# Solapur University, Solapur

# M. C. A. III (Science Faculty)

# Syllabus (Semester – V and VI)

# (Choice Based Credit System)

# With Effect from June 2017

**MASTER OF COMPUTER APPLICATIONS (SCIENCE FACULTY)**
**DETAIL SYLLABUS OF SEMESTERS V AND VI**

**1. Introduction:** The **Master of Computer Applications (M.C.A.) Programme has been designed with a semester approach** in mind. It is a three years course and in each year there are two semesters. Courses in semester-I to semester-V are aimed at skills development in computers using various technologies. Also in each semester student has to develop a software project so that a student can become more expert in handling the programming language and the programming logic is also improved.

**2. Objective**: The M.C.A. program prepares students to take up positions as systems analysts, systems designers, programmers, and managers in any field related to information technology. The program, therefore, aims at imparting comprehensive knowledge with equal emphasis on theory and practice. However, the course curriculum will have enough flexibility to enable a student to undertake advance studies in Computer Science later on.

**3. Intake Capacity: 60**

**4. Ordinances and regulations**
   **O.MCA. S1 – ELIGIBILIY**: Admission to the course is open to any graduate of this University or graduate of any other University recognized by UGC, New Delhi, satisfying the following conditions:
   a) The candidate should have secured at least FIFTY PERCENT marks (45% in case of candidates of reserved categories) at the aggregate of all years of Graduation Examination.
   b) The student must have taken Mathematics at XII std. or at least one of the subjects from Mathematics/ statistics / Computer Science/ Computer Applications/ Computer Programming in first year of Bachelors Degree.
   *c) The candidate should not be employed at the time of admission and should not take employment during the tenure of course.*
   d) The candidate should not be above TWENTY-EIGHT years of age as on 30th June of the year of his admission.
   e) Subject to the above conditions, the final admission is based solely on the merit at the entrance test. Every candidate has to appear for the entrance test conducted during the year in which he/she is seeking admission.
   f) Seats are allocated as per the reservation policy of the State Government. However, 10% of the seats are reserved for the candidates from the other University. The entrance test score of the student admitted from other University should not be less than that of the last candidate admitted from Solapur University, Solapur.
   **O.MCA. S2 - FEES STRUCTURE:** The tuition fees or laboratory fees and other fees have to be paid at the beginning of every semester. At present a student has to pay tuition fees Rs.7000 /- per semester, laboratory fee Rs.14000/-per semester and laboratory deposit of Rs.500/- together with

other fees. These fees may be revised from time to time. The fees once paid will not be refunded.

**O.MCA. S3 – COURSE STRUCTURE:** The MCA course is a SIX semester course. The teaching for the semesters I, III and V will be during the first half of the academic year and for the semesters II and IV will be during the second half the academic year. During the sixth semester the student has to work for the project and the project will be evaluated at the end of that semester.

**O.MCA. S4**

A) A student has to clear all the heads of passing of first and second semesters to be eligible for the admission to the fifth semester.

B) A candidate will be awarded a class or distinction as per the rules of other science subjects.

C) The Regulations/ Ordinance not covered in this shall be followed from the Regulations/ Ordinance laid down for the science faculty.

## 5. Credit System:

### Six Semester M. C. A. Course

| Semester | No. of Papers/ Practicals | Marks | Credits |
|---|---|---|---|
| **Semester I** | | | |
| • Theory Papers | 05 | 500 | 20 |
| • Practical Papers | 01 | 100 | 04 |
| • Project | 01 | 100 | 04 |
| **Semester II** | | | |
| • Theory Papers | 05 | 500 | 20 |
| • Practical Papers | 01 | 100 | 04 |
| • Project | 01 | 100 | 04 |
| **Semester III** | | | |
| • Theory Papers | 05 | 500 | 20 |
| • Practical Papers | 01 | 100 | 04 |
| • Project | 01 | 100 | 04 |
| **Semester IV** | | | |
| • Theory Papers | 05 | 500 | 20 |
| • Practical Papers | 01 | 100 | 04 |
| • Project | 01 | 100 | 04 |
| **Semester V** | | | |
| • Theory Papers | 05 | 500 | 20 |
| • Practical Papers | 01 | 100 | 04 |
| • Project | 01 | 100 | 04 |
| **Semester VI** | | | |
| • Project | 01 | 250 | 10 |
| **Total marks and credits for MCA Course** | **3750** | | **150** |

# MCA – III Semester V and VI Syllabus

## M. C. A. Part – III Semester-V

| Paper Code | Title of the Paper | Contact hours/ week | Distribution of Marks for Examination | | | Credits |
| | | | Internal | University | Total | |
|---|---|---|---|---|---|---|
| MCA-501 | Artificial Intelligence | 04 | 30 | 70 | 100 | 04 |
| MCA-502 | Web Design Techniques | 04 | 30 | 70 | 100 | 04 |
| MCA-503 | Network Security | 04 | 30 | 70 | 100 | 04 |
| MCA-504 | OPTIONAL COURSES | 04 | 30 | 70 | 100 | 04 |
| MCA-505 | (GROUP-I, GROUP-II) SELECT ANY ONE GROUP | 04 | 30 | 70 | 100 | 04 |
| MCA-506 | Practical - V | 12 | 30 | 70 | 100 | 04 |
| MCA-507 | Project -V | 02 | 30 | 70 | 100 | 04 |
| | **Total** | **34** | **210** | **490** | **700** | **28** |

**Group-I:**  MCA504 – Digital Image Processing

MCA505 - Mobile Computing

**Group-II:**  MCA504 – Pattern Recognition

MCA505 - Real Time Systems

## M. C. A. Part – III Semester-VI

| Paper Code | Title of the Paper | Contact hours/ week | Distribution of Marks for Examination | | | Credits |
| | | | Internal (Project Viva) | University (Project Viva) | Total | |
|---|---|---|---|---|---|---|
| MCA-601 | Project - VI | 02 | 50 | 200 | 250 | 10 |

# MCA 501 – Artificial Intelligence

**Unit – I**

  **What is Artificial Intelligence**: The AI Problems, The underlying Assumption, What is an AI Technique? (4)
  **Problems, Problem Spaces and Search:** Defining the problem, as a state space search, production systems, problem characteristics, production system characteristics, Issues in the design of search programs. (4)
  **Heuristic Search Techniques:** Generate-and-Test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction Means-Ends Analysis. (7)

**Unit – II**

  **Knowledge Representation Issues:** Approaches to Knowledge representation, Issues in Knowledge representation. (5)
  **Using Predicate Logic:** Representing Simple Facts in Logic, Representing Instance and ISA Relationships, Computable Functions and Predicates, Resolution, Natural deduction. (5)
  **Representing Knowledge Using Rules:** Procedural versus Declarative Knowledge, Forward Versus Backward Reasoning, Matching. (5)

**Unit – III**

  **Statistical Reasoning:** Probability and Bayes' Theorem, Certainty Factors and Rule-Based Systems, Bayesian Networks, Dempster-Shafer Theory, Fuzzy Logic. (5)
  **Weak Slot-and Filler Structures:** Semantic Nets, Frames. (5)
  **Strong Slot-and-Filler Structures**: Conceptual Dependency, Scripts. (5)

**Unit – IV**

  **Game Playing:** Overview, The Minmax Search Procedure, Adding Alpha-Beta Cutoffs, Additional Refinements, Iterative Deepening. (5)
  **Natural Language Processing:** Introduction, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing. (5)
  **Expert Systems:** Representing and Using Domain Knowledge, Expert System Shells, Explanation, Knowledge Acquisition. (5)

**References**

1. Elaine Rich, Kevin Knight, Artificial Intelligence, TMH, 3rd Edition.
2. George F Luger, Artificial Intelligence: Structures and Strategies for Complex Problem solving, 4th Edition, Pearson Education, Asia.
3. D W Patterson, Introduction to Artificial Intelligence and Expert Systems, PHI, 2nd Edition.

# MCA 502 – Web Design Techniques

**Unit – I**

**Introduction to HTML:** World Wide Web, Web Publishing, Physical & logical HTML, Structure of HTML, HTML Text formatting tags, Ordered and unordered List tags, Inserting image, HTML Links: text, image and image mapping, Tables, Frames, HTML Forms: controls.　　　　　　(7)

**Cascading Style Sheet:** Introduction to CSS, Types of style sheets, Text formatting properties, CSS Borders, Margin Properties, Color properties, Use of <div> and <span> tag, Use of classes in CSS with an example.　　　(8)

**Unit – II**

**JavaScript:** Concept of script, Types of Scripts, Introduction to Javascript, Variables, identifiers, constants, Operators, Control and looping structure, Array and its predefined functions, Math object and its predefined functions, string object and its predefined functions, date object and its predefined functions, event handling, DOM concept, DOM objects: Window navigator, History object and its methods, Location object with methods, Validations in JavaScript　　　　　　　　　　　　　　　　　　(15)

**Unit – III**

**jQuery and AJAX:** Introduction to jQuery, Syntax Overview, Anatomy of a jQuery Script, Creating first jQuery script, Traversing the DOM, Selecting Elements with jQuery, Refining & Filtering Selections,

Selecting Form Elements, Working with Selections - Chaining, Getters & Setters, CSS Styling and Dimensions,

Manipulating Elements - Getting and Setting Information about Elements, Moving, Copying, and Removing Elements, Creating New Elements

Manipulating Attributes, Utility Methods Events - Connecting Event to Elements, Namespacing Events, Event handling,Triggering Event handlers, Event Delegation Animating effects - animate(), click(), hover(), toggle()

Plugins - Create a basic plugin, Finding & Evaluating Plugins, Writing Plugins, Tabs, Panels and Panes examples

jQuery UI and Forms

AJAX Overview, jQuery's AJAX related methods, Ajax and Forms, Ajax Events
　　　　　　　　　　　　　　　　　　　　　　　　(15)

**Unit – IV**

**XML:** Concept of XML, features of XML, Writing XML elements, attributes, etc. XML with CSS, XML with DSO, XML Namespace, XML DTD, XML schemas, writing simple sheet using XSLT, SAX Parser, DOM Parser

Introduction to SOAP and Examples on XML　　　　　　　　(9)

**Web Server:** Concept of Web Server, Obtaining and Installing Apache Http Server on Windows, Editing httpd.conf configuration file, Configuration directives in  httpd.conf -ServerRoot, PidFile, ServerName, Add site to /etc/hosts file, DocumentRoot, ErrorLog, Listen, Directory, Files, Location
　　　　　　　　　　　　　　　　　　　　　　　　(6)

**References**

1. Complete reference HTML, TMH, 4th Ed.
2. Ivan Bayross, HTML, DHTML, JavaScript, Perl & CGI, BPB Pub, 3rd Ed.
3. Web enabled commercial application development using HTML, DHTML, JavaScript, PERLCGI, BPB Pub,3rd Ed.
4. Robert W. Sebesta, Programming the World Wide Web, Pearson,4th Ed.
5. JavaScript Bible, Wiley Pub.
6. Jonathan Chaffer, Karl Swedberg, Learning jQuery.
7. Professional Ajax, 2nd Edition Wrox Press
8. Ryan B. Bloom, Apache Server 2.0: The Complete Reference, , TMH Pub.
9. Apache HTTP Server Reference Manual for Apache version 2.2.17 – Apache Software Foundation.
10. Hofstetter fred, Internet Technology at work, TMH.
11. Deitel & Deitel, Beginning XML Wrox Press 12. XML how to program, Pearson Pub.
12. Reference Sites: http://www.w3schools.com
13. Reference Sites: http://www.apache.org

## MCA 503 – Network Security

**Unit – I**

**Introduction:** Security Concepts, Threats and Risks, Attacks – Passive and ActiveSecurity Services, Confidentiality, Authentication, Non-Repudiation, Integrity, Access Control, Availability, Model for Internetwork Security, Internet Standards and RFCs                                                              (8)

**Access Control Mechanisms:** Access Matrix, HRU, TAM, ACL and capabilities, Access Control Models, Chinese Wall, Clark-Wilson, Bell-LaPadula, Non-Interference and Role Base Model                          (7)

**Unit – II**

**Cryptography**: Secret Key and Public Key Cryptosystems, Symmetric Ciphers, Block Ciphers and Stream Ciphers, DES, IDEA and Key Escrow, RSA and ElGamal, Secure Hash and Key management, Digital Signature and Non-repudiation, cryptanalysis                                                      (15)

**Unit – III**

**Network Security**: Objectives and Architectures, Internet Security Protocols, IP encapsulating Security Protocol, Network and Transport Layer Security
                                                                                                         (7)

**Network Security Applications**: Authentication Mechanisms – Passwords, Cryptographic authentication protocols, Smart Card, Biometrics, Digital Signatures and seals, Kerberos, X.509 LDAP Directory,
 Web Security  - SSL Encryption, TLS, SET,  E-mail Security, PGPs / MIME, IP Security                                                                               (8)

**Unit – IV**

**Access and System Security**: Intruders, Intrusion Detection and Prevention
Firewalls - Hardware Firewall, Software Firewall, Application Firewall, Packet Filtering, Packet Analysis
Proxy Severs - Firewall setting in Proxy, ACL in Proxy                          (15)

**References**
   1. William Stallings, "Network Security Essentials", Prentice-Hall.
   2. Edward Amoroso, "Fundamentals of Computer Security Technology", Prentice-Hall.
   3. Dorothy E. Denning, "Cryptography and Data Security", Addison-Wesley.
   4. Peter J. Denning, "Computers under Attack", Addison-Wesley.
   5. Douglas R. Stinson, "Cryptography: Theory and Practice", CRC Press.
   6. D. Brent Chapman and Elizabeth D. Zwicky, "Building Internet Firewalls", O'Reilly and Associates.

**GROUP – I**
**MCA 504 (GROUP-I) – Digital Image Processing**

**Unit – I**
  **Introduction:** Digital image processing, Applications of digital image processing, Fundamental steps in digital image processing, and Components of an image processing system.                                      (5)
  **Digital image fundamentals:** Image sampling and quantization, some basic relationships between pixels, Linear and nonlinear operation          (5)
  **Image enhancement in the spatial domain:** Some basic gray level transformations, Histogram processing, Enhancement using arithmetic/logic operations, Basics of spatial filtering, Smoothing spatial filters, Sharpening spatial filters                                            (5)

**Unit – II**
  **Image enhancement in the frequency domain:** Introduction to the Fourier transform and the frequency domain, Smoothing frequency-domain filters, Sharpening frequency domain filters, homomorphic filtering          (7)
  **Image restoration     :** A model of the image degradation/restoration process, Noise models, Restoration in the presence of noise only-spatial filtering, Periodic noise reduction by frequency domain filtering          (8)

**Unit – III**
  **Morphological image processing:** Preliminaries, Dilation and erosion, Opening and closing, The hit-or-miss transformation, Some basic morphological algorithms                                            (7)
  **Image segmentation:** Detection of discontinuities, Edge linking and boundary detection, Thresholding, Region-based segmentation, Segmentation by morphological watersheds                                    (8)

**Unit – IV**
  **Representation and description:** Representation, Boundary descriptors, Regional descriptors, Use of principal components for description, Relational descriptors                                                    (7)
  **Object recognition:** Patterns and pattern classes, Recognition based on decision- theoretic methods, Structural methods          (8)

**References**
  1. Gonzalez and Woods, Digital image processing, PHI
  2. Milan Sonka, Vaclav Hlavac, Roger Boyle, Image Processing, Analysis and Machine Vision,  Thomson Brooks / Cole Edition.
  3. Anil K. Jain, Fundamentals of Digital Image Processing, Prentice Edition Hall of India.

# MCA 505 (GROUP-I) – Mobile Computing

**Unit – I**

  **Wireless Transmission:** Frequencies for radio transmission, Regulations. Signals, Antennas, Signal propagation-Path loss of radio signals, Additional signal propagation effects, Multipath propagation. Multiplexing-Space, Frequency, Time, Code division multiplexing. Modulation- Amplitude, Frequency, Phase Shift Keying, Advanced frequency and phase shift keying, spread spectrum- DSSS, FHSS. Cellular System. (8)

  **Medium Access Control:** CSMA/CD, Hidden and exposed terminals, Near and Far terminals, SDMA, FDMA, TDMA- Fixed TDM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Demand assigned multiple access, PRMA, Reservation TDMA,MACA , Polling, CDMA. (7)

**Unit – II**

  **Telecommunication System:** GSM – Mobile services, Architecture of a GSM System, Protocol Architecture, Radio Interface, Localization and calling: MTC, MOC, Handover, Security-Authentication, Encryption. (6)

  **Wireless LAN:** Introduction, Infrared vs radio transmissions, architecture of an infrastructure based IEEE 802.11 and Ad-hoc networks, Protocol architecture, Physical Layer, Format of an IEEE 802.11 frame using DSS. MAC management- synchronization, power management, roaming. Bluetooth Architecture, simple Bluetooth Pico-net. (9)

**Unit – III**

  **Mobile Network Layer:** Entities & terminology in Mobile IP, IP packet delivery agent discovery, Registration. Dynamic Host Configuration Protocol (DHCP) (7)

  **Mobile Transport Layer:** Traditional TCP- Congestion control, Slow start, fast retransmit/Fast recovery, implications on mobility. Classical TCP-Indirect TCP, Snooping TCP, Mobile TCP. (8)

**Unit – IV**

  **Introduction to Android:** Android System Architecture, Creating and Running Android Applications, Types of Android Applications, Building blocks, Application Manifest, Application Life Cycle, Application Priority and Process States, Creating and Using Resources, The Activity Life Cycle, Android GUI architecture, Views, Layouts, Creating simple android GUI based applications with event handling such as Sudoku game and To-do list. (8)

  **Using Bluetooth and Managing Networks in Android:** Using Bluetooth - Introducing the Bluetooth Service, Controlling the Local Bluetooth Device, Discovering and Bonding with Bluetooth Devices, Managing Bluetooth Connections, Communication with Bluetooth. Managing Networks - Monitoring and Managing Your Internet Connectivity, Managing Active Connections, Managing Your Wi-Fi. (7)

**References**

1. John Schiller, Mobile communication (2nd Edition), Pearson Edition.
2. Peter T Davis, Craig R McGuffin, Wireless LAN, MGH International.
3. Reto Meier, Professional Android Development, Wrox Publication.
4. Burnette, Hello Android - Ed, Pragmatic Bookshelf.
5. Rick Rogers, John Lombardo, Android Application Development, O'Reilly Publication.

# GROUP – II
## MCA 504 (GROUP-II) – Pattern recognition

**Unit – I**
**Introduction:** Application of Pattern Recognition, statistical decision theory, Image processing and analysis . (5)
**Probability:** Probability of Events, Random Variables, Joint Distribution and Densities, Moments of Random variables, Estimation of Parameters from samples, Minimum Risk Estimations. (10)

**Unit – II**
**Statistical Decision Making:** Baye's Theorem, Multiple Features, Conditionally Independent Features, Decision Boundaries Estimation of Error rates, Characteristic centers, Estimating the Composition of Populations. (8)
**Non Parametric Decision Making:** Histograms, Kernel and windows estimators, nearest neighbor classification techniques, adaptive decision boundaries, adaptive discriminant functions, minimum squared. (7)

**Unit – III**
**Clustering:** Hierarchical clustering, partitioned clustering. (7)
**Artificial Neural Networks:** Nets without hidden layers, nets with hidden layer, the Back-Propagation algorithm, Hopfied nets – an application: Classifying sex from facial images. (8)

**Unit – IV**
**Processing of Wave form and images:** gray level scaling, transformations, equalizations, geometric image scaling and interpolations, logarithmic gray level scaling, the statistical significance of image features. (15)

**References**
1. Earl Gose, Richard Johnsonbaugh and Steve Jost, Pattern Recognition and Image Analysis, PHI 1997
2. Fu. K. S., Syntactic Methods in Pattern Recognition, Acaemis Press 1974.
3. Tray Y Young and Thomas W Calvers, Classification, Estimation and Pattern Recognition, American Elsevier Publication Company Inc. 1994.
4. Duda R. O. and Hart P. E., Pattern Classification and Scene Analysis, John Wiley (1973)

# MCA 505 (GROUP-II) - Real Time Systems

### Unit -I
**Introduction:** Issues in real-time computing, structure of a real-time system, performance measures for real time systems, estimating program run times, introduction to hardware components of real time systems (microcontroller, sensor and actuator, interrupts). (15)

### Unit – II
**Task Assignment and Scheduling:** Pre-emptive, nonpreemptive, scheduling, classical microprocessor scheduling algorithms, rate-monotonic scheduling algorithm and preemptive earliest deadline first (EDF)algorithm, Allowing for precedence and exclusion conditions, using primary and alternative task, Introduction to IRIS tasks, task assignment and allocation algorithms, Utilization: Balancing algorithm, A next-fit algorithm for RM scheduling, A bin-packing assignment algorithm for EDF, A myopic offline scheduling (MOS) algorithm, fault-tolerant scheduling, (15)

### Unit – III
**Programming languages for real-time applications:** Desired language characteristics, data typing, control structures, hierarchical decomposition, exception handling, overloading, multitasking, low-level programming, tasks scheduling, timing specifications, programming environments, run-time support, real time database, real-time Vs. relative databases, main memory databases, transaction priorities, transaction aborts, concurrency control issues, disk scheduling algorithms, database for hard real-time systems .
(15)

### Unit – IV
**Real-time communication:** Network topologies, network architecture issues, protocols (Contention-bases protocols, token-based protocols, stop and Go multi hop protocol, polled bus protocol, hierarchical round robin protocol, deadline-based protocols, fault-tolerant routing) fault-tolerance techniques. Introduction to fault types, fault detection, hardware, software information and time redundancy, data diversity, Introduction to reliability evaluation and clock synchronization for hardware and software redundancy. (15)

### References
1. C. M. Krishna and Kang G. Shin, Real-Time Systems, McGraw Hill International Editions, Computer Science Series, 1997
2. J. E. Cooling, Software Design for real-time systems, Chapman and Hall pub.
3. John B. Peatman, Design with Micro Controllers, McGraw-Hill International.

## MCA 506 – Practical – V

The practical course will contain 20 practical assignments covering syllabi of all theory papers

## MCA 507 - Project and Viva - V

**Project work.**

**M. C. A. Part – III Semester-VI**

| Paper Code | Title of the Paper | Contact hours/ week | Distribution of Marks for Examination | | | Credits |
|---|---|---|---|---|---|---|
| | | | Internal (Project Viva) | University (Project Viva) | Total | |
| MCA-601 | Project – VI | 02 | 50 | 200 | 250 | 06 |

**GENERAL INSTRUCTION REGARDING PREPARATION OF PROJECT REPORT FOR MCA-III SEM-VI**

# TYPING

(a) The typing shall be standard 12 pts in double spaced
(b) Margins must be   Left  2 inches    Right    1.5 inches
                                          Top  2 inches     Bottom 1.5 inches
(c)  Paper    A4 size Bond Paper

# COPIES

Two hard-bound copies (Black Rexene with Golden Embossing as per format displayed herewith)  One original and one clean Xerox Copy.

# FORMAT FOR TITLE PAGE AND FOR EMBOSSING

PROJECT REPORT
ON

*NAME OF THE SYSTEM*

*NAME OF THE COMPANY*

BY
*NAME OF STUDENT*

**Department of Computer Science
Solapur University, Solapur**

**MASTER IN COMPUTER APPLICATION
200___  -  200__**

The Guidelines regarding the documentation and scope of project are mentioned here below:

**MCA-III SEM-VI   (COMMERCIAL SYSTEM PROJECTS)**
Project Report should be submitted in following format for Commercial

Application Projects  viz. Payroll, Sales, Purchase, Inventory, Book Shop,

Examination system etc. Where VB, Access, Oracle, ASP and Java is

used.

**2 Blank Pages at beginning
Title Page**

**Certificate from Company**
**Certificate from Guide and Head of Department**

# Acknowledgement

**Index with printed Page Numbers**

# Drawbacks and Limitations

**Proposed Enhancements**
**Conclusions**
**Bibliography**
**ANNEXURES:**
**ANNEXURE 1: INPUT FORMS WITH DATA**
**ANNEXURE 2: OUTPUT REPORTS WITH DATA**
**ANNEXURE 3: SAMPLE CODE**
**2 Blank Pages at the end.**

Project report should be submitted in following format for project using

OOAD, Embedded System, WAP and other technologies and Web

Deployed Systems where C, C++, J2EE, .NET, OOAD and JAVA, SDK's,

API's are used.

**2 Blank Pages at beginning**
**Title Page**
**Certificate from Company**
**Certificate from Guide and Head of the Department**

# Acknowledgement
**Index with printed Page Numbers**
**CHAPTER 1: INTRODUCTION**
  1.1 Company Profile
  1.2 Existing System and Need for System
  1.3 Scope of Work
  1.4 Operating Environment – Hardware and Software
  1.5 Detail Description of Technology Used

# CHAPTER 2: PROPOSED SYSTEM
2.1 Proposed System
2.2 Objectives of System
2.3 User Requirements

# CHAPTER 3: ANALYSIS & DESIGN
3.1 Object Diagram
3.2 Class Diagram
3.3 Use Case Diagrams
3.4 Module Hierarchy Diagram
3.5 Component Diagram
3.6 Deployment Diagram ( in case of Web Deployment )
3.7 Module Specifications
3.8 Interface Diagram ( in case of WAP and Embedded  Systems )
3.9 Web Site Map Diagram ( in case of Web Site )
3.10    User Interface Design ( Screens etc. )
3.11    Table specifications ( in case back end is a database )
3.12    Test Procedures and Implementation

# CHAPTER 4: USER MANUAL

4.1 User Manual
4.2 Operations Manual / Menu Explanation
4.3 Program Specifications / Flow Charts

## Drawbacks and Limitations

**Proposed Enhancements**
**Conclusions**
**Bibliography**

**ANNEXURES:**
**ANNEXURE 1: USER INTERFACE SCREENS**
**ANNEXURE 2: OUTPUT REPORTS WITH DATA ( if any )**
ANNEXURE 3: SAMPLE PROGRAM CODE ( which will prove sufficient development is done by the student ) and 2 Blank Pages at the end.