

Department: Civil Engineering
Course Number: CE6332/5332
Title: Modern Methods in Engineering Computation

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class BigFile:
    def __init__(self, datadir, ndims):
        idfile = os.path.join(datadir, "id.txt")
        self.names = [x.strip() for x in str.split(open(idfile).read()) if x.strip()]
        self.name2index = dict(zip(self.names, range(len(self.names))))
        self.ndims = ndims
        self.featurefile = os.path.join(datadir, "feature.bin")
        self.features, self.dimensions = load(self.names, self.ndims)
        print "[BigFile] %d features, %d dimensions" % (len(self.names), self.ndims)
        print "      binary: %s" % self.featurefile
        print "      txt: %s" % idfile
    def read(self, requested, isname=True):
        if isname:
            index_name_array = [(self.name2index[x], x) for x in requested if x in self.names]
        else:
            assert(min(requested) == 0)
            assert(max(requested) < len(self.names))
            index_name_array = [(x, self.names[x]) for x in requested]
        index_name_array.sort()
        vecs = seq_read(self.featurefile, self.ndims, [x[0] for x in index_name_array])
        return [x[i] for x in index_name_array], vecs
    def show(self):
        print len(self.names), self.ndims
  
```

Textbook: No textbook is required

Topics:

Implementation of numerical methods to the solution of various engineering & research problems of medium to high complexity requiring the implementation of numerical methods including:

- Linear Algebra
- Eigenvalues and Eigenvectors
- Curve Fitting
- Root Finding
- Optimization
- Differentiation and Integration
- Ordinary Differential Equations
- Others

Course Objectives:

The objective of this course is to provide students with the basic numerical analysis and programming skills that are critical to the development of a successful research project.

Class Schedule:

The course will be project-based, and no regular lectures will take place. Students will schedule individual meetings with the instructor to present each project at pre-determined windows of time. Details will be given in BlackBoard.

Projects:

Between five and seven projects will be assigned during class requiring the numerical solution of engineering/research problems using Python. The numerical solutions (programs/code) must be developed individually although interaction and discussion with other classmates is acceptable and encouraged.

Grades:

Projects 100%

Policy on Cheating

Students are expected to be above reproach in all scholastic activities. Students who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the university. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student, or the attempt to commit such acts. The Department of Civil Engineering has established the Honor Code because it has an obligation to the State and the public to prevent students from entering the profession who are not honest and trustworthy in their academic efforts. This Honor Code Policy allows the Department to recommend disciplinary action to the University Student Conduct Office and to remove students from the Department who have violated the Honor Code. This Honor Code is consistent with the *Student Conduct and Discipline* Chapter of the *Student Affairs* Section of the *Handbook of Operating Procedures* of the University of Texas at El Paso.

All students should sign the Honor Code Agreement and submitted to the Civil Engineering office for record keeping and be deeply familiar with the Honor Code Policy published in our website: <http://ce.utep.edu/honorcode.htm>