**CSC 1105 Numerical Methods**

(a) Description

The course is to sharpen the students’ skills in using numerical ap- proaches to solve mathematical/real life problems. The focus will be on the ability to correctly formulate numerical problems and schemes that solve them. Emphasis will be put on the precision and robustness of the schemes.

(b) Aims

The aims of the course are

*•* To provide a solid basis on the numerical approaches to computa- tional problem solving;

*•* To provide students with problem analysis and solving skills to be able to handle typical computational problems in practice.

(c) Learning Outcomes

By the end of the course, the student should be able to

*•* Derive schemes for different set ups of numerical problems

*•* Test for convergence of different schemes

*•* Correctly use the schemes to generate solutions to the numerical problems to the required precision

(d) Teaching and Learning Pattern

The course will be taught theoretically. The developed schemes can be implemented and run in any programming language.

(e) Indicative Content

*•* Numerical solutions to non linear equations;

*•* Numerical solutions for systems of linear equations;

*•* Fast - Fourier transforms;

*•* Numerical differentiation;

*•* Numerical integration;

*•* Numerical solutions for differential and difference equations.

(f ) Assessment method

At least 2 (1 hour) tests and 1 assignment (40%) One 3-hour examination (60%)

(g) Reading lists

(i) Numerical Analysis by Richard L. Burden and J. Douglas Faires, Wardsworth, 1993.

(ii) A.K. Kaw, E.E.Kalu and D.Nguyen(2008) Numerical Methods with applications.