THE UNIVERSITY OF NORTH CAROLINA AT ASHEVILLE

FACULTY SENATE

Senate Document Number   2912S

Date of Senate Approval   02/09/12

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Statement of Faculty Senate Action:

APC Document 19:   **Delete MATH 341, Replace with MATH 441**
                                          Delete CSCI 381, Replace with CSCI 441

Effective Date: Fall 2012

1. **Delete**:   On page 220, the entry for **MATH 341, Numerical Analysis:**

    341   Numerical Analysis (CSCI 381) (3)
            Methods for numerically solving mathematical problems: polynomial
            approximation, approximation theory, numerical differentiation and integration,
            numerical methods in matrix algebra and differential equations, numerical
            solution of non-linear equations. Prerequisites: MATH 291; proficiency in any
            programming language; or permission of instructor. Even years Spring.

    Add: On page 221 new course, **MATH 441, Numerical Analysis**:

    441   Numerical Analysis (CSCI 441) (3)
            The theory and methods behind solving mathematical problems numerically.
            Topics include polynomial approximation, numerical integration, matrix algebra,
            solutions to systems of non-linear equations and numerical solutions to
            differential equations. Prerequisites: MATH 365 or permission of instructor. Even
            years Spring.

2. **Delete**:   On page 112, the entry for **CSCI 381, Numerical Analysis:**

    381   Numerical Analysis (MATH 341) (3)
            Methods for numerically solving mathematical problems, polynomial
            approximation, approximation theory, numerical differentiation and integration,
            numerical methods in matrix algebra and differential equations, numerical
            solution of non-linear equations. Prerequisites: MATH 291; proficiency in any
            programming language; or permission of instructor. Odd years Fall.

Add: On page 113, renumbered course, **CSCI 441, Numerical Analysis:**

441   Numerical Analysis (MATH 441) (3)
The theory and methods behind solving mathematical problems numerically. Topics include polynomial approximation, numerical integration, matrix algebra, solutions to systems of non-linear equations and numerical solutions to differential equations. Prerequisites: MATH 365 or permission of instructor. Even years Spring.

Impact Statement:
The department offers MATH 365 frequently, and many students take this class early, thus most students interested in Numerical Analysis will have had the prerequisites. This change will not have major resource implications.

Rationale:
The main change in this description is the new prerequisite. This change raises the expectations of this class and will give students a stronger background in applied mathematics. Since many of the traditional topics of this class: polynomial approximation, solutions to systems of non-linear equations, and numerical solutions to differential equations, require basic knowledge of Linear Algebra, students will be better prepared for class.

A second change is a drop in the programming requirement. Most of the computer work in this class will be done with a higher powered language like Matlab or Mathematica, as opposed to Fortran or C++. (NOTE: Prior to 1982 the department offered a similar course, with similar prerequisites called Numerical Linear Algebra. This proposed restructured class, has many of the same topics, thus we are using the same course number, Math 441.)

This catalogue change is part of a restructuring of UNC Asheville's applied mathematics concentration. MATH 441 will be one option that students can choose as a course sequence.

The rationale for changing the number of numerical analysis to the 400 level has multiple reasons. First, since we have added a 300 level prerequisite it seems appropriate that a subsequent course has a higher number. Second, since we are now teaching a course similar to one in the past it seems appropriate we maintain the traditional number. Finally, we are increasing the complexity of the material and expect students in this class to have a high degree of mathematical sophistication, and the course number should reflect this.