# GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. - Electronics & Communication Engineering
(VLSI &Embedded Systems Design)
**Semester: I**

Subject Name**: Advanced Computer Programming (Elective – I)**
Subject Code: **715204**

## Objective:

The study of data structures, algorithms, programming languages, compilers and operating systems.In the process of the laboratory work it is necessary to use and study standard programming, compilation and debugging tools.

## Lectures:

**Topic 1 - Introduction**

Basic concepts of programming, data structures, algorithms, compilers, operating systems. Basics of Linux operating system usage and scripts in shell/perl languages.

**Topic 2 - C language re-cap**

Recap of C language programming and commonly used constructs.
Use of gcc and gdb.

**Topic 3 - Data structures and Algorithms**

Data types, records/structures, arrays, linked lists, trees and graphs. Databases, Sort, search and traversal algorithms. Computing efficiency. P and NP computational problems.

**Topic 4 - Programming languages and compilers**

Regular expressions, LR(k) grammars, BNF grammars. Lex and Yacc. Compiler internals.

**Topic 5 - Operating Systems**

Basics of Operating systems and h/w-s/w interface. Study of Linux, Windows, Symbian. Device drivers. Scheduling and resource management.

## Labs:

Tools used during laboratory works: Linux, Perl, Gcc,Gdb.

- Study and implementation of Linux and Perl
- Study and implementation of Gcc and Gdb
- Study and implementation of data structures
- Study and implementation of algorithms
- Study and implementation of compilers
- Study and implementation of operating systems

## Course Project:

A project of suitable complexity, comprising of program design, coding, compilation and debug must be completed.

## Course Material:

The field of VLSI and Embedded Systems is getting updated constantly and to keep up to date with the latest research, technology and industry trends, Instructor for this course will decide and provide the course material. This could be a combination of slides or research material or text book references or any other relevant documentation depending on a) the nature of the curriculum and b) relevant skills to be imparted as outcome of the course.

## Reference Books:


1. C Programming Language (2nd Edition) by Brian W. Kernighan and Dennis M. Ritchie
2. Alfred V. Aho, John Hopcroft, Jeffrey D. Ullman: Data Structures and Algorithms. Addison-Wesley 1986,
3. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman: Compilers: Princiles, Techniques, and Tools. Addison-Wesley 1986
4. Modern Operating Systems (3rd Edition) by Andrew S. Tanenbaum