Course Number: CEMS 300/400

Department: CEMS (Ceramics/Materials Engineering)

Course Title: Special Topic: A brief introduction to using matrix routines via Xcode

Course Designation: elective course

Catalog Description: Course activities will focus on the use of specific LAPACK routines and custom algorithms for matrix calculations involving C with Apple Xcode. Xcode installation, basic editor operation, and simple example routines will be demonstrated utilizing the Accelerate Framework (for high performance work). Students will create and test their sample code with reference to the class examples. Hardware and software requirements: a Mac computer with the latest operating system (as of this writing OS 10.9).

Prerequisites: none

Credit Hours: 3 credits, lecture/studio type

Semester/Year: Allen Term 2014/15

Course days, time, duration: TBD

Class location: Distance Learning

Instructor name/title: William Carlson, Professor

Office location: 352D McMahon

Office hours: TBA

E-mail address: carlson@alfred.edu

Website URL: http://mechanics.alfred.edu/ note: class is the official source of information

Course Outcomes (proposed): related to ABET (Accreditation Board for Engineering and Technology) criteria for meeting program outcomes: a, e, and k:
Outcome a: "an ability to apply knowledge of mathematics, science, and engineering"
Outcome e: "an ability to identify, formulate, and solve engineering problems"
Outcome k: "an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice"
Relationship of course to program outcomes:
a. introduction to the knowledge of mathematics (algebra, matrices).
e. efforts to formulate matrix approaches to problems (research) and solve (‘templates’) engineering problems
k. introduction to techniques (calling routines) and tools (C and algorithms) for engineering practice

Contribution of course to meeting curriculum requirements:
1. develops student calculation skills
2. introduction of basic concepts of engineering and quantification of problems.

Required reading: Selected readings for C, LAPACK, and Accelerate topics
Other resources: on-line resources as per faculty selection

Course Outline:
1) Linear Algebra, data manipulation, and matrix calculations
2) Installation of Xcode and IDE environment
3) C and algorithm development
4) LAPACK, BLAS
5) Accelerate software (enhanced cales w/CPUs and GPUs)
6) example algorithms for matrix solutions
7) custom algorithm development

Required Materials/Supplies: n/a

Assessment Methods: homework assignments, project(s)
Due dates: will be assigned in class
Grading: assessment weighting: homework 50%, project(s) 50%
process: total points in each assessment method is weighted, assessments summed, and the total is used to evaluate the grade.

Attendance Policy: attendance is mandatory, except illness with excuse. Advanced notification of professor is required for an excused activity.
Laboratory safety: n/a
Make-up policy: illness with excuse and religious holiday.
Late work policy: all work is to be completed as scheduled. Late work will be penalized.

Extra credit policy: n/a

Laboratory hours: n/a

Academic misconduct policy: refer to AU Policy 700 on Academic Dishonesty: 
http://my.alfred.edu/index.cfm/fuseaction/academic_policies.academic_regulation_ug.cfm