reference”, 7th Edition, TMH2011.
3. S.Ramkumar, K.Sathesh Kumar, .P.Sumathi, “Java for Beginners a Guide”, Scitech Publisher, 2018.

REFERENCE BOOKS

1. E. Balagurusamy, PROGRAMMING WITH JAVA – A PRIMER, 4th Edition, Tata McGraw-Hill, 2010.

MCA18R5002	DATA COMMUNICATIONS AND NETWORKS	L	T	P	C
		3	0	0	4

PREREQUISITE

Basic knowledge in computer networking concepts.

COURSE OBJECTIVES

This course aims to provide basic knowledge of network protocols, ISO OSI reference models, network standards, switching, multiplexing, routing and World Wide Web.

COURSE OUTCOMES

CO1: Understand the importance of data communications and the internet in supporting business Communications and daily activities.

CO2: Understand the concept of transmission medium, Data conversion and Error correction in Networking functionalities.

CO3: Apply the concept of multiplexing and switching techniques in networking.

CO4: Analyze the services and features of wired and wireless LANs.

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CO5: Implement routing algorithm in various applications.

OVERVIEW OF NETWORK MODELS

Introduction to Data communications- Networks- Protocols & standards and standards organizations –The OSI model- Layers in the OSI model-TCP/IP protocol Suite

Transmission Medium and Error Correction

Guided Media- Unguided Media-Transmission Mode-Digital to Analog Control-Analog to Digital Conversion-Introduction to errors-Redundancy- Detection Versus Correction- Block Coding- Checksum

SWITCHING, MULTIPLEXING AND DATA LINK CONTROL

Multiplexing - types of Multiplexing - Multiplexing Application – Spread Spectrum-Circuit Switched Network-Datagram Networks- Virtual Circuit Network-Framing-Flow and Error Control-HDLC

WIRED AND WIRELESS LANS

IEEE Standards- Standard Ethernet-Fast Ethernet-IEEE 802.11- Bluetooth-ATM-ATM LAN

ROUTING AND WORLD WIDE WEB

Repeaters Bridges- Routers - Gateway - Routing algorithms – TCP-UDP-DNS- File Transfer World Wide Web Architecture-Webdocument..

TEXT BOOKS :

1. Behrouz and Forouzan Data Communication and Networking, TMH, 4th Edition, 2012.

REFERENCES

1. Larry Peterson, L., and Brule Davie, S., Computer Networks – A System Approach, MarGankangmann – Harcourt Asia, 2009.
2. Andrew Tanenbaum, S., Computer Networks, 4th Edition, Tata McGraw Hill, 2010.

THEORY WITH PRACTICAL COMPONENT

1. Make a study on network devices in detail.
2. Make a study on network IP
3. Connect computer through LAN
4. Make a study on different types of network cable.
5. Configure a network using Distance vector routing protocol.
6. Configure a network using link state vector routing.

MCA CURRICULUM & SYLLABUS

MCA18R5003	VISUAL PROGRAMMING	L	T	P	C
		4	0	0	3

PRE REQUISITE

Programming in VB

COURSE OBJECTIVES

This course aims to make the students developing visual programming skills and web page designing skills, have proficiency in C# by building stand-alone applications in the .NET framework using C#, VB.Net and ASP.Net.

COURSE OUTCOMES

CO1: Able to analyze program requirements

CO2: Develop programs with GUI interfaces

CO3: Code programs and develop interface using Visual Basic .Net,C#.Net,ASP.Net

CO4: Perform tests, resolve defects and revise existing code.

CO5: Able to develop projects using ASP .NET

GUI

GUI concept – Data types – GUI Architecture – Message Processing – Keyboard and Mouse Handling
Displaying Text and Graphics – File and Printer Handling – DDE – DDL – ODBC– COM/DCOM /
CORBA - .NET Namespaces, Assemblies, .NET Memory Management, Process Management,
Interoperation with COM.

.NET FRAMEWORK

Transactions in .NET, Structures Exception Handling, Code Access Security, Web Controls using the .NET framework, The .NET Framework Class Library.

VB.NET

VB.NET – basic features - Inheritance, Value Types, Operator Overloading, Exception Handling, Arrays and Collections, Properties, Delegates and Events, Windows Forms, Dialog Boxes and Controls, Graphical Output, Files, Data access.

C# .NET

C#.NET – basic features, Arrays and Collections, parameter arrays, Inheritance, Garbage collection and Resource management.

MCA CURRICULUM & SYLLABUS

ASP. NET

ASP.NET – Validation controls – Accessing Data with web forms – Building ASP.NET applications – Building and XML web service handling XML.

TEXT BOOKS

1. Jeff Prosise, Programming Microsoft .NET, Microsoft Press, 2009
2. David S Plat, Introducing Microsoft .NET, Microsoft Press ,3rd Edition, 2003

REFERENCES

- 1.Thuan Thai ,Hoang Q.Lam,.Net Frame Work Essentials ,O'Reilly and Associates,3rd Edition,2003
- 2.Paul Yao,David Durant ,Programming .NET Compact Framework 3.5,Pearson Education,2nd edition,2011.

MCA18R5080	ADVANCED JAVA PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE

Java Programming

COURSE OBJECTIVES

The objective of the course is intended for Java programmers who wish to write programs using many of the advanced Java features.

COURSE OUTCOMES

At the end of the course, the student able to

- CO1:** Develop Swing-based GUI
- CO2:** Update and retrieve the data from the databases
- CO3:** Develop distributed applications using RMI
- CO4:** Develop component-based Java software using JavaBeans
- CO5:** Develop server side programs in the form of servlets

LIST OF EXPERIMENTS

1. Create a program to implement the multithreading concept.
2. Create a program to implement the interface concept
3. Create a program to implement the package concept
4. Create program to implement the RMI concept
5. Write a program to design a calculator using Java components and handle various events related activities.

MCA CURRICULUM & SYLLABUS

6. Write a program to demonstrate use of Grid Layout.
7. Write a program to demonstrate use of Flow Layout.
8. Write a program to demonstrate use of Card Layout.
9. Write a program to demonstrate use of Border Layout.
10. Write a program to design a form using basic swing components.
11. Write a program to demonstrate the use of scroll panes in Swing.
12. Write a servlet to demonstrate the Http Servlet class using do Get ().
13. Write a servlet to demonstrate the Http Servlet class using do Post ().
14. Write a servlet to demonstrate the cookie.
15. Write an Application program/Applet to send queries through JDBC bridge & handle result.

MCA18R5081	VISUAL PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE

Programming and Problem solving

COURSE OBJECTIVES

This course aims to make the students in developing visual programming skills and web page designing skills, have proficiency in .net platform by building stand-alone applications in the .NET framework using Vb.net and ASP.net.

COURSE OUTCOMES

CO1: Develop windows programming

CO2: Design, document, code and test small C# console and GUI applications.

CO3: Design, document, code and unit test class libraries as part of a larger projects

CO4: Ability to Use an object browser and .NET documentation to examine the .NET framework namespace contents.

CO5: Use the Visual Studio IDE to create and debug application and class library solutions and projects

LIST OF EXPERIMENTS

1. Create a window form controls
2. Create a form validation using ASP.Net
3. Write a program to perform to perform string operations
4. Write a program to perform to students mark list with database connectivity using VB.Net

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5. Write a program to perform student information system with database connectivity Using VB.Net
6. Write a program to perform employee payslip with database connectivity using ASP.Net
7. Write a program to perform ebb ill generation with database connectivity Using ASP.Net

MCA18R5004	MOBILE APPLICATION DEVELOPMENT	L	T	P	C
		4	0	0	3

PREREQUISITE

Java Programming (MCA5002)

COURSE OBJECTIVES

This course aims the students to describe the aspects of mobile programming that make it unique from programming for other platforms. It aims to utilize rapid prototyping techniques to design and develop sophisticated mobile interface. This course used to program mobile applications for the Android operating system that use basic and advanced phone features to deploy applications to the Android marketplace for distribution.

COURSE OUTCOMES:

- CO1:** Understand the limitations and challenges of working in a mobile and wireless environment.
- CO2:** Describe and apply the different types of application models/architectures used to develop mobile software applications.
- CO3:** Understand the components and structure of a mobile development frameworks (Android SDK and Eclipse Android Development Tools (ADT))
- CO4:** Design, implement and deploy mobile applications using an appropriate software development environment.
- CO5:** Analyze and interpret objects through pattern classes, Apply the knowledge of representation and description of images

HISTORY OF MOBILE

The Evolution of Devices - the mobile ecosystem – Operators – Networks – Devices – Platforms - Operating-Systems - Application Frameworks – Applications – Services - Size and Scope of the Mobile Market -The Addressable Mobile Market-Mobile As a Medium.

MCA CURRICULUM & SYLLABUS

MOBILE DESIGN

Thinking in Context-Taking the Next Steps- Developing a Mobile Strategy -New Rules- Types of Mobile Applications-Mobile Application Medium Types- Mobile Information Architecture – Mobile Information Architecture-The Design myth-Interpreting Design-the mobile design tent-pole-designing for the best possible experience-the elements of mobile design-mobile design tools-designing for the right device-designing for different screen Sizes

MOBILE APPLICATION DEVELOPMENT

Mobile web apps versus native applications-the ubiquity principle-when to make a native application-when to make a mobile web application-what is mobile 2.0? - mobile web development –web standards-designing for multiple mobile browsers-device plans-markup-css: cascading style sheets-javascript

INTRODUCTION TO ANDROID

Background.-an open platform for mobile development.-native android applications.-android sdk features.-introducing the open handset alliance.-what does android run on? - why develop for android?-introducing the development framework..

APPLICATION DEVELOPMENT

Developing for android.-developing for mobile devices.-to-do list example. -android development tools.-what makes an android application? -Introducing the application manifest.-using the manifest editor-the android application life cycle.-understanding application priority and process state-a closer look at android activities.

TEXT BOOKS

1. Mobile Design and Development Practical concepts and techniques for creating mobile sites and web apps By Brian Fling Publisher: O'Reilly Media(UNIT I,II,III)
2. Professional Android Application Development by Reto Meier (Unit-IV and Unit-V)

MCA18R5005	WEB PROGRAMMING	L	T	P	C
		4	0	0	3

PREREQUISITE

Basic knowledge in computer networking and internet concepts.

MCA CURRICULUM & SYLLABUS

COURSE OBJECTIVE

The objective of this course is to provide graduate students with an understanding of the role of technologies used in Web Programming. Know the importance of object oriented aspects of Scripting. . This course includes creating web pages in HTML, DHTML, JSP, RMI. Learn the concepts and develop our own web based application using PHP, .Net framework.

COURSE OUTCOMES:

At the end of the course, the student able to

CO1: Be familiar with Web page design using HTML / DHTML and style sheets

CO2: Be exposed to creation of user interfaces using Java scripts and CSS.

CO3: Learn to create dynamic web pages using server side scripting.

CO4: Learn to write PHP database functions.

CO5: Learn .Net frame work and RMI

SCRIPTING

Web page Designing using HTML, Scripting basics- Client side and server side scripting. JavaScriptObject, names, literals, operators and expressions- statements and features- events - windows - documents - frames - data types - built-in functions- Browser object model - Verifying forms.-HTML5- CSS3- HTML 5 canvas - Web site creation using tools.

JSP

Introduction to object oriented programming-Features of JSP – Data types, variables and arrays – Operators – JSP Control statements – web page developed using JSP– Inheritance. Packages and Interfaces – Exception Handling – Multithreaded Programming – Input/output – Files – Utility Classes – String Handling in JSP.

JDBC

JDBC Overview – JDBC implementation – Connection class – Statements - Catching Database Results, handling database Queries. Networking– InetAddress class – URL class- TCP sockets – UDP sockets, Java Beans –RMI.

SERVLET

Java applets- Life cycle of an applet – Adding images to an applet – Adding sound to an applet. Passing parameters to an applet. Event Handling. Introducing AWT: Working with Windows Graphics and Text.

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Using AWT Controls, Layout Managers and Menus. Servlet – life cycle of a servlet. The Servlet API, Handling HTTP Request and Response, using Cookies, Session Tracking. Introduction to JSP.

XML AND WEB SERVICES

Xml – Introduction-Form Navigation-XML Documents- XSL – XSLT- Web services-UDDI-WSDL-Java web services – Web resources..

TEXT BOOKS:

1. Harvey Deitel, Abbey Deitel, Internet and World Wide Web: How To Program 5th Edition.

REFERENCES:

1. John Pollock, JavaScript - A Beginners Guide, 3rd Edition –Tata McGraw-Hill Edition.
2. Keyur Shah, Gateway to Java Programmer Sun Certification - Tata McGraw Hill, 2002.
3. Herbert Schildt, Java - The Complete Reference, 7th Edition. Tata McGraw- Hill Edition.
4. Michael Morrison XML Unleashed Tech media SAMS.

MCA18R5006	DATA WAREHOUSING AND DATA MINING	L	T	P	C
		4	0	0	4

PREREQUISITE

Knowledge in Database Management Systems

COURSE OBJECTIVES

This course aims to introduce advanced database concepts such as data warehousing, data mining techniques, clustering, classifications and its real time applications.

COURSE OUTCOMES

CO1: Design a data mart or data warehouse for any organization

CO2: Develop skills to write queries using DMQL

CO3: Extract knowledge using data mining techniques

CO4: Adapt to new data mining tools.

CO5: Explore recent trends in data mining such as web mining, spatial-temporal mining

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DATA WAREHOUSEING

Data Warehousing: OLTP Vs OLAP - Multidimensional Data Model –Data Warehouse Architecture - Metadata repository – Data warehouse Implementation - OLAM

DATA MINING TECHNIQUES

Data Mining – Motivation – Functionalities- Classification of DM - Primitives of DM - DM Metrics - DM Applications - DM Issues – Social Implications of DM

DATA PREPROCESSING

Summarization - Data cleaning - Data Integration and Transformation - Data Reduction – Discretization and Concept Hierarchy Generation

CLASSIFICATION AND PREDICTION

Mining Frequent Patterns – Frequent Item set Mining Methods. Classification: Classification by Decision Tree Induction – Bayesian Classification–Rule based Classification-Prediction – Accuracy and Error Measures

CLUSTERING AND APPLICATIONS OF DATA MINING

Cluster Analysis–Types of Data in Cluster Analysis–Categorization of clustering Methods – Partition Methods - Outlier Analysis – Mining Data Streams – Social Network Analysis – Mining the World Wide Web

TEXT BOOK

1. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques” McGraw – Hill, 3rd Edition, 2011.

REFERENCES

1. Alex Berson and Stephen J. Smith “Data Warehousing, Data Mining & OLAP”, Tata McGraw Hill, 3rd Edition 2007.
- 2 .P. Soman, Shyam Diwakar and V. Ajay “Insight into Data mining Theory and Practice”, Easter Economy, 3 rd Edition Prentice Hall of India, 2006.
3. G. K. Gupta “Introduction to Data Mining with Case Studies”, Easter Economy 3rd Edition, Prentice Hall of India, 2006.

PRACTICAL COMPONENT

1. To perform multidimensional data model using SQL queries (Star, Snowflake and Fact

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- Constellation schemes) using Oracle 8i
2. To perform various OLAP operations such as Slice, Dice, Roll-up, Drill-down, Pivot using Oracle 8i PL/SQL
 3. To perform attribute relevance analysis on a given data using .NET framework 2.0
 4. To perform information gain for a particular attribute in the given data using .NET Framework 2.0
 5. To perform data generalization and summarization using Oracle
 6. Implementing pre-processing using any data mining algorithm
 7. Implementing Association Rule mining using Apriori algorithm
 8. Implementing Classification rule process using naïve Bayes algorithm
 9. Implementing Clustering rule process using simple K-means

MCA18R5082	MOBILE APPLICATION DEVELOPMENT LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE

Students should have some basic knowledge of object oriented programming.

COURSE OBJECTIVE

- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, and dictionaries.
- Read and write data from/to files in Python.

COURSE OUTCOMES:

At the end of the course, the student able to

CO1: Understand the mobile market platforms and applications frame work.

CO2: Explore the basic design of mobile applications.

CO3: Understand usage of mobile application development.

CO4: Demonstrate the android SDK futures.

CO5: Demonstrate the Android application life cycle.

LIST OF EXPERIMENTS:

1. Simple programs using Button, Text Field, Radio Button, Checkbox, Spinner, Image View

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2. Programs using listeners and event handlers
3. Creating Layouts – Linear and Relative, List View, Grid View, Menus, Action Bars, Notifications: Status, Toasts and Dialogs, Styles and Themes
4. Creating Custom Widgets, Focus, Touch Mode and Screen Orientation
5. Data Access and Storage - SQLite Databases, Playing audio/video
6. How to get your app on the app store

MCA18R5083	WEB PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE

Basic knowledge in computer networking and internet concepts.

COURSE OBJECTIVE

The objective of this course is to provide graduate students with an understanding of the role of technologies used in Web Programming. Know the importance of object oriented aspects of Scripting. . This course includes creating web pages in HTML, DHTML, JSP, RMI. Learn the concepts and develop our own web based application using PHP, .Net framework.

COURSE OUTCOMES:

At the end of the course, the student able to

CO1: Be familiar with Web page design using HTML / DHTML and style sheets

CO2: Be exposed to creation of user interfaces using Java scripts and CSS.

CO3: Learn to create dynamic web pages using server side scripting.

CO4: Learn to write PHP database functions.

CO5: Learn .Net frame work and RMI

LIST OF EXPERIMENTS:

1. Write a html program for Creation of web site with forms, frames, links, tables etc
2. Design a web site using HTML and DHTML. Use Basic text Formatting, Images,
3. Create a script that asks the user for a name, then greets the user with “Hello” and the user name on the page
4. Create a script that collects numbers from a page and then adds them up and prints them to a blank field on the page.

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5. Create a script that prompts the user for a number and then counts from 1 to that number displaying only the odd numbers.
6. Create a script that will check the field in Assignment 1 for data and alert the user if it is blank. This script should run from a button.
7. Using CSS for creating web sites
8. Creating simple application to access data base using JDBC Formatting HTML with CSS.
9. Program for online student information manipulating with Java Scripts
10. Program using PHP database functions.
11. Write a web application that functions as a simple analog clock using PHP
12. Install Tomcat and use JSP and link it with any of the assignments above
13. Reading and Writing the files using .Net
14. Write a program to implement web service for calculator application
15. Implement RMI concept for sharing files in various system.

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MCA18R6001	BIG DATA ANALYTICS	L	T	P	C
		4	0	1	3

PREREQUISITE

Basic knowledge in database concepts and advanced programming.

COURSE OBJECTIVES

The course aims to cover Big Data Fundamentals, including the characteristics of Big Data, the sources Big Data (such as social media, sensor data, geospatial data etc), as well as the challenges imposed around information management, data analytics, privacy and security, as well as platforms and architectures

COURSE OUTCOMES

- CO1:** Understand the concepts of HDFS and MapReduce framework
- CO2:** Setup Hadoop Cluster and write Complex MapReduce programs
- CO3:** Implement HBase and MapReduce Integration
- CO4:** Implement best Practices for Hadoop Development
- CO5:** Develop a Real Life Project on Big Data Analytics

BIG DATA SCIENCE

Introduction- Origin of Big Data -Methodology for Defining Big Data-Different Attributes -Defining Big Data From 3Vs to 32 Vs- Big Data Analytics and Machine Learning - Hadoop, HDFS, MapReduce, Spark, and Flink-Google File System (GFS) and HDFS-MapReduce - The Origin of the Hadoop Project -Spark and Spark Stack- Flink and Other Data Process Engines

BIG DATA INFRASTRUCTURES AND PLATFORMS

Database Techniques for Big Data-Navigational Data Models-Relational Data Models-NoSQL Movement-NoSQL Solutions for Big Data Management- NoSQL Data Models - Key-Value Stores - Column-Based Stores - Graph-Based Stores- Document-Based Stores- Big Data Processing Systems and Platforms-Hadoop- Dryad – Pregel- Storm- Spark.

BIG DATA PROCESSING

Basic Framework of the Hadoop Ecosystem- Parallel Computation Framework: MapReduce- Job Scheduling Algorithm- Performance Optimization of HDFS- Performance Optimization of HBase - Performance Enhancement of Hadoop System.

PACKING ALGORITHMS

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Packing Algorithms for Big Data Replay on Multicore -Performance Bottlenecks- Big Data Replay Method- Packing Algorithms- Performance Analysis-Big Data Applications-XDOM- Implementation- Validation parameter, method, results - A Case Study in Big Data Analytics- Exploring Twitter Sentiment Analysis and the Weather.

BIG DATA SECURITY AND PRIVACY

Spatial Privacy Challenges in Social Networks- Security and Privacy in Big Data- Secure Queries Over Encrypted Big Data- System Model - Threat Model and Attack Model- Secure Query Scheme in Clouds - Security Definition of Index-Based Secure Query Techniques- Implementations of Index-Based Secure Query Techniques- Other Big Data Security-Digital Watermarking - Self-Adaptive Risk Access Control - Privacy on Correlated Big Data - Correlated Data in Big Data - Anonymity - Differential Privacy.

Text Book:

1. Big Data principles and paradigms, Rajkumar Buyya, Rodrigo N. Calheiros, Amir Vahid Dastjerdi, Elsevier, Morgan Kaufmann, 2016.

REFERENCES

1. Tom White “Hadoop: The Definitive Guide” Third Edition, O’reilly Media, 2012.
2. Anand Rajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
3. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012.

MCA18R6002	CLOUD COMPUTING	L	T	P	C
		4	0	1	4

PREREQUISITE

Data Communication and Networks

COURSE OBJECTIVES

The students can be aware of different cloud service providers, number, types of services they provide , advantages ,concerns in adapting cloud computing services.

COURSE OUTCOMES:

CO1: Understand security implications in cloud computing

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CO2: Analyze the trade-offs inherent in Cloud Computing

CO3: Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.

CO4: Understand the core issues of cloud computing such as security, privacy, and interoperability

CO5: Ability to Identify problems, and explain, analyze, and evaluate various cloud computing solutions

UNDERSTANDING CLOUD COMPUTING

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

DEVELOPING CLOUD SERVICES

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

CLOUD COMPUTING FOR EVERYONE

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

USING CLOUD SERVICES

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing – Collaborating on Databases – Storing and Sharing Files

OTHER WAYS TO COLLABORATE ONLINE

Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wiki.

TEXT BOOKS

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

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REFERENCES

Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008

PRACTICAL COMPONENT

1. Installation & Configuration of Oracle Virtual box for windows xp& android.
2. Installation Configuration of Hadoop.
3. Using Hadoop for counting word frequency with map reduce.
4. Service deployment research & uses over cloud- Google app &Amazon web services.
5. Cloud Security Management.
6. Performance evaluation of services over cloud- Google App &Amazon web services.

MCA17 R6003	GAME PROGRAMMING	L	T	P	C
		4	0	0	3

PREREQUISITE

Basic knowledge in object oriented programming concepts.

COURSE OBJECTIVE

This course aims to get the knowledge of current trends in game programming and make the students to build their own game of choosing

COURSE OUTCOMES:

- CO1:** Familiarity with leading open source game engine components
- CO2:** Familiarity with game animation
- CO3:** Exposure to network-based gaming issues.
- CO4:** Exposure to AI for games
- CO5:** Develop 3D and 2D interactive games

3D GRAPHICS FOR GAME PROGRAMMING

3D Transformations, Quaternions, 3D Modeling and Rendering, Ray Tracing, Shader Models, Lighting, Color, Texturing, Camera and Projections, Culling and Clipping, Character Animation, Physics-based Simulation, Scene Graphs.

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GAME ENGINE DESIGN

Game engine architecture, Engine support systems, Resources and File systems, Game loop and real-time simulation, Human Interface devices, Collision and rigid body dynamics, Game profiling.

GAME PROGRAMMING

Application layer, Game logic, Game views, managing memory, controlling the main loop, loading and caching game data, User Interface management, Game event management.

GAMING PLATFORMS AND FRAMEWORKS

2D and 3D Game development using Flash, DirectX, Java, Python, Game engines - DX Studio, Unity.

GAME DEVELOPMENT

Developing 2D and 3D interactive games using DirectX or Python – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.

TEXT BOOKS:

1. Mike Mc Shaffrfy and David Graham, “Game Coding Complete”, Fourth Edition, Cengage Learning, PTR, 2012.
2. Jason Gregory, “Game Engine Architecture”, CRC Press / A K Peters, 2009.
3. David H. Eberly, “3D Game Engine Design, Second Edition: A Practical Approach to Real-Time Computer Graphics” 2nd Editions, Morgan Kaufmann, 2006.

REFERENCES:

1. Ernest Adams and Andrew Rollings, “Fundamentals of Game Design”, 2nd Edition Prentice Hall / New Riders, 2009.
2. Eric Lengyel, “Mathematics for 3D Game Programming and Computer Graphics”, 3rd Edition, Course Technology PTR, 2011.
3. Jesse Schell, The Art of Game Design: A book of lenses, 1st Edition, CRC Press, 2008.

MCA CURRICULUM & SYLLABUS

HSS18R008	Entrepreneurship Development	L	T	P	C
		4	0	0	3

PREREQUISITE

Knowledge in business opportunities

COURSE OBJECTIVE

The students develop and can systematically apply an entrepreneurial way of thinking that will allow them to identify and create business opportunities that may be commercialized successfully.

COURSE OUTCOMES:

After the completion of the course, the students will be able to:

CO1: Have the ability to discern distinct entrepreneurial traits

CO2: Know the parameters to assess opportunities and constraints for new business ideas

CO3: Understand the systematic process to select and screen a business idea

CO4: Design strategies for successful implementation of ideas

CO5: Write a business plan

Entrepreneurial Competence

Conceptual models of entrepreneurship –entrepreneurial leaders,managers –Entrepreneurial characteristics – attitudes, motivation, ethical issues –Social entrepreneurship.

Entrepreneurial Environment

Small business and corporate entrepreneurship-Risk –Intrapreneurship –culture and competence -Building entrepreneurial organization -Entrepreneurial team –matching human resources needs and skills.

Business Plan Preparation

Identifying business opportunities and planning for business production -Innovation and creativity -Business promotion, process, stages, facilities and incentives.

Launching of Small Business

Finance and Human Resource Mobilization - operations planning, market and channel selection, growth strategies, product launching.

Management of Small Business

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Monitoring and Evaluation of Business, preventing sickness and rehabilitation of business units -Effective Management of small Business

Text Book

1. Michael H Morris, Entrepreneurship and Innovation in Corporations, 7th Edition, CENGAGE Learning, Delhi, 2008
2. Jerry Katz, Entrepreneurship Small Business, 5th edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2007.

Reference Books

1. Khanka S.S., Entrepreneurial Development, 1st edition, S.Chand and Company Limited, New Delhi, 2001.
2. Prasama Chandra, Projects: Planning, Analysis, Selection, Implementation and Reviews, 2nd edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 1996.
3. Robert D. Hisrich, Entrepreneurship, 6th edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2006.
4. Cynthia Greene, Entrepreneurship, 9th Edition, CENGAGE Learning, Delhi, 2008.

MCA18R6080	R PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE

Statistical background, analytical background

COURSE OBJECTIVE

Become proficient in writing a fundamental program and perform analytics with R

COURSE OUTCOMES:

CO1: Learn the basics of R programming including objects, classes, vectors, attributes etc.

CO2: Write functions including generic functions using various methods and loops

CO3: Install various packages and work effectively in the R environment

CO4: Select and modify values as required

CO5: Useful programming tool for catering to practical data science problems.

LIST OF PROGRAMS

1. Create function which calculates the mean and standard deviation of a numeric vector.

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2. Implement pre processing algorithm
3. Implement feature selection algorithm
4. Implement supervised classification algorithm.
5. Implement unsupervised classification algorithm.
6. Implement clustering algorithm
7. Illustrate the potential hazards of adding a multi way table over one of its margins. Data are from a study that compared outcomes for two different types of surgery for kidney stones; A: open, which used open surgery, and B: ultrasound, which used a small incision, with the stone destroyed by ultrasound. Determine the success rate that is obtained from combining the data for the two different sizes of stone. Also determine the success rates for the two different stone sizes separately.
8. Plot the density and the cumulative probability curve for a normal distribution with a mean of 2.5 and SD = 1.5.
9. The density for the distribution in items (i) and (ii), given by $d_{\text{norm}}(x, 2.5, 1.5)$, gives the relative number of observations per unit interval that can be expected at the value x . For example $d_{\text{norm}}(x=2, 2.5, 1.5) \approx 0.2516$. Hence
 - (i) In a sample of 100 the expected number of observations per unit interval, in the immediate vicinity of $x=2$, is 25.16
 - (ii) In a sample of 1000 the expected number of observations per unit interval, in the immediate vicinity of $x=2$, is 251.6
 - (iii) The expected number of values from a sample of 100, between 1.9 and 2.1, is approximately $0.2 \times 251.6 = 50.32$! The number can be calculated more exactly as $(p_{\text{norm}}(2.1, 2.5, 1.5) - p_{\text{norm}}(1.9, 2.5, 1.5)) * 1000$ " Repeat the calculation to get approximate and more exact values for the expected number
 - (i) between 0.9 and 1.1
 - (ii) between 2.9 and 3.1
 - (iii) between 3.9 and 4.1
10. In each of the data frames `elastic1` and `elastic2`, fit straight lines that show the dependence of distance on stretch. Plot the two sets of data, using different colours, on the same graph. Add the two separate fitted lines. Also, fit one line for all the data, and add this to the graph.

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MCA18R6081	GAME PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE

Knowledge in data mining and data warehousing.

COURSE OBJECTIVE

This course aims to build student familiarity with the API library of a specific game engine as well as give students an appreciation of the technology and algorithms that form those engines.

COURSE OUTCOMES:

- CO1: Illustrate an understanding of the concepts behind game programming techniques.
- CO2: Implement game programming techniques to solve game development tasks.
- CO3: Build familiarity and appreciation of the programmatic components of an industry standard game development engine
- CO4: Developing games using android.
- CO5: Games development using python.

LIST OF PROGRAMS

1. Rainbow Lines Project
2. Maze Game Project
3. Basketball Game Project
4. Snake Game Project
5. Android Game development
6. Game development using python

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MCA18R4101	COMPUTER GRAPHICS AND MULTIMEDIA	L	T	P	C
		4	0	0	3

PREREQUISITE

Programming and Problem solving (MCA3003)

COURSE OBJECTIVES

This course aims to make the students be aware of the concepts of underlying modern Computer Graphics. Student can gain skills to design algorithms for digital image processing problems in various domains. This course contains 2D geometric transformations, algorithms for clipping, 3D geometric, modeling transformation and Illumination models etc.

COURSE OUTCOMES

CO1 : Understand contemporary graphics hardware.

CO2 : Ability to develop interactive graphics applications using 2D concepts

CO3 : Implement projections and 3D concepts.

CO4 : Develop multimedia applications.

CO5 : Understand and able to demonstrate compression formats and techniques

INTRODUCTION

Overview of graphics system - various Display Devices – Interactive Input devices –Line drawings algorithms - DDA Algorithm - Bresenham's Line Drawing Algorithm – Parallel line Algorithm– Circle Drawing Algorithm and Ellipse drawing Algorithms.

2D CONCEPTS

Two-dimensional Transformations – Filling Algorithms – Windowing – Clipping – Line Clipping and Polygon Clipping

3D CONCEPTS

Projections- 3D object representations –Polygon surfaces-Quadric surfaces-Fractals – Three dimensional Transformations

MULTIMEDIA

Multimedia hardware and software - Components of multimedia – Text-Image – Graphics – Audio – Video – Animation.

DATA COMPRESSION

Multimedia communication systems – JPEG Compression-MPEG Compression –Applications of Multimedia.

TEXT BOOKS

1. Donald Hearn, Pauline Baker, M., Computer Graphics ,Pearson Education,2nd Edition,2011.

MCA CURRICULUM & SYLLABUS

2. Raff Steinmetz, Klara Nahrstedt, Computing, Communication and Application – Multimedia, Pearson Education, 5th Edition, 2009.

REFERENCES

1. Tom McReynolds, David Blythe “Advanced Graphics Programming Using OpenGL”, Elsevier, 2010.
2. Parag Havaldar and Gerard Medioni, “Multimedia Systems Algorithms, Standards and Industry Practices”, Course Technology, Cengage Learning, 2010.

MCA18R4102	MANAGEMENT INFORMATION SYSTEM	L	T	P	C
		4	0	0	3

PRE-REQUISITES:

Principles of Management

COURSE DESCRIPTION

Studies the important uses of information technology in organizations. Includes information requirements and flow, system design and analysis methodologies, the generation and accumulation of data for decision making, and the implementation and control of information systems. The course will provide students with information systems knowledge that is essential for creating successful and competitive firms.

COURSE OBJECTIVES:

After completing this course, students will be able to

- CO1: Discuss the roles played by information technology in today’s business and define various technology architectures on which information systems are built
- CO2: Define and analyze typical functional information systems and identify how they meet the needs of the firm to deliver efficiency and competitive advantage
- CO3: Identify the basic steps in systems development
- CO4: Define the relationships between the non-MIS manager and the MIS function and identify the role of the non-MIS manager in areas such as MIS strategic planning, end-user liaison support, customer-facing systems, and decision support systems
- CO5: Define and analyze various MIS management responsibilities, including planning, budgeting, project management, and personnel management, Discuss critical ethical and social issues in information systems.

SYSTEM CONCEPTS

Definition of Information Systems; Management levels as a Framework for Information Systems; Information System Planning Strategies and Methods; Business Systems Types of System - Subsystems

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Role of information system in business -Components of Information system-Dimensions of information system - Challenges and opportunities of information system.

INFORMATION SYSTEMS

Functional areas - Finance, marketing, production, HR - Decision Support System (DSS): Concept and Philosophy, DSS: Deterministic Systems, Artificial intelligence(AI) System, Knowledge based expert system(KBES), MIS & the role of DSS, Transaction Processing System(TPS), Enterprise Management System(EMS), Enterprise Resource Planning (ERP) System, Benefits of ERP, EMS & ERP.

SYSTEM DEVELOPMENTS

System Development Life Cycle: Problem Definition, Feasibility Study, Systems Analysis, System Design, Implementation and Maintenance.

IMPLEMENTATION AND CONTROL

Testing security – Coding techniques – detection of error, validation – Cost benefits analysis – assessing the value and risk information systems.

SOFTWARE ENGINEERING

Software engineering qualities – Design, production, service, software specification, and software metrics - Software quality assurance – Software life cycle models – Verification and validation.

TEXT BOOK

1. Kenneth C. Laudon and Jane Price Laudon, Management Information Systems Managing the Digital Firm, 10th Edition, Pearson Education Asia., New Delhi, 2006.
2. James AN O' Brein, Management Information Systems, 7th edition, Tata McGraw Hill, New Delhi, 2007.

REFERENCES

1. Gordon B. Davis, Management Information System: Conceptual Foundations, Structure and Development, 2nd edition, McGraw Hill, New Delhi, 1974.
2. Prasad L.M., Management Information System, 1st edition, Sultan Chand, New Delhi, 2006.
3. Managing with information, Kanter, Jerome
4. Information system for Modern Management, Murdick & Ross, R.claggetti

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MCA18R4103	CLIENT SERVER TECHNOLOGY	L	T	P	C
		4	0	0	3

PRE-REQUISITES:

Knowledge in

COURSE OBJECTIVE:

This course covers the evolution, impact and services available with Client/Server technology and distributed computing. The characteristics of clients and servers and the role of middleware will be discussed.

COURSE OUT COMES:

CO1: Understand basic of Client/Server configurations

CO2: Understand the concepts of Client / server OS

CO3: To understand and distinguish different types of network servers.

CO4: To provide students with an understanding of distributed systems

CO5: To beautifying an existing mainframe application by adding a GUI front-end to it.

INTRODUCTION

Client Server Computing, Benefits, Evolution of client server computing, Client Server Applications, Components, Classes of Client Server Computing – Categories of Client Server Computing

CLIENT/SERVER OPERATING SYSTEMS

Dispelling the myths, Obstacles upfront and hidden, open systems and standards, factors needed for success. Standards setting organizations

THE CLIENT

Client Hardware and software, Client components, Client Operating Systems, GUI, Xwindows and Windowing, Database Access Application Logic, Client Software Products, Client Requirements

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THE SERVER

Server Hardware, Categories, Features classes of Server Machines, Server Environment, Network management environment, network Computing Environment, Network Operating Systems, Server requirements, Platform Independence, Transaction Processing, and Connectivity. Server Data Management and Access Tools

CLIENT SERVER AND INTERNET

Client server and internet, Web client server, 3 tier client server web style, CGI , the server side of web, CGI and State, SQL database servers, Middleware and federated databases, data warehouses, EIS/DSS to data mining, GroupWare Server , what is GroupWare, components of GroupWare

Text Books

1. Dawana Travis Dewire, “ Client Server Computing”, Tata Mc-Graw Hill Education Pvt. Ltd., New Delhi, 2003. Robert Orfali, Dan Harkey & Jeri Edwards, “Essential Client/Server Survival Guide”,second edition, John Wiley & Sons, Singapore, 2003.

References Books

1. Eric J Johnson, “A complete guide to Client / Server computing”, first edition, Prentice Hall, New Delhi, 2001.

2. Smith & Guengerich, “Client /Server Computing”, Prentice Hall, New Delhi, 2002. James E. Goldman, Phillip T. Rawles, Julie R. Mariga, “Client/Server Information Systems, A Business Oriented Approach”, John Wiley & Sons, Singapore, 2000.

MAT18R5113 Graph Theory	L	T	P	Credit
	3	1	0	3
Pre-requisite: Basic Set Theory		Course Category: Elective Course Type: Theory		

Course Objective(s):

1. To familiarize the students with the concept of sub graph, walks, path, circuits, connected and disconnected graphs.
2. To understand the properties of tree and cut set and Fundamental circuits.
3. To grasp the concepts in Fundamental circuits and Chromatic number.

Course Outcome(s):

After completing this course, the student will be able to:

1. Solve some real life problems using techniques of graphs.
2. Understand the properties of tree and cut set and Fundamental circuits

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3. Get knowledge about spanning tree of a connected graph
4. Acquire logical skills in the connectivity and edge connectivity
5. Gain knowledge about matrix representation of graph and also find chromatic number of graph.

UNIT I

Definition of a Graph – finite & infinite graphs – incidence, degree isolated & pendent Vertices – isomorphisms –sub graphs – walks , paths & circuits –Connected &disconnected graphs – components – Euler graphs - Operations on Graphs –More on Euler graphs –Hamiltonian paths & circuits .

UNIT II

Trees –properties of trees – pendent vertices in a tree – distances & centres in a tree – Rooted & binary trees – Spanning trees –Fundamental circuits – Finding all spanning trees of a Graph –Spanning trees in a weighted graph .

UNIT III

Cut sets – Properties of a Cut set – all Cut sets in a graph – Fundamental circuits & Cut sets –Connectivity & separability.

UNIT IV

Vector Space of a Graph – Sets with one , two operations –modular arithmetic - Galois Fields –Vectors- Vector Spaces –Basis vectors of a graph – circuit & cutset subspaces – Orthogonal vectors & spaces.

UNIT V

Matrix representation of a graph – Incidence matrix –Circuit Matrix - Fundamental Circuit Matrix and rank of the circuit matrix – Cut set matrix – adjacency matrix – Chromatic Number - Chromatic partitioning – Chromatic polynomial.

TEXT BOOK:

Narsingh Deo, Graph Theory with applications to Engineering & Computer Science, Prentice Hall of India ,New Delhi,2nd Edition 1997.

REFERENCES:

- 1.Dr.S. Arumugam & Dr. S. Ramachandran, Invitation to Graph Theory, Scitech Publications India Pvt Limited, Chennai, 2001.
- 2.K.R. Parthasarathy, Basic Graph Theory, Tata McGraw Hill Publishing Company, New Delhi, 1994.
- 3.G.T. John Clark, Derek Allan Holten, A First Look at Graph Theory, World Scientific Publishing company, 1995.

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MAT18R5114 NUMERICAL METHODS	L	T	P	Credit
	3	1	0	3

Pre-requisite: Basic Set Theory **Course Category: Elective**
Course Type: Theory

Course Objective(s):

To make the students to solve the real world problems using Numerical methods.

Course Outcome(s):

After completing this course, the student will be able to:

1. solve by Direct methods and Iteration methods for solving system of equations.
2. know different types of difference operators.
3. solve physical problems using different types of operators.
4. find derivatives of functions using operator.
5. to know different rules of Numerical integration.

UNIT–I: Numerical solutions of equations

Errors in Numerical Computation - Iteration method – Regula Falsi Method -Newton-Raphson Method - Simultaneous Equations-Back Substitution-Gauss Elimination Method-Gauss- Jordan Elimination Method-Iterative methods- Gauss Jacobi Iteration Method – Gauss–Seidel Iteration Method.

UNIT–II: Difference Operators

Difference Operators- Forward difference Table- Properties of the Operator - Backward Differences – Central Difference Operator - Other Difference Operators.

UNIT–III: Interpolation Formulas

Newton’s Interpolation Formulae-Central Difference Interpolation Formulae –Lagrange’s Interpolation Formula -Divided Differences - Newton’s Divided Difference Formula.

UNIT–IV: Numerical differentiation

Derivatives using Newton’s Forward Difference Formula and Newton’s Backward Difference Formula – Derivatives using Central Difference Formulae.

UNI -V: Numerical Integration

Numerical Integration - Newton-Cote’s quadrature formula – Trapezoidal rule –Simpson’s one third rule – Simpson’s three eight rule –Weddle’s rule – Romberg’s method.

Text Book(s):

S. Arumugam, A.Thangapandi Isaac, and A. Somasundaram, Numerical Methods, Scitech Publications Pvt. Ltd., 2012.

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Reference(s):

S.S. Sastry, Introduction Methods of Numerical Analysis, Prentice Hall of India Pvt. Ltd., 2000.

MAT18R5115 Probability and Combinatorics	L	T	P	Credit
	3	1	0	3
Pre-requisite: Basic Set Theory		Course Category: Elective Course Type: Theory		

Course Objective(s):

1. To familiarize the students with the concept probability and random variables
2. To grasp the concepts in combinatorics

Course Outcome(s):

After completing this course, the student will be able to:

1. Understand the basic concepts of probability and random variables
2. Understand the concepts of expectations and moment generating functions
3. Understand the basic concepts of permutations and combinations
4. Know the method of enumerator of permutations
5. Apply the principle of inclusion and exclusion

UNIT- I: Probability

Sample space – Events - Axioms – Conditional Probability – Baye’s rule –Discrete and continuous random variables – Density functions – Marginal and conditional distributions – Stochastic independence.

UNIT – II: Expectation

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Expectation of a function- Conditional expectation and variance- Moment generating function- Cumulant generating functions- Characteristic functions- Distributions: Discrete and continuous distributions.

UNIT – III: Permutations and combinations

Introduction – rules of sum and product - Permutations and combinations – Distributions of distinct and non-distinct objects

UNIT – IV: Generating Functions

Introduction - Generating functions for combinations - Enumerators for permutations- Distribution of distinct objects into non-distinct cells.

UNIT – V: Recurrence Relations, Inclusion and exclusion Principles

Linear recurrence relation with constant coefficients - Solution techniques - Principles of inclusion and exclusion - Derangements.

Text Books:

1. Liu, C.L., "Introduction to Combinatorial Mathematics". McGraw Hill. 1996.
2. Ross, S., "A First Course in Probability", Collier Macmillan, New York, 1976.

Reference Books:

1. Gupta, S.C. and Kapoor, V.K, Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi, 11th Edition.
2. Richard A. Brualdi, Introductory Combinatorics, Pearson Education, Inc, China machine press, Fifth Edition, 2009.

MCA18R5101	DIGITAL IMAGE PROCESSING	L	T	P	C
		4	0	0	3

PREREQUISITE

Linear algebra and matrix operations, linear time-invariant systems, Fourier transform analysis and filtering

COURSE OBJECTIVES

This course is to make students learn fundamentals of image processing such as formation, restoration, segmentation, morphology.

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COURSE OUTCOMES

CO1: Understand the basic concepts in digital image processing.

CO2: Analyze the histogram, filtering techniques, the image Degradation/Restoration process for image enhancement

CO3: Synthesize the various image compression and segmentation methods.

CO4: Apply the knowledge of representation and description of images.

CO5: Analyze and interpret objects through pattern classes.

DIGITAL IMAGE FUNDAMENTALS

Digital Image Processing – Fundamental steps and Components, Elements of visual perception, simple image formation model, Image sampling and quantization, Basic relationship between pixels, Image formation, Image transforms – 2-d Discrete Fourier transforms.

IMAGE ENHANCEMENT AND RESTORATION

Basic Intensity transformation functions, Histogram processing - Spatial filtering - smoothing spatial filters – Sharpening spatial filters, Frequency domain filtering – smoothing frequency filters – Sharpening frequency filters

Image restoration – Degradation/Restoration process – Noise models – spatial and frequency domain restoration filters.

IMAGE COMPRESSION AND SEGMENTATION

Fundamentals - Compression Methods – Huffman, Golomb, Arithmetic, LZW, Run-length, Symbol-based, Bit-plane coding, Image segmentation – Detection of discontinuities - Edge linking and boundary detection - Thresholding – Region based segmentation.

REPRESENTATION AND DESCRIPTION

Representation schemes - Boundary descriptors - Regional descriptors - Relational descriptors.

OBJECT RECOGNITION AND INTERPRETATION

Patterns and pattern classes - Decision - Theoretic methods - Structural methods.

PRACTICAL COMPONENTS(MATLAB)

1. Perform Image read & write operation
2. Apply geometric transformations on objects such as translation, rotation and scaling
3. Apply image enhancement techniques such as Thresholding, Contrast, Brightness Adjustment and Gray level Slicing
4. Apply Basic transformation such as Log transformation, Power law transformation and Image

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Negative

5. Apply filters in spatial and frequency domain
6. Perform morphological operations.

TEXT BOOK

1. Gonzalez, R.C., Woods, R.E., Digital Image Processing, 3rd Edition, Pearson Education ,2008.

REFERENCES

1. Anil Jain, K., Fundamentals of Digital image Processing, Prentice Hall of India, 1989.
2. Sid Ahmed, Image Processing, McGraw Hill, New York, 1995.

MCA18R5102	INFORMATION AND NETWORK SECURITY	L	T	P	C
		4	0	0	3

Prerequisite:

Basic knowledge in Mathematical concepts.

Course Objective:

- To understand the fundamentals of Cryptography.
- To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.
- To understand the various key distribution and management schemes.

Course Outcomes:

CO1: Implement basic security algorithms required by any computing system.

CO2: Analyze the vulnerabilities in any computing system and hence be able to design a security solution.

CO3: Analyze the possible security attacks in complex real time systems and their effective countermeasures

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CO4: Identify the security issues in the network and resolve it.

CO5: Evaluate security mechanisms using rigorous approaches, including theoretical derivation, modeling, and simulations

INTRODUCTION

An Overview of Computer Security-Security Services-Security Mechanisms-Security Attacks-Access Control Matrix, Policy-Security policies, Confidentiality policies, Integrity policies and Hybrid policies.

CRYPTOSYSTEMS & AUTHENTICATION

Classical Cryptography-Substitution Ciphers-permutation Ciphers-Block Ciphers-DES Modes of Operation-AES-Linear Cryptanalysis, Differential Cryptanalysis- Hash Function - SHA 512- Message Authentication Codes-HMAC - Authentication Protocols -

PUBLIC KEY CRYPTOSYSTEMS

Introduction to Public key Cryptography- Number theory- The RSA Cryptosystem and Factoring Integer-Attacks on RSA-The ELGamal Cryptosystem- Digital Signature Algorithm-Finite Fields-Elliptic Curves Cryptography- Key management – Session and Interchange keys, Key exchange and generation-PKI

SYSTEM IMPLEMENTATION

Design Principles, Representing Identity, Access Control Mechanisms, Information Flow and Confinement Problem Secure Software Development: Secured Coding - OWASP/SANS Top Vulnerabilities -Buffer Overflows - Incomplete mediation - XSS - Anti Cross Site Scripting Libraries - Canonical Data Format - Command Injection - Redirection - Inference – Application Controls

NETWORK SECURITY

Secret Sharing Schemes-Kerberos- Pretty Good Privacy (PGP)-Secure Socket Layer (SSL)- Intruders – HIDS- NIDS - Firewalls – Viruses

Text Book:

1. William Stallings, “Cryptography and Network Security: Principles and Practices”, Third Edition, Pearson Education, 2006.
2. Matt Bishop, “Computer Security art and science ”, Second Edition, Pearson Education, 2002

Reference Book(s):

1. Wade Trappe and Lawrence C. Washington, “Introduction to Cryptography with Coding Theory” Second Edition, Pearson Education, 2007.
2. Jonathan Katz, and Yehuda Lindell, Introduction to Modern Cryptography, CRC Press, 2007.

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3. Douglas R. Stinson, "Cryptography Theory and Practice", Third Edition, Chapman & Hall/CRC, 2006

MCA18R5103	SOFT COMPUTING TECHNIQUES	L	T	P	C
		4	0	0	3

PREREQUISITE

Basic knowledge of problem solving, design and analysis of algorithms.

COURSE OBJECTIVES

The objective of the course is to familiarize with soft computing concepts, to introduce the ideas of neural networks, fuzzy logic and use of heuristics based on human experience. This course introduces the concepts of Genetic algorithm and its applications in soft computing.

COURSE OUTCOMES

- CO1:** Implement numerical methods in soft computing and apply derivative based and derivative free optimization
- CO2:** Understand the fuzzy set theory
- CO3:** Design the neural networks and supervised and unsupervised learning networks
- CO4:** Comprehend neuro fuzzy modeling
- CO5:** Demonstrate some applications of computational intelligence

SOFTCOMPUTING AND CONVENTIONAL AI

Evolution of Computing – Soft Computing Constituents – From Conventional AI to Computational Intelligence – Derivative based optimization: Descent Methods, Newton's method – Step size determination – Derivative free optimization.

FUZZY SYSTEMS

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions – Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making.

ARTIFICIAL NEURAL NETWORKS

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Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks – Reinforcement Learning – Unsupervised Learning Neural Networks.

NEURO - FUZZY MODELING

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rule based Structure Identification – ANFIS Applications.

GENETIC ALGORITHMS

Evolutionary Computation – Genetic Algorithms – Terminologies and Operators of GA – Classification of GA: Simple GA, Parallel and Distributed GA, Adaptive GA – Ant Colony Optimization – Particle Swarm Optimization – Application of GA: Machine Learning, Image Processing, Data Mining and Wireless networks.

TEXTBOOK

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, “Neuro-Fuzzy and Soft Computing”, 1st Edition, Prentice Hall of India, 2003.

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REFERENCES

1. S.N.Sivanandam, S.N.Deepa, “Principles of Soft Computing”, Wiley & Sons, 2nd Edition, 2007.
2. Agoston E.Eiben, J.E.Smith, “Introduction to Evolutionary Computing”, 1st Edition, Springer, 2008.

MCA18R5104	ORGANIZATIONAL BEHAVIOR	L	T	P	C
		4	0	0	3

PREREQUISITE

Basic knowledge in business administration

COURSE OBJECTIVES

This course aims to provide a definition of motivation, distinguish between the various theories of motivation presented, apply some of these theories to the case study presented, determine how learning theory may be useful to an organization and explain why goal setting has been used in many organizations.

COURSE OUTCOMES:

- CO1:** To provide an overview of the influential theoretical perspectives and research findings in the field of organizational behavior.
- CO2:** To offer a set of conceptual frameworks, methodological approaches, and analytical skills which are useful in increasing our understanding of human behavior in organizations.
- CO3:** To provide opportunities to practice the use of these conceptual frameworks through their application to organizational problems.
- CO4:** To challenge the student to think analytically and creatively about significant issues facing
- CO5:** To demonstrate organizational development

FOCUS AND PURPOSE

Organizational Behaviour - Need and importance, nature and scope, framework.

INDIVIDUAL BEHAVIOUR

Personality – types, factors influencing personality, theories – Learning – types of learners, learning theories – Organizational Behaviour modification - Attitudes – characteristics, components, formation and measurement - Perceptions – importance, factors influencing perception, interpersonal perception – Motivation - Importance, types, effects on work behaviour.

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GROUP BEHAVIOUR

Groups in organizations, influence, group dynamics – emergence of informal leaders and working norm, group decision making techniques - Interpersonal relations – communication, control.

DYNAMICS OF ORGANIZATIONAL BEHAVIOUR

Leadership styles – theories, leaders Vs managers, sources of power, power centers, power and politics - Organizational climate – factors affecting organizational climate, importance, job satisfaction, determinants, measurements, and influence on behavior.

ORGANIZATIONAL DEVELOPMENT

Organizational development - Importance, characteristics, objectives, stability Vs change, proactive Vs reaction change, the change process, resistance to change, managing change, team building - Organizational effectiveness, perspective, effectiveness Vs efficiency, approaches, the time dimension, achieving organizational effectiveness.

TEXT BOOKS

1. Fred Luthans, Organisational Behaviour, 9th edition, Tata McGraw Hill publishing company Ltd., New Delhi, 2011.
2. Stephen P. Robins, Organisational Behavior, 9th edition, Prentice Hall of India, New Delhi, 2008.

REFERENCES

1. Sekaran, Uma, Organisational Behaviour, 4th edition, Tata McGraw Hill publishing company Ltd., New Delhi, 2011.
2. Hellriegel, Slocum and Woodman, Organisational Behavior, 11th edition, South-Western, Thomson Learning, New Delhi, 2010.
3. Schermerhorn, Hunt and Osborn, Organisational Behavior, 9th edition, John Wiley, New Delhi, 2011.

MCA CURRICULUM & SYLLABUS

MCA18R5105	E-COMMERCE	L	T	P	C
		4	0	0	3

PREREQUISITE

Basic knowledge in internet concepts

COURSE OBJECTIVE

This course aims the students to illustrate management's role in the networked economy, identify strategies involved in running an e-commerce company, explain the four infrastructures influencing strategy, describe the history and basic technology of the Internet, create a market analysis in the new online environment.

COURSE OUTCOMES:

At the end of the course, the student able to

CO1: The scope of e-commerce in the realm of modern business.

CO2: The technologies used to develop and deliver e-commerce applications.

CO3: The marketing methods used in e-commerce.

CO4: The legal and regulatory framework in which e-commerce must operate.

CO5: The methods and metrics used to measure effectiveness of e-commerce activities.

E-BUSINESS

The difference between e-commerce and e-business - Types of e-commerce - Origins and Growth of E-commerce - Impact of E-commerce on Consumer, Organization and Society - Benefits and Limitations of E-commerce to Consumer, Organization and Society - Barriers to E-commerce - E-commerce business models and concepts

SYSTEM ANALYSIS AND DESIGN

Planning - Systems analysis and design - Building the system: In-house vs. outsourcing - Website hosting: In-house vs. outsourcing - System Testing - Implementation and maintenance - Website optimization factors - Choosing web server software - Logistics and Order Fulfilment - Overview of E-commerce website development tools.

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ELECTRONIC TRANSFER

Payment systems - Merchant Accounts, Payment Gateways, Credit Cards Processing & Third Party Payment Processors - E-commerce digital payment in the B2C arena-Electronic Check, E-Cash, SET based payment systems

MARKETING CONCEPTS

The Internet audience - Internet traffic patterns - Basic marketing concepts - On-site Marketing Techniques – customer feedback, links, banner ads, affiliate programs, newsletters, emails

POLICY AND ISSUES

Impact of E-commerce on society - Legal/policy issues in e-commerce - Auctions- Portals - Communities

TEXT BOOK:

1. Frontiers of E Commerce , Ravi Kalakota, Andrew B Whinston, Pearson Education 7th Edition 2011

REFERENCES

- 1.E-Commerce 2009: Business, Technology, and Society by Kenneth Laudon and Carol Guercio Traver

MCA18R5106	SOCIAL NETWORK ANALYSIS	L	T	P	C
		4	0	0	3

PREREQUISITE

Basic knowledge in social networks and data mining

COURSE OBJECTIVES

The course aims to enable students to be aware about threats and hacking in social networks, how to create social networks and building social network services and data analysis and mining process of data flow in social networks

COURSE OUTCOMES

CO1: Understand how to relate network theory concepts and social networks

CO2: Ability to use various social networks

CO3: Analyze the current data set of social networks

CO4: Design and Development of mathematical models in social network

CO5: Understand the tools for creating social networks

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INTRODUCTION

Social network concepts – Development of social network and analysis - Online social networks – Social Network Data - Issues and challenges

STATIC AND DYNAMIC ANALYSIS

Linked-based and structural analysis - Content-based analysis - Static and dynamic analysis, Mathematical Representation of social networks

CLASSIFICATION OF SOCIAL NETWORKS

Social networking systems and API - Statistical Analysis of Social Networks- Community Detection in Social Networks - Node Classification in Social Networks -Evolution in Dynamic Social Networks

ANALYSIS AND DATA MINING

Social Influence Analysis -Link Prediction in Social Networks -Data Mining in Social Media Text Mining in Social Networks - Social Tagging -Building social services

TOOLS FOR SOCIAL NETWORKS

Tools for Social network analysis: UCINET –PAJEK– NETDRAW – SOcNET - SPlus - R – NodeXL-SIENA and RSIENA - Real-world networks (Face book graph, Twitter networks, etc.)

TEXT BOOK

1. Christina Prell, Social Network Analysis: History, Theory and Methodology, SAGE Publications Ltd, 2011.

REFERENCES

1. David Easley and Jon Kleinberg, “Networks, Crowds, and Markets: Reasoning About a Highly Connected World”, 2010
2. Stanley Wasserman and Katherine Faust, “Social Network Analysis: Methods and Applications”, Cambridge University Press, 1994
3. Carrington and Scott (eds). The SAGE Handbook on Social Network Analysis SAGE, First Edition 2011.

MCA18R6101	GREEN COMPUTING	L	T	P	C
		4	0	0	3

PREREQUISITE

Basic knowledge in energy management and distributed computing

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COURSE OBJECTIVE

The objective of this course is to provide graduate students with an understanding of the role of Green Computing and their impact on the global carbon footprint. This course includes how to estimate the carbon footprint of the Green Computing operations of an organization and access ways to reduce the carbon footprint by changes to policies for procurement of Green Computing.

COURSE OUTCOMES:

At the end of the course, the student able to

CO1: Understand fundamental principles of energy management.

CO2: Explore basic energy management option in individual components

CO3: Understand energy generation and delivery

CO4: Demonstrate about different strategies of Green Computing

CO5: Demonstrate about relation between Green computing and Data mining

INTRODUCTION

Importance of Green IT: The Growing Significance of Green IT and Green Data Centers –All Basic Steps towards Green IT - The Basics of Green IT

GREEN COMPUTING AND GOVERNEMENT

Collaboration is Key for Green IT - The Government's Role - Regulation and EPA Activity -: Regulating Greenhouse Gases - Role of the EPA -IT Company Support of Government Regulation -Educational Institutions and Government Regulation

VIRTUALIZATION

Magic of Incentive - The Role of Electric Utilities - A Most-Significant Step - “Virtualizing” IT Systems: Consolidation and Virtualization - Data Storage

STRATEGIES OF GREEN COMPUTING

Need for Standard IT Energy-Use Metrics: SPEC -EPA- LEED- Green Grid Data Center Power-Efficiency Metrics: PUE and DciE. Data Center - Strategies for Increasing Data Center - Cooling Efficiency - Fuel Cells for Data Center Electricity - Emerging Technologies for Data Centers.

DATA MINING AND GREEN COMPUTING

Web, Temporal And Spatial Data Mining Green IT Case Studies for Energy Utilities – Green IT Case Studies for Universities and a Large Company - Worldwide Green IT - Case Studies - The Future of Green IT for Corporations.

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TEXT BOOK

1. John Lamb, "The Greening of IT-How Companies Can Make a Difference for the Environment", IBM Press 2009

REFERENCES

1. Frederic P. Miller, Agnes F. Vandome, John McBrewster, "Green Computing", Alpha script publishing 2009.

MCA18R6102	NATURAL LANGUAGE PROCESSING	L	T	P	C
		4	0	0	3

PREREQUISITE

Basic knowledge in data structures and algorithms

COURSE OBJECTIVES

- Understand the information retrieval techniques.
- Exposed to machine translation
- Familiar with the natural language generation.
- Learn the techniques in natural language processing.

COURSE OUTCOMES:

CO1: Utilize and explain the function of software tools such as corpus readers, stemmers, taggers and parsers

CO2: Understand the difference between regular and context-free grammars and define formal grammars for fragments of a natural language

CO3: critically appraise existing Natural Language Processing (NLP) applications such as chat bots and translation systems

CO4: Describe some applications of statistical techniques to natural language analysis, such as classification and probabilistic parsing.

CO5: Apply skills for application

OVERVIEW AND LANGUAGE MODELING

Overview: Origins and challenges of NLP-Language and Grammar-Processing Indian Languages- NLP Applications-Information Retrieval. Language Modeling: Various Grammar- based Language Models- Statistical Language Model.

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WORD LEVEL AND SYNTACTIC ANALYSIS

Word Level Analysis: Regular Expressions-Finite-State Automata-Morphological Parsing-Spelling Error Detection and correction-Words and Word classes-Part-of Speech Tagging. Syntactic Analysis: Context-free Grammar-Constituency- Parsing-Probabilistic Parsing.

SEMANTIC ANALYSIS AND DISCOURSE PROCESSING

Semantic Analysis: Meaning Representation-Lexical Semantics- Ambiguity-Word Sense Disambiguation. Discourse Processing: cohesion-Reference Resolution- Discourse Coherence and Structure.

NATURAL LANGUAGE GENERATION AND MACHINE TRANSLATION

Natural Language Generation: Architecture of NLG Systems- Generation Tasks and Representations- Application of NLG. Machine Translation: Problems in Machine Translation- Characteristics of Indian Languages- Machine Translation Approaches-Translation involving Indian Languages.

INFORMATION RETRIEVAL AND LEXICAL RESOURCES

Information Retrieval: Design features of Information Retrieval Systems-Classical, Non-classical, Alternative Models of Information Retrieval – valuation Lexical Resources: World Net-Frame Net-Stemmers-POS Tagger- Research Corpora.

TEXT BOOKS

1. Tanveer Siddiqui, U.S. Tiwary, “Natural Language Processing and Information Retrieval”, Oxford University Press, 2008.

REFERENCES

1 Daniel Jurafsky and James H Martin, “Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition”, 2 nd Edition, Prentice Hall, 2008.

2. James Allen, “Natural Language Understanding”, 2nd edition, Benjamin /Cummings publishing company, 1995.

MCA18R6103	ARTIFICIAL INTELLIGENCE AND ITS APPLICATIONS	L	T	P	C
		4	0	0	3

PREREQUISITE

Basic knowledge in database management system

COURSE OBJECTIVES

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- To search and discover intelligent characteristics of existing AI projects, map a new problem as search and create an animation showing different search strategies for a problem, program a new game/ problem in Prolog.
- Evaluate different Knowledge Representation schemes for typical AI problems, design and implement a typical AI problem to be solved.
- Using Machine Learning Techniques design and implement a futuristic AI application

INTRODUCTION

Introduction – Definition - Future of Artificial Intelligence – Characteristics of Intelligent Agents – Typical Intelligent Agents – Problem Solving Approach to Typical AI problems

PROBLEM SOLVING METHODS

Problem solving Methods - Search Strategies- Uninformed - Informed - Heuristics – Local Search Algorithms and Optimization Problems - Searching with Partial Observations -Constraint Satisfaction Problems – Constraint Propagation - Backtracking Search – Game Playing -Optimal Decisions in Games - Alpha--Beta Pruning -Stochastic Games

KNOWLEDGE REPRESENTATION

First Order Predicate Logic – Prolog Programming - Unification -Forward Chaining -Backward Chaining - Resolution –Knowledge Representation - Ontological Engineering - Categories and Objects –Events - Mental Events and Mental Objects - Reasoning Systems for Categories -Reasoning with Default Information

MACHINE LEARNING

Probability basics - Bayes Rule and its Applications - Bayesian Networks – Exact and Approximate Inference in Bayesian Networks - Hidden Markov Models - Forms of Learning - Supervised Learning - Learning Decision Trees - Regression and Classification with Linear Models - Artificial Neural Networks - Nonparametric Models - Support Vector Machines - Statistical Learning - Learning with Complete Data - Learning with Hidden Variables- The EM Algorithm – Reinforcement Learning

APPLICATIONS

AI applications – Language Models - Information Retrieval - Information Extraction – Natural Language Processing - Machine Translation – Speech recognition – Robot – Hardware –Perception – Planning – Moving

TEXT BOOKS

1. S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall, 3rd Edition, 2009

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2. Bratko, I., Prolog Programming for Artificial Intelligence (International Computer Science Series), Addison-Wesley Educational Publishers Inc; 4th edition, 2011.
3. David L. Poole, Alan K. Mackworth, Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press, 2010.

REFERENCES:

1. M. Tim Jones, Artificial Intelligence: A Systems Approach (Computer Science), Jones and Bartlett Publishers, Inc; 1 edition, 2008
2. Ethem Alpaydin, Introduction to Machine Learning (Adaptive Computation and Machine Learning series), The MIT Press; second edition, 2009
3. Nils J. Nilsson, the Quest for Artificial Intelligence, Cambridge University Press, 2009.
4. William F. Clocksin, and Christopher S. Mellish, "Programming in Prolog: Using the ISO Standard, Fifth Edition, Springer, 2003.

MCA18R6104	Internet of Things	L	T	P	C
		4	0	0	3

PREREQUISITE

Knowledge about Embedded system

Course Objectives:

1. Vision and Introduction to IoT.
2. Understand IoT Market perspective.
3. Data and Knowledge Management and use of Devices in IoT Technology.
4. Understand State of the Art – IoT Architecture.
5. Real World IoT Design Constraints, Industrial Automation and Commercial Building Automation in IoT.

Course Outcomes:

At the end of the course the student will be able to:

1. Understand the vision of IoT from a global context.
2. Determine the Market perspective of IoT.
3. Use of Devices, Gateways and Data Management in IoT.
4. Building state of the art architecture in IoT.
5. Application of IoT in Industrial and Commercial Building Automation and Real World Design Constraints.

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INTRODUCTION

The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics.

M2M to IoT

A Market Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, The international driven global value chain and global information monopolies. **M2M to IoT-An Architectural Overview**– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

M2M AND IOT TECHNOLOGY FUNDAMENTALS

Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management

IOT ARCHITECTURE

IoT Architecture-State of the Art- Introduction, State of the art, **Architecture Reference Model**- Introduction, Reference Model and architecture, IoT reference Model

IOT REFERENCE ARCHITECTURE

Introduction, Functional View, Information View, Deployment and Operational View,.. **Real-World Design Constraints**- Introduction, Technical Design constraints-hardware is popular again, **Industrial Automation**- Service-oriented architecture-based device integration, IMC-AESOP: from the Web of Things to the Cloud of Things.

Textbook:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, **“From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”**, 1st Edition, Academic Press, 2014.

Reference Books:

1. Vijay Madiseti and Arshdeep Bahga, **“Internet of Things (A Hands-on-Approach)”**, 1st Edition, VPT, 2014.
2. Francis daCosta, **“Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”**, 1st Edition, Apress Publications, 2013

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MCA18R6105	PYTHON PROGRAMMING	L	T	P	C
		4	0	0	3

PREREQUISITE

Students should have some basic knowledge of object oriented programming.

COURSE OBJECTIVE

The objective of this course is to provide graduate students with an understanding of the role of Python based open source software practices and tools. The course helps the students to use the open source software in operating systems, Python Programming and web framework in approaching real time applications.

COURSE OUTCOMES:

At the end of the course, the student can be able to

CO1: Understand python scripting elements python constructs, data structures, functions.

CO2: Explore basic, modules, packages, string and dictionary manipulation

CO3: Understand usage of object oriented features, various file handling operations

CO4: Demonstrate about overlapping and overloading operators, Exception Handling

CO5: Demonstrate about databases, SQL tables, Multi threading concepts

INTRODUCTION

Introduction – program structure – output function – variables, constants, data types, operators and expressions - control structures – input function . Data structures – python blocks - for loop using ranges, string, list and dictionaries - Use of while loops in python

LIST

List - Dictionary manipulation - generator - comprehensions. Functions - User defined functions - variable number of arguments, default parameters, key value pairs as arguments, Data Storage, Data formatting - Modules- packages and programs - Regular expressions, String Handling, Errors and Exception handling in python

CLASSES AND OBJECTS

Classes, objects, Testing and debugging, GUI Programming - Relational databases, Concurrency and Networks - Reading config files in python - Writing log files in python - Understanding read functions, read(), readline() and readlines() - Understanding write functions, write() and writelines() - Manipulating file pointer using seek - Programming using file operations

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PYTHON OBJECT ORIENTED PROGRAMMING

Python Object Oriented Programming - Real time use of class in live projects, overlapping and overloading operators - Adding and retrieving dynamic attributes of classes Programming using OOPS support - Python Regular Expression - Powerful pattern matching and searching - Power of pattern searching using regex in python - Real time parsing of networking or system data using regex - Password, email, URL validation using regular expression - Python Exception Handling - Avoiding code break using exception handling -

PYTHON DATABASE INTERACTION

Python Database Interaction - SQL Database connection using python - Creating and searching tables - Reading and storing config information on database - Programming using database connections. Python Multithreading - Understanding threads - Forking threads - Synchronizing the threads - Programming using multithreading

TEXT BOOK

1. Introducing Python- Modern Computing in Simple Packages – Bill Lubanovic, O'Reilly Publication, 3rd Ed., 2016

REFERENCES

1. How to Think Like a Scientist –Learning with Python “,Allen Downey, Jeffrey Elkner, Chris Meyers, Green Tea Press, 2002.
2. Introduction to Computer Science Using Python- Charles Dierbach, Wiley Publication Learning with Python “, Green Tea Press, 2002.
3. Beginning Python –From Novice to Professional, - Magnus Lie Hetland, Second Edition, A Press Publication, 2009.
4. Think Python-How to think like a computer scientist, Allen B. Downey, O'Reilly Publication 2015.

MCA18R6106	BIOINFORMATICS	L	T	P	C
		4	0	0	3

PREREQUISITE

Basic knowledge in mathematics and computer programming

COURSE OBJECTIVES

This targets the students to get basic knowledge of basic bioinformatics tools and databases and make them to critically analyze the results of their analysis using such tools.

COURSE OUTCOMES:

- CO1:** Understand about molecular biology and bioinformatics applications.
- CO2:** Manipulate the sequences using data analysis tool.
- CO3:** Analyze the design data mining and pattern matching tools.

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CO4: Apply the molecular modeling and simulation technologies and software that are used to study a wide range of molecular phenomena in biology and medicine.

CO5: Evaluate the BLAST and FASTA algorithms to find the similarity between protein and DNA sequences.

INTRODUCTION

Need for Bioinformatics technologies – Overview of Bioinformatics technologies Structural bioinformatics – Data format and processing – Secondary resources and applications – Role of Structural bioinformatics - Biological Data Integration System

DATAWAREHOUSING AND DATAMINING IN BIOINFORMATICS

Bioinformatics data – Data warehousing architecture – data quality – Biomedical data analysis – DNA data analysis – Protein data analysis – Machine learning – Neural network architecture and applications in bioinformatics.

MODELING FOR BIOINFORMATICS

Hidden Markov modeling for biological data analysis – Sequence identification –Sequence classification – multiple alignment generation – Comparative modeling –Protein modeling – genomic modeling – Probabilistic modeling – Bayesian networks – Boolean networks - Molecular modeling – Computer programs for molecular modeling.

PATTERN MATCHING AND VISUALIZATION

Gene regulation – motif recognition – motif detection – strategies for motif detection – Visualization – Fractal analysis – DNA walk models – one dimension – two dimension – higher dimension – Game representation of Biological sequences – DNA, Protein, Amino acid sequences.

MICROARRAY ANALYSIS

Microarray technology for genome expression study – image analysis for data extraction – preprocessing – segmentation – gridding – spot extraction – normalization, filtering – cluster analysis – gene network analysis – Compared Evaluation of Scientific Data Management Systems – Cost Matrix – Evaluation model - Benchmark – Tradeoffs.

TEXT BOOK

1. Yi-Ping Phoebe Chen (Ed), “BioInformatics Technologies”, First Indian Reprint, Springer Verlag, 2007.

REFERENCES

1. Bryan Bergeron, “Bio Informatics Computing”, Second Edition, Pearson Education, 2003.
2. Arthur M Lesk, “Introduction to Bioinformatics”, Second Edition, Oxford University Press, 2005

MCA CURRICULUM & SYLLABUS

MCA18R6107	Sentiment Analysis	L	T	P	C
		4	0	0	3

PREREQUISITE:

Artificial Intelligence and Natural Language Processing

COURSE OBJECTIVES:

The objective is to study concepts of Sentiment analysis and opinion mining. Sentiment analysis and opinion mining is the field of study that analyzes people opinions, sentiments, evaluations, attitudes, and emotions from written language. It is one of the most active research areas in natural language processing and is also widely studied in data mining, Web mining, and text mining.

SENTIMENT ANALYSIS

Sentiment Analysis: Sentiment Analysis Applications, Sentiment Analysis Research, Opinion Spam Detection.

Problem of Sentiment Analysis: Problem Definitions, Opinion Summarization, Different Types of Opinions, Subjectivity and Emotion, Author and Reader Standing Point.

DOCUMENT SENTIMENT CLASSIFICATION

Document Sentiment Classification: Sentiment Classification Using Supervised Learning, Sentiment Classification Using Unsupervised Learning, Sentiment Rating Prediction, Cross-Domain Sentiment Classification, Cross-Language Sentiment Classification Sentence Subjectivity: Subjectivity Classification, Sentiment Classification, Dealing with Conditional Sentences, Dealing with Sarcastic Sentences, Cross-language Subjectivity and Sentiment Classification, Using Discourse Information for Sentiment Classification.

ASPECT-BASED SENTIMENT ANALYSIS

Aspect-based Sentiment Analysis: Basic Rules of Opinions and Compositional Semantics, Aspect Extraction, Identifying Resource Usage Aspect, Simultaneous Opinion Lexicon Expansion and Aspect Extraction, Grouping Aspects into Categories, Entity, Opinion Holder and Time Extraction, Word Sense Disambiguation.

ANALYSIS OF COMPARATIVE OPINIONS

Analysis of Comparative Opinions: Problem Definitions Identify Comparative Sentences, Identifying Preferred Entities. Opinion Search and Retrieval: Web Search vs. Opinion Search, Existing Opinion Retrieval Techniques Opinion Spam Detection: Types of Spam and Spamming, Supervised Spam Detection, Unsupervised Spam Detection, Group Spam Detection.

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QUALITY OF REVIEWS

Quality of Reviews: Quality as Regression Problem, Other Methods. Applications: Social Networks: machine learning approach to sentiment analysis in social networks - irony and sarcasm- opinionated text - opinion leader detection- SpagoBI, SOMA, KRC, They Say, Biomedical: Sentiment Extraction from Medical Concepts - Extending WME – Medical Concept Network (MediConceptNet) - Preparation - Computational Creativity and Machine Learning

TEXT BOOKS:

1. Bing Liu, Sentiment Analysis and Opinion Mining, Morgan & Claypool Publishers, May 2012
2. Ranjan Satapathy, Erik Cambria, Amir Hussain, “Sentiment Analysis in the Bio-Medical Domain Techniques, Tools, and Applications”, Springer International Publishing, 2017.
3. Federico Alberto Pozzi, Elisabetta Fersini, Enza Messina, Bing Liu- Sentiment Analysis in Social Networks, Morgan Kaufmann, 2017 Elsevier Inc.

REFERENCES:

1. Cambria E., Das D., Bandyopadhyay S., Feraco A. (Editors), A Practical Guide to Sentiment Analysis, Socio-affective computing, Springer, 2017.
2. Bo Pang, Lillian Lee, Opinion mining and sentiment analysis, Foundations and Trends in Information Retrieval 2(1-2), pp. 1–135, 2008.