JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MASTER OF COMPUTER APPLICATIONS (MCA)
Effective from Academic Year 2020-21 Admitted Batch

COURSE STRUCTURE & SYLLABUS (R20)

I YEAR I SEMESTER

Category	Course Title	L	T	P	Credits
Core Course - I	Mathematical Foundations of Computer Science	3	0	0	3
Core Course - II	C and Data Structures	3	1	0	4
Core Course – III	Python Programming	3	0	0	3
Core Course – IV	Operating Systems	3	0	0	3
Core Course – V	Accounting and Financial Management	3	0	0	3
Laboratory – I	Data Structures through C Lab	0	0	3	1.5
Laboratory – II	Python Programming Lab	0	0	2	1
Laboratory – III	Operating Systems Lab	0	0	3	1.5
	Total Credits	**15**	**1**	**8**	**20**

I YEAR II SEMESTER

Category	Course Title	L	T	P	Credits
Core Course - I	Java Programming	3	0	0	3
Core Course - II	Database Management Systems	3	0	0	3
Core Course – III	Computer Networks	3	0	0	3
Core Course – IV	Data Mining	3	0	0	3
Core Course – V	Software Engineering	3	0	0	3
Laboratory – I	Database Management Systems & Data Mining Lab	0	0	4	2
Laboratory – II	Software Engineering Lab	0	0	3	1.5
Laboratory – III	Java Programming Lab	0	0	3	1.5
	Total Credits	**15**	**0**	**10**	**20**

II YEAR I SEMESTER

Category	Course Title	L	T	P	Credits
Core Course - I	Cloud Applications	3	0	0	3
Core Course - II	Web Technologies	3	0	0	3
Core Course – III	Internet of Things	3	0	0	3
Professional Elective - I	**Professional Elective - I** Artificial Intelligence Information Retrieval Systems Ad-hoc and Sensor Networks	3	0	0	3
Professional Elective - II	**Professional Elective - II** Cyber Security Mobile Computing Software Testing Methodologies	3	0	0	3
Laboratory – I	Internet of Things Lab	0	0	3	1.5
Laboratory – II	Cloud Applications Lab	0	0	3	1.5
Laboratory – III	Web Technologies Lab	0	1	2	2
	Total Credits	**15**	**1**	**8**	**20**

II YEAR II SEMESTER

Category	Course Title	L	T	P	Credits
Professional Elective - III	**Professional Elective - III** Machine Learning Mobile Application Development Big Data Analytics	3	0	0	3
Open Elective - I	**Open Elective - I** e-Commerce Cyber Laws and Privacy Management Information System Entrepreneurship	3	0	0	3
Seminar	Seminar	0	0	4	2
Project	Project Work Review - II	0	0	4	2
Project	Project Viva-Voce	0	0	20	10
	Total Credits	**6**	**0**	**24**	**20**

***Note:** Please refer Academic Regulations for Project Work Review – I.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

MCA I Year I Sem.

L	T	P	C
3	0	0	3

Pre-requisites: An understanding of Math in general is sufficient.

Course Objectives: To learn

- Introduces the elementary discrete mathematics for computer science and engineering.
- Topics include formal logic notation, methods of proof, induction, sets, relations, graph theory, permutations and combinations, counting principles; recurrence relations and generating functions.

Course Outcomes: After learning the contents of this paper the student must be able to

- Ability to understand and construct precise mathematical proofs.
- Ability to use logic and set theory to formulate precise statements.
- Ability to analyze and solve counting problems on finite and discrete structures.
- Ability to describe and manipulate sequences.
- Ability to apply graph theory in solving computing problems.

UNIT-I:
The Foundations Logic and Proofs: Propositional Logic, Applications of Propositional Logic, Propositional Equivalence, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Proof Methods and Strategy.

UNIT-II:
Basic Structures, Sets, Functions, Sequences, Sums, Matrices and Relations: Sets, Functions, Sequences & Summations, Cardinality of Sets and Matrices Relations, Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.

UNIT-III:
Algorithms, Induction and Recursion: Algorithms, The Growth of Functions, Complexity of Algorithms.
Induction and Recursion: Mathematical Induction, Strong Induction and Well-Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Correctness.

UNIT-IV:
Discrete Probability and Advanced Counting Techniques:
An Introduction to Discrete Probability. Probability Theory, Bayes' Theorem, Expected Value and Variance. Advanced Counting Techniques:
Recurrence Relations, Solving Linear Recurrence Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion-Exclusion, Applications of Inclusion-Exclusion.

UNIT-V:
Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring.
Trees: Introduction to Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010

2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

REFERENCE BOOKS:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
C AND DATA STRUCTURES

MCA I Year I Sem.

L	T	P	C
3	1	0	4

Pre-requisites:

1. Requires analytical skills and logical reasoning.

Course Objectives: To learn

- This course covers the basics of computers and program development
- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Course Outcomes: After learning the contents of this paper the student must be able to

- Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings; and data structures like stacks, queues and linked lists.
- Ability to implement searching and sorting algorithms

UNIT-I:

Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development Method, Algorithms, Pseudo code, flow charts, applying the software development method.

Introduction to C Language: Background, Simple C programs, Identifiers, Basic data types, Variables, Constants, Input / Output, Operators. Expressions, Precedence and Associatively, Expression Evaluation, Type conversions, Bit wise operators, Statements, Simple C Programming examples.

UNIT-II:

Statements: if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, Simple C Programming examples.

Designing Structured Programs: Functions, basics, user defined functions, inter function communication, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Pre-processor commands, example C programs

UNIT-III:

Arrays and Strings: Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples. Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

Pointers: Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions, command –line arguments.

UNIT-IV:

Derived Types: Structures – Declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, typedef, bit fields, enumerated types, C programming examples.

Input and Output: Concept of a file, streams, standard input / output functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (error handling), C program examples.

UNIT-V:

Sorting and Searching: selection sort, bubble sort, insertion sort, linear and binary search methods. **Data Structures:** Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

TEXT BOOKS:

1. C Programming & Data Structures, B. A. Forouzan and R.F. Gilberg, 3rd Edition, Cengage Learning.
2. Problem Solving and Program Design in C, J. R. Hanly and E. B. Koffman, 5th Edition, Pearson Education.
3. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, PHI/Pearson Education.

REFERENCE BOOKS:

1. C for Engineers and Scientists, H. Cheng, Mc. Graw-Hill International Edition.
2. Data Structures using C – A.M. Tanenbaum, Y. Langsam, and M.J. Augenstein, Pearson Education / PHI.
3. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
PYTHON PROGRAMMING

MCA I Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites:

1. Requires analytical skills and logical reasoning.

Course Objectives: To learn

- Learn Syntax and Semantics and create Functions in Python.
- Handle Strings and Files in Python.
- Understand Lists, Dictionaries and Regular expressions in Python.
- Implement Object Oriented Programming concepts in Python.
- Build Web Services and introduction to Network and Database Programming in Python.

Course Outcomes: After learning the contents of this paper the student must be able to

- Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
- Demonstrate proficiency in handling Strings and File Systems.
- Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

UNIT-I:

Python Basics, Objects- Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types

Numbers - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules

Sequences - Strings, Lists, and Tuples, Mapping and Set Types

UNIT-II:

Files: File Objects, File Built-in Function [open()], File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules

Exceptions: Exceptions in Python, Detecting and Handling Exceptions, Context Management,

*Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, *Creating Exceptions, Why Exceptions (Now)?, Why Exceptions at All?, Exceptions and the sys Module, Related Modules

Modules: Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages, Other Features of Modules

UNIT-III:

Regular Expressions: Introduction, Special Symbols and Characters, Res and Python

Multithreaded Programming: Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules

UNIT-IV:

GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs

Web Programming: Introduction, Wed Surfing with Python, Creating Simple Web Clients, Advanced Web Clients, CGI-Helping Servers Process Client Data, Building CGI Application, Advanced CGI, Web (HTTP) Servers

UNIT-V:

Database Programming: Introduction, Python Database Application Programmer's Interface (DB-API), Object Relational Managers (ORMs), Related Modules

TEXT BOOK:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

REFERENCE BOOKS:

1. Think Python, Allen Downey, Green Tea Press.
2. Introduction to Python, Kenneth A. Lambert, Cengage.
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.
4. Learning Python, Mark Lutz, O' Really.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
OPERATING SYSTEMS

MCA I Year I Sem.

L	T	P	C
3	0	0	3

Pre-requisites:

1. A course on “Computer Programming and Data Structures”.
2. A course on “Computer Organization and Architecture”.

Course Objectives: To learn:

- Operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection).
- The issues to be considered in the design and development of operating system.
- Basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix.

Course Outcomes: After learning the contents of this paper the student must be able to:

- Control access to a computer and the files that may be shared.
- Demonstrate the knowledge of the components of computer and their respective roles in computing.
- Recognize and resolve user problems with standard operating environments.
- Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

UNIT-I:

Operating System Introduction: Structures - Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls.

UNIT-II:

Process and CPU Scheduling: Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, and Interposes Communication, Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling.
System call interface for process management: fork, exit, wait, waitpid, exec

UNIT-III:

Deadlocks: System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.
Process Management and Synchronization: The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors.
Interprocess Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

UNIT-IV:

Memory Management and Virtual Memory: Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

UNIT-V:

File System Interface and Operations: Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl, system calls.

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Advanced programming in the Unix environment, W. R. Stevens, Pearson education.

REFERENCE BOOKS:

1. Operating Systems – Internals and Design Principles Stallings, 5th Edition–2005, Pearson Education/PHI.
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 2nd edition, Pearson/PHI.
4. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education.
5. Unix Internals the New Frontiers, U. Vahalia, Pearson Education.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
ACCOUNTING AND FINANCIAL MANAGEMENT

MCA I Year I Sem.

L	T	P	C
3	0	0	3

Course Objectives: To learn

- To learn Financial Management and Accounting
- To learn different types of costing

Course Outcomes: After learning the contents of this paper the student must be able to

- Able to prepare balance sheets of budget.
- Get the skill to manage finances of a firm/company

UNIT-I:

Introduction to Accounting: Principles, concepts, conventions, double entry system of accounting, introduction of basic books of accounts ledgers.

Preparation of Trial Balance: Final accounts - company final accounts.

UNIT-II:

Financial Management: Meaning and scope, role, objectives of time value of money - over vitalization - under capitalization - profit maximization - wealth maximization - EPS maximization.

Ratio Analysis: Advantages - limitations - Fund flow analysis - meaning, importance, preparation and interpretation of Funds flow and cash flow statements-statement.

UNIT-III:

Costing: Nature and importance and basic principles. Absorption costing vs. marginal costing - Financial accounting vs. cost accounting vs. management accounting.

Marginal Costing and Break-even Analysis: Nature, scope and importance - practical applications of marginal costing, limitations and importance of cost - volume, profit analysis.

UNIT-IV:

Standard Costing and Budgeting: Nature, scope and computation and analysis - materials variance, labor variance and sales variance - budgeting - cash budget, sales budget - flexible Budgets, master budgets.

UNIT-V:

Introduction to Computerized Accounting System: coding logic and codes, master files, transaction files, introduction documents used for data collection, processing of different files and Outputs obtained.

TEXT BOOKS:

1. Van Horne, James, C: Financial Management and Policy, 12th Edition, Pearson Education.
2. Financial Accounting, S. N. Maheshwari, Sultan Chand Company.
3. Financial Management, S. N. Maheshwari, Sultan Chand Company.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
DATA STRUCTURES THROUGH C LAB

MCA I Year I Sem.

L	T	P	C
0	0	3	1.5

Prerequisites:

- Requires analytical skills and logical reasoning

Course Objectives:

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Course Outcomes: After learning the contents of this paper the student must be able to

- Develop C programs for computing and real life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
- Implement searching and sorting algorithms

Week 1:

1. Write a C program to find the sum of individual digits of a positive integer.
2. Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
4. Write a C program to find the roots of a quadratic equation.

Week 2:

1. Write a C program to find the factorial of a given integer.
2. Write a C program to find the GCD (greatest common divisor) of two given integers.
3. Write a C program to solve Towers of Hanoi problem.
4. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Week 3:

1. Write a C program to find both the largest and smallest number in a list of integers.
2. Write a C program that uses functions to perform the following:
   i) Addition of Two Matrices
   ii) Multiplication of Two Matrices

Week 4:

1. Write a C program that uses functions to perform the following operations:
   i) To insert a sub-string in to a given main string from a given position.
   ii) To delete n Characters from a given position in a given string.
2. Write a C program to determine if the given string is a palindrome or not
3. Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.
4. Write a C program to count the lines, words and characters in a given text.

Week 5:

1. Write a C program to generate Pascal's triangle.
2. Write a C program to construct a pyramid of numbers.
3. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:
   $1+x+x^2+x^3+..+x^n$
   For example: if n is 3 and x is 5, then the program computes 1+5+25+125. Print x, n, the sum Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.

Week 6:

1. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
2. Write a C program to convert a Roman numeral to its decimal equivalent.

Week 7:

1. Write a C program that uses functions to perform the following operations:
   i) Reading a complex number
   ii) Writing a complex number
   iii) Addition of two complex numbers
   iv) Multiplication of two complex numbers (Note: represent complex number using a structure.)

Week 8:

1. Write a C program which copies one file to another.
2. Write a C program to reverse the first n characters in a file. (Note: The file name and n are specified on the command line.)
3. a) Write a C program to display the contents of a file.
   b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

Week 9:

1. Write a C program that uses functions to perform the following operations on singly linked list.:
   i) Creation ii) Insertion iii) Deletion iv) Traversal

Week 10:

1. Write C programs that implement stack (its operations) using
   i) Arrays ii) Pointers
2. Write C programs that implement Queue (its operations) using
   i) Arrays ii) Pointers

Week 11:

1. Write a C program that implements the following sorting methods to sort a given list of integers in ascending order
   i) Bubble sort ii) Selection sort

Week 12:

1. Write C programs that use both recursive and non-recursive functions to perform the following searching operations for a Key value in a given list of integers:

i) Linear search ii) Binary search

TEXT BOOKS:

1. C Programming & Data Structures, B. A. Forouzan and R. F. Gilberg, 3rd Edition, Cengage Learning.
2. Problem Solving and Program Design in C, J.R. Hanly and E. B. Koffman, 5th Edition, Pearson Education.
3. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, PHI/Pearson Education

REFERENCE BOOKS:

1. C for Engineers and Scientists, H. Cheng, McGraw-Hill International Edition
2. Data Structures using C – A. M. Tanenbaum, Y. Langsam, and M.J. Augenstein, Pearson Education / PHI
3. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
PYTHON PROGRAMMING LAB

MCA I Year I Sem.

L	T	P	C
0	0	2	1

Prerequisites: Students should install Python on Linux platform.

Course Objectives:

- To be able to introduce core programming basics and program design with functions using Python programming language.
- To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
- To understand the high-performance programs designed to strengthen the practical expertise.

Course Outcomes:

- Student should be able to understand the basic concepts scripting and the contributions of scripting language
- Ability to explore python especially the object-oriented concepts, and the built-in objects of Python.
- Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations

List of Programs:

1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
4. Write a python script to print the current date in the following format “Sun May 29 02:26:23 IST 2017”
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python.
8. Write a python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: c/5 = f-32/9]
10. Write a Python program to construct the following pattern, using a nested for loop

```
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
```

11. Write a Python script that prints prime numbers less than 20.
12. Write a python program to find factorial of a number using Recursion.
13. Write a program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from the Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides).
14. Write a python program to define a module to find Fibonacci Numbers and import the module to another program.

15. Write a python program to define a module and import a specific function in that module to another program.
16. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.
17. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
18. Write a Python class to convert an integer to a roman numeral.
19. Write a Python class to implement pow(x, n)
20. Write a Python class to reverse a string word by word.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
OPERATING SYSTEMS LAB

MCA I Year I Sem.

L	T	P	C
0	0	3	1.5

Prerequisites:

- A course on "Programming for Problem Solving".
- A course on "Computer Organization and Architecture".

Co-requisite:

- A course on "Operating Systems".

Course Objectives:

- To provide an understanding of the design aspects of operating system concepts through simulation.
- Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix.

Course Outcomes:

- Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
- Able to implement C programs using Unix system calls.

List of Experiments:

1. Write C programs to simulate the following CPU Scheduling algorithms
   a) FCFS b) SJF c) Round Robin d) priority
2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close, fcntl, seek, stat, opendir, readdir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.
5. Write C programs to illustrate the following IPC mechanisms
   a) Pipes b) FIFOs c) Message Queues d) Shared Memory
6. Write C programs to simulate the following memory management techniques
   a) Paging b) Segmentation

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Advanced programming in the Unix environment, W. R. Stevens, *Pearson* education.

REFERENCE BOOKS:

1. Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition–2005, Pearson Education/PHI.
2. Operating System - A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum, 2nd edition, Pearson/PHI.
4. UNIX Programming Environment, Kernighan and Pike, PHI/Pearson Education.
5. UNIX Internals: The New Frontiers, U. Vahalia, Pearson Education.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
JAVA PROGRAMMING

MCA I Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- A course on "Computer Programming & Data Structures"

Course Objectives:

- Introduces object-oriented programming concepts using the Java language.
- Introduces the principles of inheritance and polymorphism; and demonstrates how they relate to the design of abstract classes
- Introduces the implementation of packages and interfaces
- Introduces exception handling, event handling and multithreading
- Introduces the design of Graphical User Interface using applets and swings

Course Outcomes:

- Develop applications for a range of problems using object-oriented programming techniques
- Design simple Graphical User Interface applications

UNIT-I:

Object oriented thinking and Java Basics: Need for oop paradigm, summary of oop concepts, History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, using final with variables, garbage collection, overloading methods and constructors, recursion, nested and inner classes, exploring string class.

UNIT-II:

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

Packages: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

UNIT-III:

Interfaces: Differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

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

UNIT-IV:

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. Handling menus, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

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

UNIT-V:

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

Multithreading: Differences between multi-threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter-thread communication, thread groups.

TEXT BOOKS:

1. Java the complete reference, Herbert schildt, 7th edition, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson edition.

REFERENCE BOOKS:

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. An Introduction to OOP, T. Budd, 3rd edition, Pearson education.
3. Introduction to Java programming, Y. Daniel Liang, Pearson education.
4. An introduction to Java programming and object-oriented application development, R.A. Johnson-Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay. S. Horstmann and Gary.
6. Cornell, 8th Edition, Pearson Education.
7. Core Java 2, Vol 2, Advanced Features, Cay. S. Horstmann and Gary Cornell, 8th Edition, Pearson Education.
8. Object Oriented Programming with Java, R. Buyya, S. T. Selvi, X. Chu, TMH.
9. Java and Object Orientation, an introduction, John Hunt, 2nd edition, Springer.
10. Maurach's Beginning Java2 JDK 5, SPD.
11. Programming and Problem Solving with Java, JM Slack, B S Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
DATABASE MANAGEMENT SYSTEMS

MCA I Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

Course Outcomes:

- Gain knowledge of fundamentals of DBMS, database design and normal forms
- Master the basics of SQL for retrieval and management of data.
- Be acquainted with the basics of transaction processing and concurrency control.
- Familiarity with database storage structures and access techniques

UNIT-I:

Database System Applications: A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS

Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model

UNIT-II:

Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views. Relational Algebra, Tuple relational Calculus, Domain relational calculus.

UNIT-III:

SQL: Queries, Constraints, Triggers: form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active data bases.

Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, multi-valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT-IV:

Transaction Management: Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.

UNIT-V:

File Organization: Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXTBOOKS:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, 3rd Edition, Tata Mc Graw Hill.
2. Database System Concepts, Silberschatz, Korth, 5th edition, Mc Graw Hill.

REFERENCES:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education.
3. Introduction to Database Systems, C.J. Date Pearson Education.
4. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
COMPUTER NETWORKS

MCA I Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- A course on "Programming for problem solving".
- A course on "Data Structures".

Course Objectives:

- The objective of the course is to equip the students with a general overview of the concepts and fundamentals of computer networks.
- Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers.

Course Outcomes:

- Gain the knowledge of the basic computer network technology.
- Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
- Obtain the skills of subnetting and routing mechanisms.
- Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.

UNIT-I:

Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet.

Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission.

UNIT-II:

Data link layer: Design issues, framing, Error detection and correction.

Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel.

Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols.

Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

UNIT-III:

Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, The Network layer in the internet.

UNIT-IV:

Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.

UNIT-V:

Application Layer: Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video.

TEXT BOOK:

1. Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S. Keshav, 2nd Edition, Pearson Education
2. Data Communications and Networking – Behrouz A. Forouzan. 3rd Edition TMH.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
DATA MINING

MCA I Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- A course on "Database Management Systems".

Course Objectives:

- Learn data mining concepts understand association rules mining.
- Discuss classification algorithms learn how data is grouped using clustering techniques.
- To develop the abilities of critical analysis to data mining systems and applications.
- To implement practical and theoretical understanding of the technologies for data mining.
- To understand the strengths and limitations of various data mining models.

Course Outcomes:

- Ability to perform the preprocessing of data and apply mining techniques on it.
- Ability to identify the association rules, classification and clusters in large data sets.
- Ability to solve real world problems in business and scientific information using data mining.
- Ability to classify web pages, extracting knowledge from the web.

UNIT-I:

Introduction to Data Mining: Introduction, What is Data Mining, Definition, KDD, Challenges, Data Mining Tasks, Data Pre-processing, Data Cleaning, Missing data, Dimensionality Reduction, Feature Subset Selection, Discretization and Binaryzation, Data Transformation; Measures of Similarity and Dissimilarity- Basics.

UNIT-II:

Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIOIRI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent Item Set.

UNIT-III:

Classification: Problem Definition, General Approaches to solving a classification problem, Evaluation of Classifiers, Classification techniques, Decision Trees-Decision tree Construction, Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction; Naive-Bayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification-Algorithm and Characteristics.

UNIT-IV:

Clustering: Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, Partitioning Clustering-K-Means Algorithm, K-Means Additional issues, PAM Algorithm; Hierarchical Clustering-Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm, Specific techniques, Key Issues in Hierarchical Clustering, Strengths and Weakness; Outlier Detection.

UNIT-V:

Web and Text Mining: Introduction, web mining, web content mining, web structure mining, we usage mining, Text mining –unstructured text, episode rule discovery for texts, hierarchy of categories, text clustering.

TEXT BOOKS:

1. Data Mining- Concepts and Techniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, Edition, 2006.
2. Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Education.
3. Data mining Techniques and Applications, Hongbo Du Cengage India Publishing.

REFERENCE BOOKS:

1. Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.
2. Data Mining Principles & Applications – T. V Sveresh Kumar, B. Esware Reddy, Jagadish S Kalimani, Elsevier.
3. Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University Press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
SOFTWARE ENGINEERING

MCA I Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives:

- The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
- Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams.

Course Outcomes:

- Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
- Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report.

UNIT-I:

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.

A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.

Process models: The waterfall model, incremental process models, evolutionary process models, the unified process.

UNIT-II:

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements Engineering Process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

System Models: Context models, behavioral models, data models, object models, structured methods.

UNIT-III:

Design Engineering: Design process and design quality, design concepts, the design model. **Creating an Architectural Design:** Software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT-IV:

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.

Product Metrics: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.

UNIT-V:

Metrics for Process and Products: Software measurement, metrics for software quality.

Risk Management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXT BOOKS:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

REFERENCE BOOKS:

1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies.
3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
DATABASE MANAGEMENT SYSTEMS & DATA MINING LAB

MCA. I Year II Sem.

L	T	P	C
0	0	4	2

Co-requisites:

- Co-requisite of course "Database Management Systems".

Course Objectives:

- Introduce ER data model, database design and normalization.
- Learn SQL basics for data definition and data manipulation.

Course Outcomes:

- Design database schema for a given application and apply normalization.
- Acquire skills in using SQL commands for data definition and data manipulation.
- Develop solutions for database applications using procedures, cursors and triggers.

List of Experiments:-

DBMS Lab

1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors

Data Mining Lab

List of Sample Problems: Task 1: **Credit Risk Assessment**

Description:

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient. To do the assignment, you first and foremost need some knowledge about the world of credit.

You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data: Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany.

Credit dataset (original) Excel spreadsheet version of the German credit data. In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer!)

A few notes on the German dataset

1. DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
2. owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
3. foreign_worker. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
4. There are 20 attributes used in judging a loan applicant. The goal is to classify the applicant into one of two categories, good or bad.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
SOFTWARE ENGINEERING LAB

MCA I Year II Sem.

L	T	P	C
0	0	3	1.5

Prerequisites

- A course on "Programming for Problem Solving".

Co-requisite:

- A Course on "Software Engineering".

Course Objectives:

- To have hands on experience in developing a software project by using various software engineering principles and methods in each of the phases of software development.

Course Outcomes:

- Ability to translate end-user requirements into system and software requirements.
- Ability to generate a high-level design of the system from the software requirements.
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report.

LIST OF EXPERIMENTS:

Do the following eight exercises for any two projects given in the list of sample projects or any other projects:

1. Development of problem statement.
2. Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents.
3. Preparation of Software Configuration Management and Risk Management related documents.
4. Study and usage of any Design phase CASE tool
5. Performing the Design by using any Design phase CASE tools.
6. Develop test cases for unit testing and integration testing
7. Develop test cases for various white box and black box testing techniques.

Sample Projects:

1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System.
10. Recruitment system

TEXT BOOKS:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th Edition, Mc GrawHill International Edition.
2. Software Engineering- Sommerville, 7th Edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
JAVA PROGRAMMING LAB

MCA I Year II Sem.

L	T	P	C
0	0	3	1.5

Prerequisites

- A course on “Computer Programming & Data Structures”.

Co-requisite:

- A Course on “Object-Oriented Programming Through Java”.

Course Objectives:

- Introduces object-oriented programming concepts using the Java language.
- Introduces the principles of inheritance and polymorphism; and demonstrates how they relate to the design of abstract classes.
- Introduces the implementation of packages and interfaces.
- Introduces exception handling, event handling and multithreading.
- Introduces the design of Graphical User Interface using applets and swings.

Course Outcomes:

- Develop applications for a range of problems using object-oriented programming techniques.
- Design simple Graphical User Interface applications.

Use Eclipse or Netbean platform and get acquainted with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

1. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea () that prints the area of the given shape.
2. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box. [Use JOption Pane –Input dialog, Message dialog]
3. Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
4. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “Stop” or “Ready” or “Go” should appear above the buttons in selected color. Initially, there is no message shown.
5. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero
6. a. Develop an applet in Java that displays a simple message.
   b. Develop an applet in Java that receives an integer in one text field, and computes its factorial value and returns it in another text field, when the button named “Compute” is clicked.

7. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Using Adapter classes).
8. Write a Java program that handles all keyboard events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).

TEXT BOOK:

1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

REFERENCE BOOKS:

1. Java for Programmers, P. J. Deitel and H. M. Deitel, Pearson education (OR) Java: How to Program P. J. Deitel and H. M. Deitel, PHI.
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
CLOUD APPLICATIONS

MCA II Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- Knowledge of Programming Languages, Software Engineering.

Course Objectives:

- This course provides an insight into cloud computing.
- Topics covered include- distributed system models, different cloud service models. service oriented architectures, cloud programming and software environments, resource management.

Course Outcomes:

- Develop cloud-based applications.
- Deploy the application on real cloud.
- To analyze and trouble shoot the problems while deploying application on cloud.
- Use application-based technologies for developing application using cloud.
- Use public cloud like IBM Bluemix, Amazon AWS, Google cloud platform or Microsoft Azure for developing an application.
- Work with real cloud services.

UNIT-I:

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing.

UNIT-II:

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models.

UNIT-III:

Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT-IV:

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers, Other Cloud Service Models.

UNIT-V:

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue ,service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM, Cloud

Models, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space, VMware, Manjra soft, Aneka Platform.

TEXT BOOK:

1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014.

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
WEB TECHNOLOGIES

MCA II Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- Knowledge of Programming Languages

Course Objectives:

- To introduce PHP language for server-side scripting.
- To introduce XML and processing of XML Data with Java.
- To introduce Server-side programming with Java Servlets and JSP.

Course Outcomes:

- Understand server-side scripting with PHP language.
- Understand what is XML and how to parse and use XML Data with Java.
- To introduce Server-side programming with Java Servlets and JSP.

UNIT-I:

Introduction to PHP: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads. Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies

File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

UNIT-II:

HTML Common Tags: List, Tables, images, forms, Frames; Cascading Style sheets;

XML: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemes, Document Object Model, XHTML Parsing XML Data – DOM and SAX Parsers in java.

UNIT-III:

Introduction to Servlets: Common Gateway Interface (CGI), Life cycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

UNIT-IV:

Introduction to JSP: The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

UNIT-V:

Client-side Scripting: Introduction to Javascript, Javascript language – declaring variables, scope of variables, functions. event handlers (onclick, onsubmit etc.), Document Object Model, Form validation.

TEXT BOOKS:

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP — Steven Holzner, Tata McGraw Hill

REFERENCE BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dreamtech
2. Java Server Pages —Hans Bergsten, SPD O'Reilly,
3. Java Script, D. Flanagan
4. Beginning Web Programming-Jon Duckett WROX.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
INTERNET OF THINGS

MCA II Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- Course on Computer Networks.

Course Objectives:

- To introduce the terminology, technology and its applications.
- To introduce the concept of M2M (machine to machine) with necessary protocols.
- To introduce the Python Scripting Language which is used in many IoT devices.
- To introduce the Raspberry PI platform, that is widely used in IoT applications.
- To introduce the implementation of web-based services on IoT devices.

Course Outcomes:

- Interpret the impact and challenges posed by IoT networks leading to new architectural models.
- Compare and contrast the deployment of smart objects and the technologies to connect them to network.
- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

UNIT-I:

Introduction to Internet of Things: Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

UNIT-II:

IoT and M2M: Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

UNIT-III:

Introduction to Python: Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

UNIT-IV:

IoT Physical Devices and Endpoints: Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT-V:

IoT Physical Servers and Cloud Offerings: Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547.
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759.

REFERENCE BOOKS:

1. Programming world wide web, R. W. Sebesta, 4th Edition, Pearson.
2. Internet and World Wide Web — How to program. Dietel and Nieto, Pearson.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
ARTIFICIAL INTELLIGENCE (PROFESSIONAL ELECTIVE - I)

MCA II Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- A course on “Computer Programming and Data Structures”.
- A course on “Advanced Data Structures”.
- A course on “Design and Analysis of Algorithms”.
- A course on “Mathematical Foundations of Computer Science”.
- Some background in linear algebra, data structures and algorithms, and probability will all be helpful.

Course Objectives:

- To learn the distinction between optimal reasoning Vs. human like reasoning.
- To understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
- To learn different knowledge representation techniques.
- To understand the applications of AI, namely game playing, theorem proving, and machine learning.

Course Outcomes:

- Ability to formulate an efficient problem space for a problem expressed in natural language.
- Select a search algorithm for a problem and estimate its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique for a given problem.
- Possess the ability to apply AI techniques to solve problems of game playing, and machine learning.

UNIT-I:

Problem Solving by Search-I: Introduction to AI, Intelligent Agents

Problem Solving by Search –II: Problem-Solving Agents, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Uniform cost search, Depth-first search, Iterative deepening Depth-first search, Bidirectional search, Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Heuristic Functions, Beyond Classical Search: Hill-climbing search, Simulated annealing search, Local Search in Continuous Spaces, Searching with Non-Deterministic Actions, Searching wih Partial Observations, Online Search Agents and Unknown Environment .

UNIT-II:

Problem Solving by Search-II and Propositional Logic Adversarial Search: Games, Optimal Decisions in Games, Alpha–Beta Pruning, Imperfect Real-Time Decisions.

Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems.

Propositional Logic: Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and backward chaining, Effective Propositional Model Checking, Agents Based on Propositional Logic.

UNIT-III:

Logic and Knowledge Representation First-Order Logic: Representation, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic.

Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and Lifting, 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.

UNIT-IV:
Planning - Classical Planning: Definition of Classical Planning, Algorithms for Planning with State-Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches.
Planning and Acting in the Real World: Time, Schedules, and Resources, Hierarchical Planning, Planning and Acting in Nondeterministic Domains, Multi agent Planning.

UNIT-V:
Uncertain knowledge and Learning Uncertainty: Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use,
Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, Approximate Inference in Bayesian Networks, Relational and First-Order Probability, Other Approaches to Uncertain Reasoning; Dempster-Shafer theory.
Learning: Forms of Learning, Supervised Learning, Learning Decision Trees.
Knowledge in Learning: Logical Formulation of Learning, Knowledge in Learning, Explanation-Based Learning, Learning Using Relevance Information, Inductive Logic Programming.

TEXT BOOK:

1. Artificial Intelligence A Modern Approach, Stuart Russell and Peter Norvig, 3rd Edition, Pearson Education.

REFERENCE BOOKS:

1. Artificial Intelligence, 3rd Edn, E. Rich and K. Knight (TMH).
2. Artificial Intelligence, 3rd Edn, Patrick Henny Winston, Pearson Education.
3. Artificial Intelligence, Shivani Goel, Pearson Education.
4. Artificial Intelligence and Expert systems – Patterson, Pearson Education.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
INFORMATION RETRIEVAL SYSTEMS (PROFESSIONAL ELECTIVE - I)

MCA II Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- A course on “Advanced Data Structures”.
- A course on “Database Management Systems”.

Course Objectives:

- To learn the different models for information storage and retrieval.
- To learn about the various retrieval utilities.
- To understand indexing and querying in information retrieval systems.
- To expose the students to the notions of structured and semi structured data.
- To learn about web search.

Course Outcomes:

- Ability to formulate an efficient problem space for a problem expressed in natural language.
- Select a search algorithm for a problem and estimate its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique for a given problem.
- Possess the ability to apply AI techniques to solve problems of game playing, and machine learning.

UNIT-I:
Introduction: Retrieval strategies: vector space model, Probabilistic retrieval strategies: Simple term weights, Non-binary independence model, Language models.

UNIT-II:
Retrieval Utilities: Relevance feedback, clustering, N-grams, Regression analysis, Thesauri.

UNIT-III:
Retrieval Utilities: Semantic networks, parsing Cross –Language: Information Retrieval: Introduction, Crossing the Language barrier.

UNIT-IV:
Efficiency: Inverted Index, Query processing, Signature files, Duplicate document detection.

UNIT-V:
Integrating Structured Data and Text: A historical progression, Information retrieval as relational application, Semi Structured search using a relational schema. Distributed Information Retrieval: A theoretical Model of Distributed retrieval, web search

TEXT BOOK:

1. David A. Grossman, Ophir Frieder, Information Retrieval – Algorithms and Heuristics, Springer, 2nd Edition (Distributed by Universal Press), 2004

REFERENCE BOOKS:

1. Gerald J Kowalski, Mark T Maybury Information Storage and Retrieval Systems: Theory and Implementation, Springer, 2004.
2. Soumen Chakrabarti, Mining the Web: Discovering Knowledge from Hypertext Data, Morgan – Kaufmann Publishers, 2002.
3. Christopher D Manning, Prabhakar Raghavan, Hinrich Schutze, An Introduction to Information Retrieval by Cambridge University Press, England, 2009.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
AD-HOC AND SENSOR NETWORKS (PROFESSIONAL ELECTIVE - I)

MCA II Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- A course on “Computer Networks”.

Course Objectives:

- To understand the concepts of sensor networks.
- To understand the MAC and transport protocols for ad hoc networks.
- To understand the security of sensor networks.
- To understand the applications of and sensor networks.

Course Outcomes:

- Ability to understand the state-of-the-art research in the emerging subject of Ad Hoc and Wireless Sensor Networks.
- Ability to solve the issues in real-time application development based on ASN.
- Ability to conduct further research in the domain of ASN.

UNIT-I:

Introduction to Ad Hoc Networks: Characteristics of MANETs, Applications of MANETs and Challenges of MANETs.

Routing in MANETs - Criteria for classification, Taxonomy of MANET routing algorithms, Topology-based routing algorithms-Proactive: DSDV; Reactive: DSR, AODV; Hybrid: ZRP; Position-based routing algorithms-Location Services-DREAM, Quorum-based; Forwarding Strategies: Greedy Packet, Restricted Directional Flooding-DREAM, LAR.

UNIT-II:

Data Transmission: Broadcast Storm Problem, Rebroadcasting Schemes-Simple-flooding, Probability-based Methods, Area-based Methods

Neighbor Knowledge-Based: SBA, Multipoint Relaying, AHBP. Multicasting: Tree-based: AMRIS, MAODV; Mesh-based: ODMRP, CAMP; Hybrid: AMRoute, MCEDAR.

UNIT-III:

Geocasting: Data-transmission Oriented-LBM; Route Creation Oriented-GeoTORA, MGR. TCP over Ad Hoc TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT-IV:

Basics of Wireless: Sensors and Lower Layer Issues, Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer, Routing Layer.

UNIT-V:

Upper Layer Issues of WSN: Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots.

TEXT BOOK:

1. Ad Hoc and Sensor Networks – Theory and Applications, Carlos Corderio Dharma P. Aggarwal, World Scientific Publications, March 2006, ISBN – 981–256–681–3.

REFERENCE BOOK:

1. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
CYBER SECURITY (PROFESSIONAL ELECTIVE - II)

MCA II Year I Sem.

L	T	P	C
3	0	0	3

Course Objectives:

- To familiarize various types of cyber-attacks and cyber-crimes.
- To give an overview of the cyber laws.
- To study the defensive techniques against these attacks.

Course Outcomes:

- The students will be able to understand cyber-attacks, types of cybercrimes, cyber laws and also how to protect them self and ultimately the entire Internet community from such attacks.

UNIT-I:

Introduction to Cybercrime: Introduction, Cybercrime, and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, And Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.

UNIT-II:

Cyber Offenses: How Criminals Plan Them: Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.

UNIT-III:

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies an Measures in Mobile Computing Era, Laptops.

UNIT-IV:

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.

UNIT-V:

Cyber Security: Organizational Implications Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

TEXT BOOK:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.

REFERENCE BOOKS:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.
2. Introduction to Cyber Security, Chwan-Hwa (John), Wu, J. David Irwin. CRC Press T&F Group.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MOBILE COMPUTING (PROFESSIONAL ELECTIVE - II)

MCA II Year I Sem.

L	T	P	C
3	0	0	3

Course Objectives:

- To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
- To understand the typical mobile networking infrastructure through a popular GSM protocol.
- To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer.
- To understand the database issues in mobile environments & data delivery models.
- To understand the ad hoc networks and related concepts.
- To understand the platforms and protocols used in the mobile environment.

Course Outcomes:

- Able to think and develop new mobile application.
- Able to take any new technical issue related to this new paradigm and come up with a solution(s).
- Able to develop new ad hoc network applications and/or algorithms/protocols.
- Able to understand & develop any existing or new protocol related to the mobile environment.

UNIT-I:

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

UNIT-II:

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT-III:

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models.

UNIT-IV:

Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods.

UNIT-V:

Mobile Ad hoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, Mobile Agents, Service Discovery.

TEXT BOOK:

1. “Mobile Communications”, Jochen Schiller, 2nd Edition Addison-Wesley, 2009.

REFERENCE BOOK:

1. “Mobile Computing”, Raj Kamal, Oxford University Press, 2007, ISBN: 0195686772.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
SOFTWARE TESTING METHODOLOGIES (PROFESSIONAL ELECTIVE II)

MCA II Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- A course on "Software Engineering".

Course Objectives:

- To provide knowledge of the concepts in software testing such as testing process, criteria, strategies, and methodologies.
- To develop skills in software test automation and management using latest tools.

Course Outcomes:

- Design and develop the best test strategies in accordance to the development model.

UNIT-I:

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs

Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT-II:

Transaction Flow Testing: transaction flows, transaction flow testing techniques. Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing. Domain Testing: domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT-III:

Paths, Path products and Regular expressions: path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing: Overview, decision tables, path expressions, kv charts, specifications.

UNIT-IV:

State, State Graphs and Transition testing: state graphs, good & bad state graphs, state testing, Testability tips.

UNIT-V:

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

TEXT BOOKS:

1. Software Testing techniques - Baris Beizer, 2nd edition, Dreamtech.
2. Software Testing Tools – Dr. K. V. K. K. Prasad, Dreamtech.

REFERENCE BOOKS:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD(Oreille).
3. Software Testing in the Real World – Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing – Meyers, John Wiley.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
INTERNET OF THINGS LAB

MCA II Year I Sem.

L	T	P	C
0	0	3	1.5

Following are some of the programs that a student should be able to write and test on an Raspberry Pi, but not limited to this only.

List of Experiments:

1. Start Raspberry Pi and try various Linix commands in command terminal window: ls, cd, touch, mv, rm, man, mkdir, rmdir, tar, gzip, cat, more, less, ps, sudo, cron, chown, chgrp, ping etc.
2. Run some python programs on Pi like:
    a. Read your name and print Hello message with name
    b. Read two numbers and print their sum, difference, product and division.
    c. Word and character count of a given string
    d. Area of a given shape (rectangle, triangle and circle) reading shape and appropriate values from standard input
    e. Print a name 'n' times, where name and n are read from standard input, using for and while loops.
    f. Handle Divided by Zero Exception.
    g. Print current time for 10 times with an interval of 10 seconds.
    h. Read a file line by line and print the word count of each line.
3. Light an LED through Python program
4. Get input from two switches and switch on corresponding LEDs
5. Flash an LED at a given on time and off time cycle, where the two times are taken from a file.
6. Flash an LED based on cron output (acts as an alarm)
7. Switch on a relay at a given time using cron, where the relay's contact terminals are connected to a load.
8. Get the status of a bulb at a remote place (on the LAN) through web.

The student should have hands on experience in using various sensors like temperature, humidity, smoke, light, etc. and should be able to use control web camera, network, and relays connected to the Pi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
CLOUD APPLICATIONS LAB

MCA II Year I Sem.

L	T	P	C
0	0	3	1.5

Course Objectives:

- To develop web applications in cloud.
- To learn the design and development process involved in creating a cloud-based application.
- To learn to implement and use parallel programming using Hadoop.

Course Outcomes:

- Configure various virtualization tools such as Virtual Box, VMware workstation.
- Design and deploy a web application in a PaaS environment.
- Learn how to simulate a cloud environment to implement new schedulers.
- Install and use a generic cloud environment that can be used as a private cloud.
- Manipulate large data sets in a parallel environment.

List of Experiments:

1. Installation and configuration of Virtual Machine using VMWare.
2. Study and Implementation of Infrastructure as a Service.
3. Installation and Configuration of Hadoop.
4. Installation and Configuration using Microsoft Azure Virtual Machine.
5. Install Google App Engine. Create hello world app and other simple web applications using python/java.
6. Create an Amazon EC2 Instance and Set up a Web Server on the Instance and Associate IP Address with the Instance.
7. Create a Database Instance in the Cloud using RDS.
8. Create a Database Instance in the Cloud using Google Cloud SQL.
9. Using Hadoop for Counting Word Frequency using Map Reduce.
10. Register with AWS and Create Windows/Linux Instance.
11. Create a S3 Storage Bucket and Store documents in Bucket.
12. Create a Static Website and Host Website by using S3.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
WEB TECHNOLOGIES LAB

MCA II Year I Sem.

L	T	P	C
0	1	2	2

Prerequisites:

- A Course on “Objected Oriented Programming through Java”.

Co-requisites:

- A course on “Web Technologies”.

Course Objectives:

- To provide hands-on experience on web technologies.
- To develop client-server application using web technologies.
- To introduce server-side programming with Java servlets and JSP.

Course Outcomes:

- Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript and XML.
- Apply client-server principles to develop scalable and enterprise web applications.

List of Experiments:

1. Write a PHP script to print prime numbers between 1-50.
2. PHP script to
    a. Find the length of a string.
    b. Count no of words in a string.
    c. Reverse a string.
    d. Search for a specific string.
3. Write a PHP script to merge two arrays and sort them as numbers, in descending order.
4. Write a PHP script that reads data from one file and write into another file.
5. Develop static pages (using Only HTML) of an online book store. The pages should resemble: www.amazon.com. The website should consist the following pages.
    a. Home page
    b. Registration and user Login
    c. User Profile Page
    d. Books catalog
    e. Shopping Cart
    f. Payment By credit card
    g. Order Conformation
6. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.
7. Create and save an XML document on the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.
8. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.
9. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

TEXT BOOK:

1. Web Technologies: A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education.

REFERENCE BOOKS:

1. Deitel H.M. and Deitel P.J., “Internet and World Wide Web How to program”, Pearson International, 2012, 4th Edition.
2. J2EE: The complete Reference by James Keogh, McGraw-Hill.
3. Bai and Ekedhi, The Web Warrior Guide to Web Programming, Thomson.
4. Paul Dietel and Harvey Deitel,” Java How to Program”, Prentice Hall of India, 8th Edition.
5. Web technologies, Black Book, Dreamtech press.
6. Gopalan N.P. and Akilandeswari J., “Web Technology”, Prentice Hall of India.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MACHINE LEARNING (PROFESSIONAL ELECTIVE - III)

MCA II Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- Data Structures.
- Knowledge on Statistical Methods.

Course Objectives:

- This course explains machine learning techniques such as decision tree learning, Bayesian learning etc.
- To understand computational learning theory.
- To study the pattern comparison techniques.

Course Outcomes:

- Understand the concepts of computational intelligence like machine learning.
- Ability to get the skill to apply machine learning techniques to address the real time problems in different areas.
- Understand the Neural Networks and its usage in machine learning application.

UNIT-I:

Introduction: Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning Concept learning and the general to specific ordering – introduction, a concept learning task, concept learning as search, find-S: finding a maximally specific hypothesis, version spaces and the candidate elimination algorithm, remarks on version spaces and candidate elimination, inductive bias. Decision Tree Learning – Introduction, decision tree representation, appropriate problems for decision tree learning, the basic decision tree learning algorithm, hypothesis space search in decision tree learning, inductive bias in decision tree learning, issues in decision tree learning.

UNIT-II:

Artificial Neural Networks: Introduction, neural network representation, appropriate problems for neural network learning, perceptions, multilayer networks and the back-propagation algorithm. Artificial Neural Networks-2- Remarks on the Back-Propagation algorithm, An illustrative example: face recognition, advanced topics in artificial neural networks. Evaluation Hypotheses – Motivation, estimation hypothesis accuracy, basics of sampling theory, a general approach for deriving confidence intervals, difference in error of two hypotheses, comparing learning algorithms.

UNIT-III:

Bayesian Learning: Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum Likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, an example: learning to classify text, Bayesian belief networks, the EM algorithm. Computational learning theory – Introduction, probably learning an approximately correct hypothesis, sample complexity for finite hypothesis space, sample complexity for infinite hypothesis spaces, the mistake bound model of learning. Instance-Based Learning- Introduction, k-nearest neighbour algorithm, locally weighted regression, radial basis functions, case-based reasoning, remarks on lazy and eager learning.

UNIT-IV:

Genetic Algorithms: Motivation, Genetic algorithms, an illustrative example, hypothesis space search, genetic programming, models of evolution and learning, parallelizing genetic algorithms. Learning Sets

of Rules – Introduction, sequential covering algorithms, learning rule sets: summary, learning First-Order rules, learning sets of First-Order rules: FOIL, Induction as inverted deduction, inverting resolution. Reinforcement Learning – Introduction, the learning task, Q–learning, non-deterministic, rewards and actions, temporal difference learning, generalizing from examples, relationship to dynamic programming.

UNIT-V:

Analytical Learning-1: Introduction, learning with perfect domain theories: PROLOG-EBG, remarks on explanation-based learning, explanation-based learning of search control knowledge. Analytical Learning-2-Using prior knowledge to alter the search objective, using prior knowledge to augment search operators. Combining Inductive and Analytical Learning – Motivation, inductive-analytical approaches to learning, using prior knowledge to initialize the hypothesis.

TEXT BOOK:

1. Machine Learning – Tom M. Mitchell, - MGH.

REFERENCE BOOK:

1. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MOBILE APPLICATION DEVELOPMENT (PROFESSIONAL ELECTIVE - III)

MCA II Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- Acquaintance with JAVA programming.
- A Course on DBMS.

Course Objectives:

- To demonstrate their understanding of the fundamentals of Android operating systems.
- To improves their skills of using Android software development tools.
- To demonstrate their ability to develop software with reasonable complexity on mobile platform.
- To demonstrate their ability to deploy software to mobile devices.
- To demonstrate their ability to debug programs running on mobile devices.

Course Outcomes:

- Student understands the working of Android OS Practically.
- Student will be able to develop Android user interfaces.
- Student will be able to develop, deploy and maintain the Android Applications.

UNIT-I:

Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Android Studio, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools

Android application components: Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes

UNIT-II:

Android User Interface: Measurements – Device and pixel density independent measuring units Layouts – Linear, Relative, Grid and Table Layouts

User Interface (UI) Components: Editable and non-editable TextViews, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers

Event Handling: Handling clicks or changes of various UI components

Fragments: Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

UNIT-III:

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS

Broadcast Receivers: Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity

Notifications: Creating and Displaying notifications, Displaying Toasts

UNIT-IV:

Persistent Storage: Files – Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference

UNIT-V:

Database: Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and etindelg data, Registering Content Providers, using content Providers (insert, delete, retrieve and update)

TEXT BOOKS:

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012.
2. Android Application Development for Java Programmers, James C Sheusi, Cengage. Learning, 2013.

REFERENCE BOOK:

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
BIG DATA ANALYTICS (PROFESSIONAL ELECTIVE - III)

MCA II Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- Acquaintance with JAVA programming.
- A Course on DBMS.

Course Objectives:

- To understand about big data.
- To learn the analytics of Big Data.
- To Understand the Map Reduce fundamentals.

Course Outcomes:

- Student understands the working of Android OS Practically.
- Student will be able to develop Android user interfaces.
- Student will be able to develop, deploy and maintain the Android Applications.

UNIT-I:

Introduction To Big Data And Analytics: Classification of Digital Data, Structured and Unstructured Data - Introduction to Big Data: Characteristics – Evolution – Definition - Challenges with Big Data - Other Characteristics of Data - Why Big Data - Traditional Business Intelligence versus Big Data - Data Warehouse and Hadoop Environment Big Data Analytics: Classification of Analytics – Challenges - Big Data Analytics important - Data Science - Data Scientist - Terminologies used in Big Data Environments - Basically Available Soft State Eventual Consistency - Top Analytics Tools.

UNIT-II:

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics; Points to Consider during Analysis; Developing an Analytic Team; Understanding Text Analytics; Analytical Approach and Tools to Analyze Data: Analytical Approaches; History of Analytical Tools; Introducing Popular Analytical Tools; Comparing Various Analytical Tools.

UNIT-III:

Understanding Map Reduce Fundamentals and HBase: The Map Reduce Framework; Techniques to Optimize MapReduce Jobs; Uses of MapReduce; Role of HBase in Big Data Processing; Storing Data in Hadoop : Introduction of HDFS, Architecture, HDFC Files, File system types, commands, org.apache.hadoop.io package, HDF, HDFS High Availability; Introducing HBase, Architecture, Storing Big Data with HBase , Interacting with the Hadoop Ecosystem; HBase in Operations-Programming with HBase; Installation, Combining HBase and HDFS.

UNIT-IV:

Big Data Technology Landscape and Hadoop: NoSQL, Hadoop; RDBMS versus Hadoop; Distributed Computing Challenges; History of Hadoop; Hadoop Overview; Use Case of Hadoop; Hadoop Distributors; HDFC (Hadoop Distributed File System), HDFC Daemons, read,write, Replica Processing of Data with Hadoop; Managing Resources and Applications with Hadoop YARN.

UNIT-V:

Social Media Analytics and Text Mining: Introducing Social Media; Key elements of Social Media; Text mining; Understanding Text Mining Process; Sentiment Analysis, Performing Social Media Analytics and Opinion Mining on Tweets; Mobile Analytics: Introducing Mobile Analytics; Define Mobile

Analytics; Mobile Analytics and Web Analytics; Types of Results from Mobile Analytics; Types of Applications for Mobile Analytics; Introducing Mobile Analytics Tools;

TEXT BOOKS:

1. Big Data and Analytics, Seema Acharya, Subhasinin Chellappan, Wiley publications.
2. Big Data, Black Book™, DreamTech Press, 2015 Edition.
3. Business Analytics 5e, BY Albright |Winston.

REFERENCE BOOKS:

1. Rajiv Sabherwal, Irma Becerra- Fernandez," Business Intelligence –Practice, Technologies, and Management", John Wiley 2011.
2. Lariss T. Moss, Shaku Atre, "Business Intelligence Roadmap", Addison-Wesley It Service.
3. Yuli Vasiliev, "Oracle Business Intelligence: The Condensed Guide to Analysis and Reporting", SPD Shroff, 2012.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
E-COMMERCE (OPEN ELECTIVE - I)

MCA II Year II Sem.

L	T	P	C
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Course Objectives:

- Identify the major categories and trends of e-commerce applications.
- Identify the essential processes of an e-commerce system.
- Identify several factors and web store requirements needed to succeed in e-commerce.
- Discuss the benefits and trade-offs of various e-commerce clicks and bricks alternatives.
- Understand the main technologies behind e-commerce systems and how these technologies interact.
- Discuss the various marketing strategies for an online business.
- Define various electronic payment types and associated security risks and the ways to protect against them.

Course Outcomes:

- Ability to identify the business relationships between the organizations and their customers.
- Ability to perform various transactions like payment, data transfer and etc.

UNIT-I:

Electronic Commerce: Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications. Consumer Oriented Electronic commerce - Mercantile Process models.

UNIT-II:

Electronic payment systems: Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems. Inter Organizational Commerce - EDI, EDI Implementation, Value added networks. Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT-III:

Corporate Digital Library: Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research. Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering. Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing's, Desktop video conferencing

UNIT-IV:

Web Marketing Strategies: Communicating with Different Market Segments, Beyond Market Segmentation: Customer Behavior and Relationship Intensity, Advertising on the Web, EMail Marketing, Search Engine Positioning and Domain Names, Selling to Businesses Online, Electronic Data Interchange, Supply Chain Management Using Internet Technologies, Electronic Marketplaces and Portals

UNIT-V:

E-Business Revenue Models: Revenue Models for Online Business, Changing Strategies: Revenue Models in Transition, Revenue Strategy Issues for Online Businesses, Creating an Effective Business Presence Online, Web Site Usability, Virtual Communities, Mobile Commerce, Online Auctions

TEXT BOOKS:

1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson. (UNITS 1, 2, 3)

2. E-Business by Gary P. Schneider, - Cengage India Learning (UNITS 4, 5).

REFERENCE BOOKS:

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, John Wiley.
2. E-Commerce, S. Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H. Michael Chang.
4. Electronic Commerce – Gary P. Schneider – Thomson.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
CYBER LAWS AND PRIVACY (OPEN ELECTIVE - I)

MCA II Year II Sem.

L	T	P	C
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Course Objectives:

- The course intends to inculcate the significance of Cyber space.
- Enlighten the various legal, social and international issues.
- The various remedies available under the Information Technology Act for the breach and commission of offence in cyber space.

Course Outcomes:

- International best practices and the various legal mechanisms to control the various offences in the cyberspace.

UNIT-I:

Introduction to cyber space: UNCITRAL Model Law - Information Technology Act, 2000 with recent amendments - Jurisdictional issues - Digital signatures - regulation of - certifying authorities - Cyber Regulation Appellate Tribunal

UNIT-II:

Online Contracts: Formation of online contracts - E banking transactions, online payment options, online advertising - Electronic and digital signatures - Taxation issues in cyber space- indirect tax, tax evasion, double tax, international tax, permanent establishment - Protection of trade secrets and deceptive trade practices

UNIT-III:

Cyber Crimes: Understanding cybercrimes - actus reus and mens rea - Types of crimes in the internet against person, against property, against government - Digital evidence- investigation and adjudication of cybercrimes in India- cyber arbitration, cyber conflict investigation

UNIT-IV:

Intellectual Property Rights (IPR) and Cyber Space: Copyright issues in the internet- protection of computer software, caching, international regime-OSS, DMCA, Data Protection Directive - Trademark issues in the internet – Domain Name Registration, Domain Name Registration, Domain Name Dispute, ICANN, UDRP policy, linking, framing, tagging - Database issues in the internet

UNIT-V:

Concept of Privacy: Historical and Cultural Perspectives, Meaning and Scope of Privacy, Critiques of Privacy, Right to Privacy – Louis Brandeis and Samuel Warren, Modern Principles of Privacy Law, Legal Regimes for Protecting Privacy, Privacy as a Legal Right, Privacy – The Human Rights Angle, Threats to Privacy in New Technological Regime, Digital and Internet Privacy Challenges.

TEXTBOOKS:

1. Computers, Technology and the new internet laws – Karnika Seth.
2. Legal dimensions of cyber space – S. K. Verma.
3. Cyber law – Nandan Kamath.
4. Intellectual property and the Internet – Rodney Ryder.

REFERENCES:

1. Information technology law – Ian. J. Lyod.
2. Cyber space law commentaries and Materials- Yee fen Lim.
3. Cyber law – Yatindra Sinha.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MANAGEMENT INFORMATION SYSTEM (OPEN ELECTIVE - I)

MCA II Year II Sem.

L	T	P	C
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Course Objectives:

- To provide the basic concepts of Enterprise Resource Planning and Management of Information System.
- Explain to students why information systems are so important today for business and management.
- Evaluate the role of the major types of information systems in a business.
- Assess the impact of the Internet and Internet technology on business-electronic commerce and electronic business.
- Identify the major management challenges to building and using information systems and learn how to find appropriate solutions to those challenges.

Course Outcomes:

- Understand the usage of MIS in organizations and the constituents of the MIS.
- Understand the classifications of MIS, understanding of functional MIS and the different functionalities of these MIS. This would be followed by case study on Knowledge management.
- Assess the requirement and stage in which the organization is placed. Nolan model is expected to aid such decisions.
- Learn the functions and issues at each stage of system development. Further different ways in which systems can be developed are also learnt.

UNIT-I:

Introduction to IS Models and Types of Information systems: Nolan Stage Hypothesis, IS Strategic Grid, Wards Model, Earl's Multiple Methodology, Critical Success Factors, Soft Systems Methodology, Socio-Technical Systems Approach (Mumford), System Develop Life Cycle, Prototype and End User Computing, Application Packages, Outsourcing, Deciding Combination of Methods. Types of Information Systems.

UNIT-II:

IS Security, Control and Audit: System Vulnerability and Abuse, business value of security and control, Need for Security, Methods of minimizing risks IS Audit, ensuring system quality.

UNIT-III:

Induction to ERP: Overview of ERP, MRP, MRPII and Evolution of ERP, Integrated Management Systems, Reasons for the growth of ERP, Business Modeling, Integrated Model, Foundations of IS in Business, Obstacles of applying IT, ERP Market- ERP Modules: Finance, Accounting Systems, Manufacturing and Production Systems, Sales and Distribution Systems, , Human Resource Systems, Plant Maintenance System, Materials Management System, Quality Management System, ERP System Options and Selection, ERP proposal Evaluation.

UNIT-IV:

Benefits of ERP: Reduction of Lead Time, On-Time Shipment, Reduction in Cycle Time, Improved Resource Utilisation, Better Customer Satisfaction, Improved Supplier Performance, Increased Flexibility, Reduced Quality Costs, Improved Information Accuracy and Design Making Capabilities.

UNIT-V:

ERP Implementation and Maintenance: Implementation Strategy Options, Features of Successful ERP Implementation, Strategies to Attain Success, User Training, Maintaining ERP & IS. Case Studies.

TEXT BOOKS:

1. Gordon B. Davis & Margrethe H. Olson: Management Information Systems, TMH, 2009.
2. C Laudon and Jane P. Laudon, et al: Management Information Systems, Pearson Education, 2009.
3. Alexis Leon: ERP (Demystified), 5/E, Tata McGraw-Hill, 2009.
4. C. S. V. Murthy: Management Information System, Himalaya, 2009
5. James A. Obrein: Management Information Systems, TMH, 2009
6. David L Olson: Managerial Issues of Enterprise Resource Planning Systems, McGraw Hill, International Edition-2009.
7. Rainer, Turban, Potter: Introduction to Information Systems, WILEY-India, 2009.
8. Vaman, ERP in Practice, TMH, 2009

REFERENCE BOOKS:

1. Dharminder and Sangeetha: Management Information Systems, Excel, 2009
2. Gerald V. Post, David L Anderson: Management Information Systems, Irvin McGraw Hill, 2009.
3. Monk: Concepts in ERP, Cengage, 2009
4. Olson: Managerial Issues of ERO, TMH, 2009
5. Motiwala: Enterprise Resource Planning, Pearson 2009
6. Miller: MIS—Cases, Pearson, 2009

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
ENTREPRENEURSHIP (OPEN ELECTIVE - I)

MCA II Year II Sem.

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Course Objectives:

- The aim of this course is to have a comprehensive perspective of inclusive learning, ability to learn and implement the Fundamentals of Entrepreneurship

Course Outcomes:

- It enables students to learn the basics of Entrepreneurship and entrepreneurial development which will help them to provide vision for their own Start-up.

UNIT-I:

Entrepreneurial Perspectives: Introduction to Entrepreneurship – Evolution - Concept of Entrepreneurship - Types of Entrepreneurs - Entrepreneurial Competencies, Capacity Building for Entrepreneurs. Entrepreneurial Training Methods - Entrepreneurial Motivations - Models for Entrepreneurial Development - The process of Entrepreneurial Development.

UNIT-II:

New Venture Creation: Introduction, Mobility of Entrepreneurs, Models for Opportunity Evaluation; Business plans – Purpose, Contents, Presenting Business Plan, Procedure for setting up Enterprises, Central level - Startup and State level - T Hub, Other Institutions initiatives.

UNIT-III:

Management of MSMEs and Sick Enterprises: Challenges of MSMEs, Preventing Sickness in Enterprises – Specific Management Problems; Industrial Sickness; Industrial Sickness in India – Symptoms, process and Rehabilitation of Sick Units.

UNIT-IV:

Managing Marketing and Growth of Enterprises: Essential Marketing Mix of Services, Key Success Factors in Service Marketing, Cost and Pricing, Branding, New Techniques in Marketing, International Trade.

UNIT-V:

Strategic perspectives in Entrepreneurship: Strategic Growth in Entrepreneurship, The Valuation Challenge in Entrepreneurship, The Final Harvest of New Ventures, Technology, Business Incubation, India way – Entrepreneurship; Women Entrepreneurs – Strategies to develop Women Entrepreneurs, Institutions supporting Women Entrepreneurship in India.

TEXT BOOKS:

1. Entrepreneurship Development and Small Business Enterprises, Poornima M. Charantimath, 2nd edition, Pearson, 2014.
2. Entrepreneurship, a South – Asian Perspective, D. F. Kuratko and T. V. Rao, 3rd edition, Cengage, 2012.

REFERENCE BOOKS:

1. Entrepreneurship, Arya Kumar, 4th edition, Pearson 2015.
2. The Dynamics of Entrepreneurial Development and Management, Vasant Desai, Himalaya Publishing House, 2015.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD`
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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
PROJECT

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