Modern Computer Application (COMA) – Class XI
(Detailed Syllabus)

A. Brief Review of Computer Systems
(30 Marks)

i) Evolution of Computers and Computer Organization : (10 marks)

- **Evolution of Computers**
  - Abacus, Napier's Bone, Pascaline, The Babbage Machine
  - Stored Program Concept, Von Neumann Concept / Architecture
- **Computer Hardware Generations**
  - First, Second, Third, Fourth and Fifth Generation of Computers;
  - Components, Advantages, Disadvantages
- **Concept of Circuit Integration**
  - SSI, MSI, LSI, VLSI, ULSI
- **Classification of Computers**
  - Analogue, Digital, Hybrid Computers
  - Mainframe and Super Computer
  - Mini, Micro, Laptop Computer
- **Computers in Modern Society**
- **Concept of Data and Information, Data Processing**
- **Brief description of each functional block of a computer**
  - Block Diagram of a Computer System
  - Input Devices (Keyboard, Mouse, Scanner, Touch Screen, OMR, OCR, MICR, Graphic Tablet, Barcode Reader, Light Pen, Microphone, Joystick)
  - Output Devices
    - Monitor – CRT, LCD
    - Printer – Impact Printers (Dot Matrix Printer), Non-Impact Printers (Inkjet Printer, Laser Printer)
    - Plotter
  - Central Processing Unit : CU, ALU
  - Storage Devices
    - Primary Memory : RAM (DRAM, SRAM), ROM (PROM, EPROM, EEPROM, UVPROM)
    - Secondary Memory : Magnetic Media (HDD, FDD), Optical Media (CD, DVD, Blue-Ray Disk)
    - Cache Memory
    - Flash Memory

  - Communication Bus
    - System Bus – Address Bus, Data Bus, Control Bus, Power Bus

ii) Data Representation : (10 Marks)

- **Number Systems**
  - Concept of Non-Positional Number System
    - Roman Number System
  - Concept of Positional Number System
    - Decimal, Binary, Octal and Hexadecimal Number System
  - Conversion
    - Inter-conversion between Decimal, Binary, Octal and Hexadecimal Numbers (Whole numbers and Fractions, using Double Add and Half Add Methods)
  - Arithmetic
    - Addition, Subtraction – Decimal, Binary, Octal and Hexadecimal Numbers
    - Multiplication, Division – Binary Number System only
  - Different methods of Negative Number Representation
    - Signed Magnitude
    - One's Complement
    - Two's Complement
    - Subtraction using Complements (1's, 2's complement)

- **Various Binary Coding Schemes**
  - BCD
  - EBCDIC
  - ASCII
  - ISCII

- **Concept of Fixed and Floating Point Numbers**
  - Difference between fixed and floating point numbers

- **Bit map representation of images**

- **Concept of Multimedia**

iii) Boolean Algebra (10 Marks)
- Definition and postulates.
- Boolean operations – OR, AND, NOT
- Proof using identities and truth tables
- De-Morgan's Theorems and Basic Principle of Duality
- Deriving truth table from Boolean expression and vice versa
- SOP and POS Expressions (Minterm and Maxterm expressions)
- Canonical form of Boolean expressions and their complements
- Simplifications

B. Software and Languages
(10 Marks)

- Definition of Software

- Programming Languages : Concepts of High Level, Low Level and Assembly language
- Types of Software
- System Software
    - Translator ó compiler, interpreter, assembler
    - Operating systems:
        - Definition and Function
        - Types of OS ó Single User, Multi-user, Multiprogramming, Multiprocessing, Time Sharing
        - Booting (cold and warm), Spooling, Buffering, Concept of Virtual Memory
        - Directory and file Structure, Path and Pathname
        - Concept of GUI, CUI with examples
        - Using MS DOS (Commands and their use ó DIR, MD, RD, CD, COPY, CON, MOVE, REN, DEL, TYPE, MORE, ATTRIB, EDIT, DATE, TIME, CLS)
        - Using MS Windows OS
- Application Software (definition and example)
- Utility Software (definition and example)

C. Programming using Visual Basic
(10 Marks)

- **Introduction to Visual Basic (Version 6 or compatible)**
- **Getting familiar with VB user interface**
    - Standard exe, pull-down menus, toolbar, toolbox, project explorer, properties window, form layout window, form immediate window, opening and closing windows, resizing and moving windows, quitting VB
- **VB Tool Box**
    - Standard window controls, label, textbox, command-button, frame, check-box, option-button, list-box, combo-box, picture box, timer control, shapes
    - Basic properties of controls
- **Programming Fundamentals**
    - Date types in VB (integer, long, single, double, currency, string)
    - Variable and Constants
    - Input / Output operations
    - Control Statements
        - Branching: If-Then-Else, Switch

- Looping: For-Next, While, Do-While
- **Simple problem solving**

D. Word Processing using MS Word
(MS Office 2007 or compatible)
(10 Marks)

- Introduction to Word Processing
- Creating, Opening, Editing and Saving a document
- Copy, Cut, Paste operations
- Page Setup, Headers and Footers
- Formatting Texts, Paragraph, Page Borders
- Inserting Clip-Art, Word-Art, Auto-Shapes, Picture, Symbol, Equation
- Table insertion
- Mail Merge
- Macros
- Spelling and Grammar check
- Printer Setup and Document Printing

E. Word Processing using MS Word
(MS Office 2007 or compatible)
(10 Marks)

- Introduction of PowerPoint
- Creating, Opening, Editing and Saving a PowerPoint presentation
- Use of Wizards
- Different styles and background
- Formatting Texts
- Inserting Clip-Art, Word-Art, Auto-Shapes, Picture
- Applying slide-transition, applying animation to text and objects
- Inserting sound and video-clips
- Slide Show
- Printing of slides

F. Practical
(30 Marks)

- **One program on Visual Basic**   **(10 Marks)**
- **Laboratory Copy (Minimum 10 programs)**   **(5 Marks)**
  - **(Suggestive programs on VB are given below)**
    - To display a message using Label, Textbook, Message Dialogue
    - To concatenate two text entries and display

- To perform a simple arithmetic operation (+,-,*,/) and display the result in message dialogue or textbox
- To make simple decision making (IF statement) solution and display relevant message (example: problems related to eligibility for a given value of age, profit/loss messages for given values of cost price and sale price, grade display for given values of marks of students etc.)
- To create a simple GUI application to perform both arithmetic and logical operations together (Total, Average, Grade calculation of given set of marks, salary calculations on different criteria)
- To create a simple GUI application to perform an operation based on the criteria input by the user in a checkbox/radio button
  (ex1: Find the discount of an item on the basis of category of item [electrical appliance / electronic gadget/stationery specified using a radio button] and its cost [below 1000/above 1000/equal 1000 specified using radio button])
  (ex2: Calculate the incentive of a sales person on the basis of his sales amount, customer feedback, count of customer specified using checkbox)

- To create a simple GUI application to change the properties of a control based on the selection made by the user.
  (ex1: To change the background/foreground colour of any of the controls of the form based on the colour selected from a list)
  (ex2: To change the background/foreground colour of a label based on the values input/stored in a combo-box)

- Use of MS Word – Same features as in Theory part **(5 Marks)**
- Use of PowerPoint – Same features as in Theory part **(5 Marks)**
- **Viva Voce** **(5 Marks)**

Proposed HS Modern Computer Application Syllabus (2013)

Modern Computer Application (COMA) – Class XII
(Detailed Syllabus)

A. Logic Gate and Combination Circuits   **(15 marks)**

- Logic Gates ó OR, AND, NOT, XOR, X-NOR Gates
- Universal Gates ó NAND and NOR Gate
- Basic gates using Universal Gates
- Two Level Circuits
- Combinational Circuits:
    - Half Adder & Full Adder (definition and representation)
    - Full Adder using Half Adders only
    - Half Subtractor & Full Subtractor (definition and representation)
    - 4 bit Adder and Subtractor Circuit
    - Multiplexer (4x1) and De-multiplexer (1x4)
    - Decoder (Maximum 3 bits), and Encoder (Decimal to Binary, Octal to Binary)

B. Networking   **(20 marks)**

- **Introduction to Networking (Definition, Advantage, Disadvantage, Application)**
    - Analogue and Digital Communication
    - Modes of Communication : Simplex, Half Duplex and Full Duplex Communication
    - Types of Network ó LAN, MAN, WAN
    - Network Architecture : Client Server & Peer-to-Peer Networks
    - Serial and Parallel Communication
    - Bandwidth, Channel Capacity, Baud
    - Synchronous and Asynchronous Transmission Modes
    - Baseband and Broadband Networks

- **Components of a Network**
    - Servers (File server, Communication Server, Print Server) and Workstation
    - NIC
    - Guided Media
        - Cables ó UTP, STP, Co-axial, Fibre Optic
    - Unguided Media
        - Infrared, Radio & Microwave Communication, Satellite
    - Network Operating System ó Characteristics

- **Network Topologies -**
    - Bus
    - Rind

- o Star

- **Network Connecting Devices –**
  - o Hub
  - o Repeater
  - o Bridge
  - o Switch
  - o Router
  - o Gateways

- **LAN Protocols**
  - o Ethernet (CSMA / CD) and Token Ring Protocol

- **Switching Technique**
  - o Circuit, Message and Packet Switching

- **Use of MODEM**

- **TCP / IP Protocols - TCP, IP, UDP, FTP, HTTP, TELNET**

- **IP Addressing**
  - o Class A, Class B, Class C IP address

- **Domain Name System**

- **URL**

- **Introduction to Internet**
  - o Basic requirement for connecting to the Internet, ISP
  - o Services provided by Internet ó www, browser, e-mail, search engine, social networking
  - o Networking Security ó Computer Virus, Concept of Firewall, Password
- HTML
  - o Basic Page Design, Using Ordered and Unordered Lists, Using Image, Hyperlinking, Using Tables

C. Database Management System   **(15 marks)**

- **Introduction of Database :**
  - o Definition of Database
  - o Advantage and disadvantages of DBMS
  - o Database Languages (DDL, DML, DCL)
  - o Data Dictionary, Metadata
  - o Database Schema and Instance
  - o DBMS and its components

- o Various Data Models ó ER Model, Hierarchical Model, Network Model, Relational Model (only concepts)
- o Different Database Users
- o Functions of DBA

- **Relational Model**
  - o Concept of Relation, Topple, Attribute, Domain, Degree, Cardinality
  - o Concept of Keys ó Key, Super Key, Candidate Key, Primary Key, Alternate Key
  - o Concept of Relationships ó 1:1, 1:N, N:M relationships
  - o Database Constraints ó Equity Integrity Constraint, Domain Constraint, Referential Integrity Constraint and Concept of Foreign Key

- **Relational Algebra**
  - o Selection Operation
  - o Projection Operation
  - o Set Operation
  - o Cartesian Product
  - o Natural Join Operation

- **SQL**
  - o Simple SELECT Queries (SELECT, FROM, WHERE, DISTINCT, AND, OR, IN, NOT IN, BETWEEN, LIKE, ORDER BY)

D. Introduction to Spread Sheet – (MS Office 2007 or compatible)   (10 marks)

- Introduction to Excel
- Concept of Workbook, Worksheet, Row, Column, Cell
- Creating Opening, Editing, Saving a Workbook
- Changing Row and Column widths
- Formatting cells
- Different data types in Excel
- Entering labels and values
- Use of following inbuilt functions only ó SUM, PRODUCT, AVERAGE, MAX, MIN, ROUND, COUNT, COUNTIF, IF, AND, OR, NOT, DATE, TIME, NOW, CONCATENATE, UPPER, LOWER
- Copying Cells ó Relative, Absolute and Mixed Referencing
- Making calculations and re-calculations
- Auto fill, Fill with series
- Conditional Formatting
- Sorting and Filtering Data (use of Auto Filter)
- Goal Seek
- Hiding Rows and Columns
- Use of Macros
- Creating Line Diagrams, Pie Charts, Bar Graphs

E. Using MS Access (MS Office 2007 or compatible)   (10 marks)

- Introduction to Access
- Table creating using Design View and Wizard
- Different data types in Access
- Manipulation of data using Access facilities ó Inserting, Updating, Deleting data
- Creating Relationships between Tables
- Form creation using Wizard, Auto Form
- Query generation using Design View
- Report generation using Wizard, Auto Report

E. Practical   (30 marks)

- **Using MS Excel and Access   (10 marks)**
- **Web Page design using HTML   (5 marks)**
- **Project Work (two projects)   (10 marks)**
  - **Suggestive Topics:**
    - Application of Excel:
      - Using Excel creation of Mark Sheet, Balance Sheet, Monthly / Yearly Expenditure, Reports
    - Web page designing using HTML (minimum 5 linked pages)
      - Travel and Tourism
      - Festivals
      - Book Catalogue
      - Pollution and pollution control
    - Viva Voce   **(5 marks)**