**"This isn't an official syllabus, just made by your mates for the preparation of the exam"**

**(It is not completed yet, you can comment for addition in this Document)**

**Self Study:**

Binary files (basic commands like open, read, write…)

**Sorting/searching:**

-Linear search  
-Linked list -Binary search tree (left subtree, right subtree, leaf note)

Application of binary tree

-Tree traversing method (in order, pre-order, post-order)  
-Application of trees (Huffman tree “without coding”)

-Stacks (precedence of operators)

-circular linked list

**Compilers and interpreters:**

* Generation of programming languages
* interpreter
* Visual environment

**Database:**

-Database engine  
Reason to make Database Management System.  
Relational DBMS  
-SQL basics (create, insert, values, use, select, update, delete, aggregate, avg, min, max, order by, group by)

**Theoretical perspective of computing:**  
Finite state machines

Finite-state diagram  
Turing Machines

**Others:**

-Firm ware  
-Power on self test (POST)

-Pointers

-Registers

-Device Drivers

-Peripheral Devices

-parity checks(even & odd parity)

-floating point numbers

-odd parity generator (fsm)

-finite automata

-boot process

-linear programming/ operations research

-documentation

-Bit operators

**Practical:  
-Gauss Jordan  
-**Binary search  
-Calculating the frequency of characters in .txt file  
-Recursion  
-Modules

**Business Programming:**

* Decision making systems
* Decision support systems
* Cost minimizing function
* Simplex method
* Graphical method
* Big O method
* Augmented matrix
* Tableau

**Artificial Intelligence :**

Computer vision

Smoothing

Edge detection

Feature vectors

Domain expert

Knowledge base

Speech analysis

Knowledge based systems

Expert systems

Production rules

Antecedent

Consequent

Inference engine

Data driven approach

Goal driven approach

Knowledge engineers

**Image Analysis (AI) :**

Low level modules

Meta data

BMP file format

Chromatic colors

Pigmented colors

Header info

File formats

Pallette

Lossy compression

Lossless compression

File formats + their compressions

3 x 3 matrix

Brightness = blue

Contrast = red

Objects detection = grayscale

Convolution kernels

Invert filter

Gaussian Blur Mask (for smoothing)

Normalization factor of blur/sharpen

Sharpen

Edge detection through mean removal

High level modules

Feature vectors

Discriminant functions

Region/path/threshold

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**BS Syllabus Outline :**

1. **Modules & packages**
2. **Recursive functions**
3. **Searching & sorting** (linear & selection sort, binary search, external merge sort, quicksort, bubble sort, hashing)
4. **Data structures** (linked list, array, stack, tree, graph)
5. **Languages & compilers** (grammar types, grammar notation)
6. **Artificial intelligence** (knowledge based systems, artificial neural network)
7. **Theoretical perspectives of computing** (state machines, querying machines )

**Practical :**

1. **Oop**
2. **Data base**
3. **Web automation**
4. **Binary files**
5. **Introduction to Software engineering**

**ICS: Introduction to Computer Science**

Practical :

* Gauss Jordan
* Calculating the frequency of characters in .txt file
* Binary files (basic commands like open, read, write…)
* Modules and packages

Data structures + searching +sorting:

* Linear search
* Linear sort
* Selection sort
* Binary search
* External merge sort
* Quicksort
* Bubble sort
* Hashing
* Linked list
* Infix ,postfix etc
* Binary search tree
* Tree traversing
* Huffman tree
* Stacks
* Circular linked list
* Trees

Compilers and languages:

* Generation of programming languages
* How are compilers made
* Interpreter
* Visual environment
* Grammar types & notation

Recursive functions:

* Factorial
* Power

Theoretical perspectives :

* Finite state machines
* Finite state diagram
* Turing Machines

Database:

* Database engine
* Reason to make Database Management System.  
  Relational DBMS
* SQL basics (create, insert, values, use, select, update, delete, aggregate, avg, min, max, order by, group by)

Business programming:

* decision making systems
* Decision support systems
* Cost minimizing function
* Simplex method
* Graphical method
* Augmented matrix
* Tableau

Artificial Intelligence:

* Computer vision/image analysis
* Knowledge base
* Knowledge based systems
* Expert systems
* Production rules
* Antecedent /Consequent
* Inference engine
* Data driven approach
* Goal driven approach

Other stuff:

* Firmware
* Power on self test (POST)
* Pointers
* Registers
* Device Drivers
* Peripheral Devices
* parity checks(even & odd parity)
* floating point numbers
* odd parity generator (FSM)
* finite automata
* boot process
* Bit operators