Course Title and Code	MATH317 - Numerical Methods

VI. Course Identification and General Information:

Course Title	Numerical Methods	Course Code	MATH317	Pre-requisite	MATH116
Department	Computer Science	Course Level	8	Credit Hours	3 (3+0)

VII. Course Description/Topics: The following course topics will be covered.

- Errors in Computation
- Taylor Series representation of a function
- Representation of Numbers
- Finding Roots of Equations
- Interpolation
- Numerical Integration
- Systems of equations
- Splines for curve fitting
- Multiple integration: double and triple integrals; applications
- Vector fields; gradient, divergence, curl, and the del operator

VIII. Course Outcomes: Summary of the main learning outcomes for students enrolled in the course.

Upon completion of this course, students will be able to :
- Explain the role of and the limitations of the computer in solving mathematical and engineering problems.
- Implement mathematical algorithms to:
        Evaluate functions
        Find approximate roots of equations
        Solve systems of linear equations
        Perform numerical differentiation and integration
        Fit a curve to a set of data.
- Discuss selected numerical algorithms for solving a variety of commonly encountered mathematical problems.
- Analyze a computation for error and discuss the types and sources of errors involved.
- Explain how error accumulates and discuss the errors inherent in using standard floating point numbers.

IX. Required Text:

- Cheney & Kincaid, Numerical Mathematics and Computing, 7 Edition, Brooks/Cole 678 pages, 2012. ISBN-13: 978-1-133-10371-4

X. References:

- Gerald, Applied Numerical Analysis, Pearson Education, 2007, 624 pages, ISBN-13: 9788131717400