1. **Course**: CSCI 1113 - Introduction to C/C++ Programming for Scientists and Engineers

2. **Workload**: 4 Credits, 7 contact hours/week

3. **Coordinator**: Phil Barry

4. **Textbook and other materials**:  

5. **Specific course information**  
   a. **Catalog Description**: Programming for scientists/engineers. C/C++ programming constructs, object-oriented programming, software development, fundamental numerical techniques. Exercises/examples from various scientific fields.  
   b. **Prerequisites**:  
      i. Calculus I concurrently (MATH 1371)  
   c. **Role in Program**: required

6. **Specific goals for the course**  
   a. **Course Outcomes**:  
      i. write good C++ code,  
      ii. use good program design techniques and programming style in the code you write,  
      iii. analyze problems and design a programming solution to them,  
      iv. Use numerical techniques such as numerical root finding and matrix manipulation in solving scientific and engineering problems.  
   b. **Criterion 3 Outcomes and Program Criteria**:  
      i. (1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

7. **Topics**:  
   - Computers, Algorithms, Programs, Compilers  
   - Variables, Expressions, Declaration statements, Assignment, Console I/O  
   - Objects, Functions, Streams, Files  
   - Boolean expressions, Selection  
   - Iteration, Nested Loops, Arrays  
   - Arrays Data Representation, Memory  
   - Aggregate Objects, Function Overloading  
   - User-defined Objects, Classes  
   - Constructors  
   - Operator Overloading, Friend functions, References, Const.  
   - Pointers and Dynamic Arrays  
   - Inheritance  
   - Polymorphism, Templates, Iterators  
   - Standard template, Library