**CSC 2100 Data Structures and Algorithms**

(a) Description

The course gives students a firm foundation of data structures and algorithms. The course trains students on systematic development and analysis of algorithms. The importance of algorithm complexity on computer performance is emphasized. Typical computational problems and their solutions/analysis are to be covered.

(b) Aims

The aims of the course are to

*•* Make students appreciate the role of data structures and algorithms in computer programs;

*•* Improve students’ problem solving skills by subjecting them to step by step analysis and design of computer algorithms;

*•* Introduce students to concepts Data structures;

*•* Introduce students to concepts of algorithm analysis;

*•* To expose students generic algorithmic problems and apply them to other computational scenarios.

(c) Teaching and Learning pattern

The teaching pattern is by lecture, practical lab work, group discussion and class presentations.

(d) Indicative content

*•* Complexity analysis (Big-O notation, orders of growth, worst case, average case and amortized analysis);

*•* NP-complete problems;

*•* Greedy algorithms;

*•* Dynamic programming;

*•* Design patterns for data structures;

*•* Graphical representation of optimization problems

*•* Parallel algorithms.

*•* Sorting and searching;

*•* Divide-and-conquer algorithms;

*•* Elementary data structures;

*•* Recursive data structures (stacks, queues,linked lists, trees);

*•* Storing and searching (hash tables, search trees);

*•* Graph algorithms on graphs (shortest path, spanning trees).

(e) Assessment method

The assessment will be done by tests/assignment (40%) and final ex- amination (60%)

(f ) Reading List

(i) Data Structures and Algorithms by Alfred V. Aho, Jeffrey D.

Ullman, John E. Hopcroft. Addison-Wesley, 1983

(ii) The Design and Analysis of Computer Algorithms by Alfred V.

Aho, Addison-Wesley Longman, 1974

(iii) Introduction to Algorithms 2nd Ed by Thomas H. Cormen, Charles

E. Leiserson, Ronald L. Rivest, and Clifford Stein, McGraw-Hill,

2008