

## **CE 201 Civil Engineering Computing Spring 2007**

### **Final Project: Numerical Modeling of a Civil & Environmental Engineering Application**

The final program may be written by pairs of students. Choose one of these options:

1. Create a VB/VBA program that calculates the deflection and moment along a beam of given material properties and length with any combination of distributed load  $q(x)$ , point loads, and end conditions (fixed, pinned, and free). The program should plot the deflection and moment, and create a tabular output file
2. Create a VB/VBA program that routes a hydrograph through an asymmetrical trapezoidal detention pond of any base dimensions and side slopes with capability of simulating a dual-level weir outlet structure or orifice-weir outlet structure of user-specified dimensions. The program should plot the input and output hydrographs, print out maximum outflow, maximum stage height, percent peak flow reduction, and create a tabular output file
3. Create a VB/VBA program that solves any problem of interest in your particular area of your research (Excel, independent study, or honors) using numerical methods with graphical output.

Whichever option you choose, your final product must include:

- a user-friendly, professional-looking graphical interface with software title and authors
- user flexibility with no hard-coded parameter values or file names
- a written instruction guide discussing: the theoretical basis of the program, how the equations are approximated numerically\*, an illustrative example with screenshots showing how to set up the inputs and run the program\*, program limitations, and reference list (do not scan material from class notes without citing the source)

\* very important components!

#### **Due Dates**

Wed, March 21: Brief progress memo with draft of code or user's guide attached  
Fri, March 23: Final program (.vbp, .frm, and .exe files) and user's guide

#### **Grading**

The program and the user's guide have equal weighting (12.5% of your final grade each)