MASTER OF COMPUTER APPLICATIONS
Department of Computer Science and Engineering

Master of Computer Applications (MCA) emphasizes on the design and application of information systems and provides a solid background in business functions and Information Technology and covers latest developments in areas where commerce and computing and in general, applications and technology blend together successfully and define the state of art.

MCA students acquire strength in principles, concepts and foundations of computer science, information technology and various applications. They would also have extensive programming / software development experience over a wide variety of platforms / applications. The curriculum has explicitly identified lab components for every course that discusses the principles with an implementation component.

The course is well balanced with significant emphasis on planning, designing and building complex commercial application software and system software. The application areas include transaction processing (such as banking, stock exchange order processing), simulation, database management, e-commerce, networking, embedded technologies, bioinformatics etc.

This MCA programme is not only a complete professional grooming for students for a successful career in the IT industry, but also, provides value-based education through a system of wholesome learning.

This is a 3 year Post Graduate program specializing on Computer Applications. The students admitted to this program are with a graduation (B.Sc.) in Mathematics, Physics, Statistics, Computer Science, BCA and B.Com. Also there is a provision for academically bright students with BCA, B.Sc (Information Technology) and B.Sc (Computer Science), to directly join the second year of the MCA programme through the lateral entry scheme.

TEXT BOOKS/ REFERENCES:


TEXT BOOKS/ REFERENCES:

Introduction and the Relational Model: Introduction to DBMS- Data Models. Structure of Relational Databases- Relational Algebra Operations. SQL: Background- SQL Data Types and Schemas- Integrity Constraints– Data Definition- Basic Structure of SQL Queries- Set Operations- Aggregate


Query Evaluation and Optimization.

TEXT BOOKS/ REFERENCES:

18CA204 PROBLEM SOLVING TECHNIQUES 3-0-1-4

General Problem Solving Concepts: Problem Solving in Everyday Life - Types of Problems - Difficulties with Problem Solving - Defining Problem – Data representation in Computer: Constants and Variables, Data types, how the computer stores the data, operators – Introduction to testing and coding the solution – Software Development Life Cycle.

Algorithms: Introduction to Programming: Local and global variables, parameters and return values, Three logic structures: sequential logic, decision logic and loop logic. Sequential Logic Structure, Flow chart for sequential logic, Decision Logic structures: If/Then/Else, Using straight through logic, using positive logic, using negative logic, Logic conversion, The case logic structure, Flow chart for decision logic. Loop Logic structure: Incrementing, Accumulating, While/WhileEnd, Repeat/Until, Nested Loops, Flow chart for looping statements – Modules: Functions, Recursion Data Structures: Queues and Stacks, Lists and Higher Order functions - Trees and fractals using recursion.

TEXT BOOKS/ REFERENCES:

18CA211 DATA STRUCTURES USING C++ 3-0-1-4

Note: Basic operations and applications of all data structures shall be covered, Different implementations with efficiency analysis shall be discussed.

Abstract Data Types, Linear Data Structures: Arrays (single and multi-dimensional), Stack ADT, Multi Stack ADT, Queue ADT, Circular Queue, Singly Linked List, Doubly Linked List, Circular Linked List.

Graphs: Matrix and List Representation of Graphs, Breadth First Search, Applications of BFS, Depth
First Search, Applications of DFS, Spanning Trees
Advanced Data Structures: Dictionaries, Hashing techniques, Disjoint Sets, List, Tree and Array
based implementation–Union/Find.

TEXT BOOKS/ REFERENCES:
1. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, “Fundamentals of Data Structures in C”,
2. Jean-Paul Tremblay and G. Sorenson, “An introduction to Data Structures with Applications”,
3. Robert L. Kruse, Bruce P. Leung, Clovis L. Tondo and Shashi Mogalla, “Data Structure and

Software Engineering – Introduction - Software Classification - Layered Technology – Software
Process – Practice - Generic Process Model, Process Assessment and Improvement – CMMI
framework - Perspective Models - Specialized Models - Agile Process Models Requirements
Engineering – SRS - Requirement Analysis - Unified Modeling Language – Approaches - Scenario
based Modelling - UML Models that supplement Use Cases – Activity and Swim lane Diagrams –
Design Engineering – Architectural Design – Modeling Component level design - Performing User
Interface Design.
DevOps - JUnit - git - github - Docker - Containers - Continuous Integration - Selenium - HTTP load
testing tool - Design patterns.

TEXT BOOKS/ REFERENCES:

18CA212 MICR OPROCESSORS AND EMBEDDED SYSTEMS 3-0-1-4

8085 microprocessor architecture; Instruction set, instruction types and formats; Instruction
execution, instruction cycles, different types of machine cycles and timing diagram. - 16-bit
microprocessors, 8086 architecture, registers, memory segmentation and addressing, 32-bit/64-bit
microprocessor families
Introduction to IoT – Architecture - Applications
Introduction to Arduino: The Arduino Platform, Architecture, Pin functions, overview of main
features such as I/O Ports, Timers, interrupts serial port, PWM, ADC, etc.
Introduction to Arduino IDE, writing, saving, compiling and uploading sketches.
Interfacing discrete LEDs, Binary counter, Seven Segment LEDs. Interfacing LCD, switch Interface.
Interfacing with different type of sensors and communication modules
Raspberry Pi Introduction: Board, ARM SoC (system-on-chip) architecture, Hardware interfaces
Basic Programming of the Pi: Hello World, Access the World Wide Web, Play audio, Control
Peripherals with a Pi

TEXT BOOKS/ REFERENCES:
2. 8086/8088 Microprocessor: Architecture, Programming, and Interfacing by Barry B. Brey
3. Programming Arduino Next Steps: Going Further with Sketches- by Simon Monk
4. Raspberry Pi Programming Genius: How to learn Python Easily & Manage Your Own Project
   Now.
OO System Development Life Cycle - Object Oriented Methodologies - Comparison (OOP and SP) -
Introduction to Object Oriented Programming - Object Basics. C++ Environment: Manipulators -
Classes and Object - Data Members - Access Specifiers - Array within a Class - Array of Objects -
Scope Resolution Operators - Inline Functions - Constructors - Default Constructors - Destructors -
Static Members - This Pointer - Constant Members - Mutable - Initializer List - References and
Reference Parameters - Default Arguments - Type Conversion - Free Storage Operators. Compile Time
Polymorphism: Overloading Operators - Function Overloading - Overloading Constructors - Friend
Functions - Friend Classes - Inheritance Types - Function Overriding - Virtual Base Class - Constructors
in Base Derived Classes-Class Containership. Run time Polymorphism: Virtual Functions - Pure
Virtual Functions-Abstract Class - Class Templates - Function Templates- Exception Handling - Data
files – C++ stream Classes, Opening and Closing of files, file modes, Sequential Input and Output
Operations, Error Handling file operations.

TEXT BOOKS/ REFERENCES:

18CA214 OPERATING SYSTEMS 3-0-0-3

Introduction to OS: Layered Approach- Kernel booting Users View- Basic Linux Commands and
Linux Architecture. Interrupts- System Calls and Protection. Process Management: Process States -
Schedulers - Operations on Processes - Inter-Process Communication – Synchronization - pipes-
Linux Processes- Process Creation in Linux- Fork. CPU Scheduling- Scheduling Mechanisms in
Linux and Solaris-Signals and Threads- Threading Concepts in CProcess Synchronization- Critical
Section Problem- Synchronization Hardware - Semaphore- Classical Problems of Synchronization -
Critical Region- Monitors- Deadlocks: Deadlock Characterization -Methods of handling Deadlocks-
Deadlock Prevention- Avoidance- Detection and Recovery. Storage Management: Memory
Management- Swapping- Contiguous Memory Allocation. Paging: Paging in Linux- Segmentation-
Segmentation with Paging- Virtual Memory- Demand Paging- Page Replacement Algorithms-
Thrashing. File Systems in Linux: Directory Structure-Directory implementation- Disk Scheduling-
Experiments in VM. Virtual Machines: Overview of VMware and Linux Demos- Case Study:The
Linux system- Android.

TEXT BOOKS/ REFERENCES:

18CA215 SOFTWARE ENGINEERING TECHNIQUES 2-0-1-3
Ltd., Ninth Edition

18CA302 ADVANCED DATABASES 3-0-0-3
Introduction to Object Oriented Database: Abstraction, encapsulation, and information hiding, Classes, Inheritance Overloading Polymorphism and dynamic binding - Object-Oriented Data Model. Complex Data Types – Structured Types and Inheritance in SQL – Table Inheritance – Array and Multiset Types in SQL – Object-Identity and Reference Types in SQL.

Distributed Databases - Introduction to distributed architectures–Distributed and parallel databases concepts – Client/server, parallel and distributed architectures –Design strategies:Horizontal, vertical and hybrid fragmentation- Resource allocation.


Introduction to Transaction Management and Concurrency Control: Transaction model and properties–Transaction serialization and recovery–Lock based concurrency control–Multi-phase locking protocols–Timestamp ordering

Concurrency Control: Optimistic concurrency control–Deadlock management – Distributed deadlock – Distributed Query Processing


Spatial and Temporal Data and Mobility: Time in Databases – Spatial and Geographic Data – Multimedia Databases – Mobility and Personal Databases.

TEXT BOOKS/ REFERENCES:

18CA305 DESIGN AND ANALYSIS OF ALGORITHMS 3-1-0-4


Graph Algorithms: Graph Traversals (DFS, BFS with Analysis) - Shortest Path Algorithms (with Analysis) – Dijkstra - Bellman Ford- Floyd Warshall’s all Pair shortest path Algorithm-Minimum spanning Tree (with Analysis) – Kruskal– Prims - Applications of BFS and DFS.

Network Flow algorithms

NP Problems: Definition: P-NP-NP Complete-NP Hard. Examples:P-NP.

TEXT BOOKS/ REFERENCES:
18CA306 COMPUTER NETWORKING AND INTERNET 3-0-1-4


Common network services and tools - ifconfig, nw.js - netcat - netstat - DNS - dhcp - apache - Nginx - Go language

TEXT BOOKS/ REFERENCES:

18CA307 WEB APPLICATIONS DEVELOPMENT 2-0-1-3

Web Application development using Spring MVC
Server Side Technologies: Servlets - Java Server Pages –PHP - AJAX Controls for PHP- Basic Node.js
Web Security: Sessions and Cookies.

TEXTBOOKS / REFERENCES:
3. “Head First JavaScript Programming -A Brain-Friendly Guide” By Elisabeth Robson, Eric Freeman Publisher: O’Reilly Media, March 2014

TEXT BOOKS/ REFERENCES:
5. H. M. Dietel& P. J. Deitel, Java: How to program, 10/e, (Early Objects) PHI, 2014.

18CA312 DATA MINING AND APPLICATIONS 3-0-1-4


TEXT BOOKS/ REFERENCES:
1. Jiawei Han, MichelineKamber and Jian Pei, “Data mining concepts and Techniques”, Third Edition, Elsevier Publisher, 2006.
5. Itay Lieder, YehezkelResheff, Tom Hope, Learning TensorFlow, O'Reilly Media, 2017
WEB SERVICES AND CLOUD

Introduction to Web Services, Web service Architecture XML, XSD, DTD, XSLT, Parsers. WSDL- Purpose of WSDL, Types of WSDL, Message Exchange Patterns, Message Exchange Formats.
Introduction to Cloud Computing- Architecture, types of Cloud- Public cloud, private cloud, Community Cloud and hybrid clouds, Cloud service models- IAAS, SAAS, PAAS, andXAAS. Cloud an organization perspective- Cloud Migration and Virtualization, Cloud OS.
Cloud Computing Platforms, Cloud service Platforms- storage service, database service, analytical service and application service, Cloud Data center management, Distributed Storage Systems, Cloud usage scenarios, Cloud Security
Amazon Web Services (AWS), Amazon Elastic Cloud, AWS Architecture, Microsoft Azure, Google App Engine, DevOps Services, Open Stack and Open Nebula Private Cloud setup and usage.

TEXT BOOKS/ REFERENCES:

CRYPTOGRAPHY AND NETWORK SECURITY 3-1-0-4

Introduction:- Goals of Security, types of attacks, services and mechanism, different techniques. Mathematics involved – integer arithmetic, modular arithmetic, matrices, linear congruence, algebraic structures,GF(2n) fields. Symmetric key ciphers – Kerckhoff’s principle, substitution ciphers, transposition ciphers, stream and block ciphers,modern block ciphers, modern stream ciphers, DES structure and analysis, multiple DES, security, AES- transformations, key expansion, ciphers, analysis.
Asymmetric key cryptography – RSA cryptosystem, RABIN cryptosystem, ELGAMAL cryptosystem, elliptic curve cryptosystem. Message integrity, Random oracle model, message authentication, hash functions, digital signature, entity authentication, Key management.
Network security: At application layer – Email, PGP, S/MIME. At transport layer – SSL architecture, handshake protocol, changecipherspec protocol, Alert protocol, Record protocol, SSL message format, Transport layer security. At network layer – modes, security protocols, security associations, security policy, Internet key exchange, ISAKMP.

TEXT BOOKS/ REFERENCES:

TEXT BOOKS/ REFERENCES:

Introduction to Bioinformatics: Definition - Importance and Uses of Bioinformatics-Information Technology - Systems Biology.

TEXT BOOKS/ REFERENCES:

18CA333 BUSINESS INTELLIGENCE 3-0-0-3


TEXT BOOKS/ REFERENCES:
2. Jiawei Han, MichelineKamber and Jian Pei, “Data mining concepts and Techniques”, Third Edition, Elsevier Publisher, 2006.

18CA334 COMPUTATIONAL INTELLIGENCE 3-0-0-3


TEXT BOOKS/ REFERENCES:

18CA335 COMPUTER GRAPHICS AND VISUALIZATION 3-0-0-3


TEXT BOOKS / REFERENCES:

18CA336 DATABASE ADMINISTRATION 3-0-0-3


TEXT BOOKS/REFERENCES:

TEXTBOOKS/REFERENCES:  


TEXTBOOKS/REFERENCES:

18CA380 ALGORITHMS LAB 0-0-1-1

Implementation of sorting algorithms – Bubble sort, Insertion Sort, Selection Sort, QuickSort- Merge Sort, Heap implementation using array, Heap sort, performance comparison of sorting algorithms for various classes of inputs like nearly sorted, unsorted etc.O(V2) and O( E log V) implementations of Dijkstra algorithm, BFS and DFS implementation, graph cycle detection using BFS. Topological sort using DFS, Prims and Kruskals MST. Divide and conquer implementation of Maximum subarray sum.
Dynamic Programming based solution for 0-1 Knapsack problem, Recursive matrix chain Multiplication, Longest common substring.

18CA381 DATA STRUCTURES AND DBMS LAB 0-0-1-1

Linear data structure implementation: Singly Linked list, Doubly linked list, Stack, Queue, and applications. Non linear data structure implementation: Binary search tree, AVL tree, Adjacency matrix and adjacency list representations, skip list, dictionary, suffix tree. Table Design- Data Definition Language (DDL) commands - Table creation and alter (include integrity constraints such as primary key, referential integrity constraints, check, unique and null constraints both column and table level, Drop - Other database objects such as view, index, cluster, sequence, synonym etc. - Practice SQL Data Manipulation Language (DML) commands - Row insertion, deletion and updating - Retrieval of data - Simple select query - Select with where options (include all relational and logical operators) - Functions: Numeric, Data, Character, Conversion and Group functions with having clause. - Set operators - Sorting data - Sub query (returning single row, multiple rows, more than one column, correlated sub query) - Joining tables (single join, self-join, outer join) - Data manipulations using date functions - User defined functions in a query- Transaction Control Language (TCL) commands (Grant, revoke, commit and save point options) - Usage of triggers, functions and procedures using PL/SQL constructs

18CA382 COMPETITIVE PROGRAMMING LAB 0-0-1-4

Sorting - Greedy algorithms – Backtracking - Dynamic programming - Basic graph algorithms - Advanced graph algorithms – Trees - Basic geometry - Computational geometry – Strings - Basic heuristic search - Advanced search - Simulation problems – Number theory – Discrete structures
Any of the online platforms like CodeChef / CodeForces / Hackerrank can be used.

18CA386 ANDROID APPLICATION DEVELOPMENT 0-0-1-1

Menu, Dialog, List and Adapters
What is Menu?-Custom Vs. System Menus-Creating and Using Handset menu Button
Hardware
What are Android Themes. What is Dialog? How to create an Alter Dialog?
List & Adapters
Database SQLite
Introducing SQLite-SQLiteOpenHelper and creating a database-Opening and closing a database
Working with cursors Inserts, updates and deletes
Location Based Services and Google Maps
Using Location Based Services -Working with Google Maps
Multimedia Programming using Android
Multimedia audio formats-Creating and Playing -Multimedia audio formats-Kill / Releasing
(Memory Management)-How to associate audio in any application-How to associate video playback with an event
WebView
How to develop your own custom made Web browser -How to use WebView object in XML
Permission for using the Internet-Methods for associated with ‘Go’, ‘Back’, ‘Forward’ etc

TEXT BOOKS/ REFERENCES:
2. Android Application Development All in one for Dummies, Barry Burd, Edition: I
3. Teach Yourself Android Application Development in 24 Hours, SAMS Publication, Edition I

18CA391 RESEARCH LEARNING AND PROBLEM FORMULATION 1-0-1-2

Familiarization of Spreadsheet Tools, Presentation Tools and Writing Tools, Structuring the Report, Pagination, Identification, Presenting Footnotes, Abbreviations, Presentation of Tables and Figures- Referencing- Use and Format of Appendices, Indexing.
Ethical Issues, Copyright, Royalty, Intellectual Property Rights and Patent Law, Reproduction of Published Material, Citation and Acknowledgement.

TEXT BOOKS/ REFERENCES:
Introduction: About Android, Pre-requisites to learn Android, Dalvik Virtual Machine & .apk file extension, Android API levels (versions & version names)
Android Java Basics: Getting started with Android development, project folder structure, simple programming, running project, generating build/APK of the app from Android Studio
First application: Creating Android Project, Android Virtual Device Creation, Set up debugging environment, Workspace set up for development, Launching emulator, debugging on mobile devices.
Basic UI design: Basics about Views, Layouts, Drawable Resources, Input controls, Input Events, Toasts.
More UI Components: Layouts - GridView and ListView, Action bar, Adapters, Menus: Option menu, context menu, sub menu, Pickers - Date and Time, Spinners.
Activity and Fragment: Activity, Fragment, Activity Lifecycle and Fragment Lifecycle.
Intents: Implicit Intents, Explicit intents, communicating data among Activities.
Navigation Drawer: Panel that displays the app’s main navigation screens on the left edge of the screen
Android Notifications – Toast, Dialogs (TimePicker, DatePicker, Progress, Alert), Notification Manager and Push Notification
Introducing SQLite - SQLiteOpenHelper and creating a database - Opening and closing a database, Working with cursors Inserts, updates, and delete.

TEXT BOOKS/ REFERENCES:
1. Erik Hellman, Android Programming: Pushing the Limits, Wiley
2. Pradeep Kothari, Android Application Development Black Book, Dreamtech Press, KLSI
3. Head first Android Development.

Automata and Language: Chomsky hierarchy of languages, Introduction to Finite Automata – Non-Deterministic Finite Automata- equivalence of NFAs and DFAs- minimization of DFA- Regular Expressions. Context-free Grammar - Parse tree derivations (Top-down, Bottom-up), Context-free languages – Chomsky normal form, GNF.

TEXT BOOKS/ REFERENCES:

18CA431 INFORMATION RETRIEVAL 3-0-0-3


TEXT BOOKS/ REFERENCES:

18CA433 MODERN WEB APPLICATION DEVELOPMENT USING MEAN STACK 3-0-0-3

2. Introduction to Node JS Installation, Callbacks, Installing dependencies with npm, Concurrency and event loop fundamentals, Node JS callbacks, Building HTTP server, Importing and exporting modules, Building chat application using web socket.
3. Building REST services using Node JS REST services, Installing Express JS, Express Node project structure, Building REST services with Express framework, Routes, filters, template engines - Jade, ejs.

TEXT BOOKS/ REFERENCES:

18CA434 NETWORK MANAGEMENT AND SYSTEM ADMINISTRATION 3-0-0-3


TEXT BOOKS / REFERENCES:

18CA436 OPEN SOURCE SYSTEMS 3-0-0-3


18CA437  SEMANTIC WEB TECHNOLOGIES  3-0-0-3


TEXT BOOKS / REFERENCES:

18CA438  SOFTWARE QUALITY ASSURANCE  3-0-0-3


TEXT BOOKS/ REFERENCES:

18CA439  STRUCTURE AND INTERPRETATION OF COMPUTER PROGRAMS  3-0-0-3

Introduction to the Elements of Programming Languages: Different Types of Programming Languages - Modeling Programming Languages, Computability versus Complexity, Computer Science for Computation.
Introduction to LISP and Scheme - Building Abstractions with Procedures - The Elements of Programming Procedures and the Process they Generate – Formulating Abstractions with Higher-Order Procedures.


TEXT BOOKS/ REFERENCES:

18CA440 WIRELESS COMMUNICATIONS AND NETWORKS 3-0-0-3


TEXTBOOK / REFERENCES:

18CA451 CLOUD COMPUTING 3-0-0-3


TEXT BOOKS / REFERENCES:

18CA452 DEEP LEARNING 3-0-0-3
Historical Trends in Deep Learning, Linear Algebra, Probability and Information theory, Numerical Computation, Machine learning basics
Deep Networks: Deep feedforward networks, Regularization for deep learning, Optimization for training deep models, Convolutional Networks, Sequence modelling: Recurrent and recursive nets, Practical methodology, Applications
Deep Learning Research: Linear factor models, autoencoders, Representation learning, Structured probabilistic models, Monte-Carlo models,
Intro to NLP and Deep Learning, Simple Word Vector representations
Introduction to Tensorflow
Convolutional neural networks- Dynamic Memory Networks.

TEXT BOOKS/ REFERENCES:
3. Yoav Goldberg, A Primer on Neural Network Models for Natural Language Processing, 2015
4. Jurafsky, James H. Martin, Speech and Language Processing, 3rd edition, 2017

18CA453 GRAPH THEORY 3-0-0-3
Trees & Applications: Trees, Properties, Rooted trees, Rooted & Binary Trees, Prefix codes, Binary codes, Huffman’s Algorithm, Spanning trees, Kruskal’s & Prim’s algorithms for the optimal spanning tree, Activity Networks in Project management, Topological sorting, CPM Algorithm for Activity Networks, Arborescence, Prefix, in-fix and post-fix Tree traversals, Expression trees, Polish notation, Matrices of digraphs, Acyclic digraphs, decyclization, Graphs in Computer Programming,
Fundamental cycles, algorithm for the fundamental cycles, Fundamental cut sets, algorithm for the fundamental cut sets, Vectors & Vector spaces of a graph, cycle & cut-set vector spaces of a graph. Connectivity, Networks & Combinatorial Optimization: Cut vertices, Bi-connected graphs, algorithm for cut vertices and biconnected graphs, Vertex & Edge connectivity, Menger’s Theorem (Statement only), Network flows, Ford and Fulkerson’s Theorem (Statement only), Edmonds-Karp Algorithm for the maximal network flow, Network Simplex algorithm for the minimum cost flow, Matching, Perfect matching, Hall’s marriage theorem, Edmond’s Algorithm for the maximum cardinality matching, Independent set, Covering, Clique, Dominating Set. Planarity, Coloring & Intractable graph problems: Planar graphs, Kuratowski graphs, Different representations of planar graphs, DMP Algorithm for the Planarity detection, Geometric dual, Coloring, chromatic number, Four color theorem (Statement only), Grundy coloring, time table scheduling problem, chromatic polynomials, Algorithmic complexity, growth rates, P, NP, NPC classes, Cook’s theorem (Statement only), NPC reduction, NPC Graph problems.

TEXT BOOKS/ REFERENCES:
1. NarsinghDeo, Graph theory with Applications to Engineering & CS, PHI
2. Alan Gibbons, Algorithmic Graph theory, Cambridge University Press

18CA454 INFORMATION SECURITY 3-0-0-3

TEXT BOOKS/ REFERENCES:

18CA455 INTELLIGENT SYSTEMS 3-0-0-3
Situational Calculus - Representation of Planning - Partial Order Planning- Practical Planners – Conditional Planning.

TEXT BOOKS/ REFERENCES:

18CA456  INTERNET OF THINGS  3-0-0-3

TEXT BOOKS/ REFERENCES:
1. The Internet of Things: Applications and Protocols, Wiley publications. Author(s): Oliver Hersent, David Boswarthick, Omar Elloumi
2. Architecting the Internet of Things, Springer publications. Author(s): Dieter Uckelmann, Mark Harrison, Florian Michahelles
3. Internet of Things with Arduino Cookbook, Packt Publications. Author(s): Marco Schwatrz.

18CA457  MACHINE LEARNING  3-0-0-3
Introduction, linear classification, perceptron update rule, Perceptron convergence, generalization, Maximum margin classification,Classification errors, regularization, logistic regression,Linear regression, estimator bias and variance, active learning Non-linear predictions, kernels, Kernel regression, kernels, Support vector machine (SVM) and kernels, kernel optimization.
Model selection, Model selection criteria, Description length, feature selection, Combining classifiers, boosting, Boosting, margin, and complexity, Margin and generalization (EM) algorithm, EM, regularization, clustering, Clustering, Spectral clustering, Markov models, Hidden Markov models (HMMs), Bayesian networks, Learning Bayesian networks, Probabilistic inference, Current problems in machine learning.

TEXTBOOKS / REFERENCES:

**18CA458 NATURAL LANGUAGE PROCESSING 3-0-0-3**


**TEXT BOOKS/ REFERENCES:**

**18CA459 SECURE APPLICATIONS FOR MOBILE DEVICES 3-0-0-3**

OS refresher; TCP/IP Refresher; Mobile Systems Characteristics; Design of Mobile OS, Android Internals, API - Application Software Design for Android - Tour of: Android Open Source Project (AOSP), CyanogenMod; Building a ROM; Linaro - Network Security; Linux Security; Android Security; Location Based Services; Pocket Spy - Android Permissions System - Mobile Malware - Privacy Violations – cyber security - Mobile-, Cloud-, Ubiquitous-, Pervasive-Computing
Apache cordova - Cross site request forgery- cross site - browser security model and policies - same origin policy - CORS - Android security model.

**TEXT BOOKS/ REFERENCES:**
5. Adapted Materials from Android security sites.
Introduction: Introduction to software testing and analysis, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory.

Specification-based testing techniques, code-based testing techniques, Model-based testing, Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Structural Testing: Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing,
Static Analysis, Dynamic Analysis

Reducing the number of test cases: Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, Slice-based testing


Program slicing and its application, Reliability analysis, Formal methods; verification methods; oracles.


TEXT BOOKS/REFERENCES:

18CA480 PYTHON LAB 0-0-1-1

Introduction To Python -Understanding Python variables -Python basic Operators - Understanding python blocks -Python Data Types -Declaring and using Numeric data types: int, float, complex - Using string data type and string operations - Defining list and list slicing

Use of Tuple data type - Python Program Flow Control - Conditional blocks using if, else and elif Simple for loops in python - For loop using ranges, string, list and dictionaries - Use of while loops in python - Loop manipulation using pass, continue, break and else - Programming using Python conditional and loops block Python Functions, Modules And Packages- Python String, List And Dictionary Manipulations - Building blocks of python programs -Understanding string in build methods -List manipulation using in build methods - Dictionary manipulation - Programming using string, list and dictionary in build functions - Python File Operation- Reading config files in python Writing log files in python - Understanding read functions, read(), readline() and readlines() Understanding write functions, write() and writelines() - Manipulating file pointer using seek Programming using file operations - Python Object Oriented Programming – Python Regular Expression - Powerful pattern matching and searching -Power of pattern searching using regex in python - Python Exception Handling - Python Database Interaction

Python packages - Numpy, Scipy, NLTK, Pandas, Matplotlib, Scikit-Learn, Tensorflow, NetworkX
Basic Organization and Hardware Components of a Personal computer: Assembling of Personal Computer-
- Formatting- Partitioning the Hard Disk-Installation of Windows and Linux Operating System- Digital Circuits: Realisation of Logic Gates- Realization of logic functions with the help of universal gates-NAND Gate- Half/Adder & Half/Subtractor - Code Conversion

18CA486 C# and .NET LAB 0-0-1-1

text class: methods and properties of string class, enumerations, boxing and unboxing, OOPS concepts: Encapsulation, data hiding, inheritance, interfaces, polymorphism, operator overloading, overriding Methods, Static Class members, Delegates and events. Exception Handling, garbage collector, generics and collection
Basics of Windows Programming- Event Driven Programming, Windows Forms, Using common controls-Labels, textboxes, buttons, check boxes, radio button, progress bar, combo box, list box. Components-timer, imagelist, Menus, Modal and Modeless Dialog Boxes, MDI, Mouse and keyboard event handling.
Files: System.IO, directory and file types, Stream readers and stream writers, working with binary data.

18CA487 FUNCTIONAL PROGRAMMING LAB 0-0-1-1


18CA488 LINUX AND SHELL PROGRAMMING LAB 0-0-1-1

Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disabling of users accounts, creating and mounting file system.
Checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel. Installing and removing packages. Backup, restore and Compress utilities - tar, cpio, dump, rsync and restore utilities.

Bash shell programming – basic concepts, expressions, decision making selections, repetition, special parameters - positional parameters, shift, argument validation, script examples.

Communication in Linux - mesg, who- T, talk, write, wall, finger, chfn, ping, traceroute utilities, email facilities. Configuration of servers- Telnet, FTP, DHCP, NFS, SSH, Proxy Server (Squid), Web server (Apache), Samba.

Daemons- init, crond, atd, xinetd, inetd, the services file. named, sshd, httpd.

**18CA489 MEAN STACK LAB 0-0-1-1**


Introduction to AngularJS - AngularJS Expressions - AngularJS Modules - AngularJS Data Binding - AngularJS Scopes - AngularJS Directives & Events - AngularJS Controllers - AngularJS Filters - AngularJS Services - AngularJS HTTP - AngularJS Tables - AngularJS Select - Fetching Data from MySQL - AngularJS Validation - AngularJS API - AngularJS Animations - AngularJS i18n and i10n

**18CA496 DISSERTATION Phase I 0-0-0-5**

The objective of Dissertation – Phase 1 is to gear up students for preparation of Dissertation-Phase 2 in Semester-VI. Dissertation provides an opportunity to the students to demonstrate independence and originality in thought and application. Students will select topics from the field of computer application and based on a thorough review of literature on that topic, they will identify the problems and decide on plans of research for dissertation. Under the supervision of faculty members, they will execute their plans involving theoretical and/or experimental work. Students will have to prepare proper documentation consisting of SRS, Modeling Techniques, Development Strategies and Implementation and Testing Strategies. Student may use any Design Methodologies such as SSAD, OOAD and UML etc. This is done during phase 1. Regular reviews will be conducted.

**18CA497 DISSERTATION Phase II 0-0-0-12**

The results obtained in phase 1 will be analysed to arrive at a conclusion which will lead to some novelty in the field of computer application. Dissertation will be prepared as per the prescribed format/ guidelines and will be presented in the form of regular reviews. The Dissertation work will be evaluated continuously over the span of the semester as per the approved procedure. For the final review, the department may appoint external expert from industry or academics. Also, a technical paper based on the work done has to be submitted and published at a reputed conference which indexes the publications in SCOPUS. The formalities insisted by the department in this regard has to be strictly adhered to.

**18HU211 FINANCIAL ACCOUNTING 2-0-0-2**

TEXT BOOKS/ REFERENCES:

18HU431 MANAGEMENT AND ORGANIZATIONAL BEHAVIOUR 3-0-0-3

Managers and Management – Meaning – Role of managers – Processes of management – Historical roots of contemporary management practices.
Foundations of planning – Types of plans–Approaches to planning – Planning in dynamic environment. Organizational designs and structures – traditional and contemporary organizational designs. Organizational culture and ethical behavior – factors shaping organizational culture–creating an ethical culture.
Motivation–early and contemporary theories of motivation. Leadership – early and contemporary approaches to leadership. Groups and group development – turning groups into effective teams.
Managing change – process, types and challenges.

TEXTBOOK / REFERENCES:
1. Jennifer George and Gareth Jones “Understanding and Managing Organizational Behavior”,Published by Pearson Education Inc.
18HU432 MANAGEMENT INFORMATION SYSTEMS 3-0-0-3

Introduction to Information System Concepts - Definition to MIS, Role and Impact - Role of Computers in MIS
Management Practices - Strategic Management of Business - The Concept of Corporate Planning - Essentia lity of Strategic Planning - Development of Business Strategies and Types of Strategies
Decision Making - Information Concepts - Systems – Concepts – Controls – Types of System
Decision Support System – Concepts And Philosophy – DSS Deterministic System – MIS and Role of DSS.

TEXTBOOK / REFERENCES:

18HU433 PRINCIPLES OF ECONOMICS AND MANAGEMENT 3-0-0-3


TEXTBOOKS/REFERENCES:

18HU434 SOFTWARE PROJECT MANAGEMENT 3-0-0-3


TEXTBOOK / REFERENCES:

18EN281 ENGLISH FOR PROFESSIONAL PURPOSES 0-0-1-1


TEXT BOOKS/ REFERENCES:

18MA201 DISCRETE STRUCTURES 3-1-0-4

Introduction to Vector Space - Subspaces, Linear Independence, Basis and Dimension
Graph Theory: Definition, walk, path, trails, connected graphs, regular and bipartite graphs, cycle and circuits. Tree and rooted tree. Spanning trees – Eccentricity of a vertex radius and diameter of a graph. Central graphs – Centre (s) of a tree. Hamiltonian and Eulerian graph, planar graphs
Groups: Finite fields and Error correcting/detecting codes

TEXT BOOKS/ REFERENCES:

18MA301 PROBABILITY AND STATISTICS 3-1-0-4

Testing of Hypothesis. Parameter and statistic – sampling distribution – Estimation and testing of hypothesis – critical region and level of significance – errors in testing of hypothesis – one-tailed and two-tailed tests – procedure for testing hypothesis – confidence interval – test of significance of large and small samples – Student’s t-distribution – Sndecor’s F distribution

Chi-Square Test for Goodness of fit and Independence.

TEXT BOOKS/ REFERENCES:

18MA311 NUMERICAL ANALYSIS AND OPTIMIZATION TECHNIQUES 3-1-0-4


TEXT BOOKS/ REFERENCES:
3. R Panneerselvam – Operations research, 2nd edition, PHI
5. Gerald and Wheatley, Applied Numerical Analysis, Pearson Education Asia, Sixth Edition