

# IT Curriculum Committee

Agenda Summary

Dec. 8, 2009

Full agenda is on the web site: <http://www.aem.umn.edu/~shield/itcc/>

1. Approval of Sept. 22, 2009 meeting Minutes – see web site.
2. Reminder: Meeting Schedule for Spring 2010
  - 2:30 on Tuesday 2010-2-2 in 4-192/4-178 EE/Csci
  - 2:30 on Tuesday 2010-4-20 in 4-192/4-178 EE/Csci
3. Items for Information only (already approved in ECAS):
  - a. See web site.
4. Items for Approval without Objection (already approved in ECAS):
  - a. CE 3101, Computer Applications in Civil Engineering I, description edits
  - b. CE 3102 , Uncertainty and Decision Analysis in Civil Engineering, description edits
  - c. CE 3402, Construction Materials , Course Title Long:
    - i. New: Civil Engineering Materials
    - ii. Old: Construction Materials and description edits
  - d. CE 4121, Computer Applications in Civil Engineering II, description edits
  - e. CE 4311, Rock Mechanics, description edits
  - f. CE 4414 → 5414, Prestressed Concrete Design
  - g. CE 4415 → 5415, Masonry Structures
  - h. CE 4591 → 5591, Environmental Law for Engineers
  - i. GEOE 3301, Soil Mechanics I, description edits
  - j. GEOE 4121, Computer Applications in Civil Engineering II, description edits
  - k. GEOE 4301, Soil Mechanics II, description edits
  - l. GEOE 4311, Rock Mechanics, description edits
  - m. GEOE 4351, Groundwater Mechanics, description edits
  - n. GEOE 4352, Groundwater Modeling, description edits
  - o. GEO 2303W, Geochemical Principles, Credits:
    - i. New: 4 credits
    - ii. Old: 3 credits
  - p. GEO 3202, Description
    - i. New: Fluid Earth Dynamics
    - ii. Old: Geodynamics II: The Fluid Earth
    - iii. Credits: 3 to 4
  - q. HSCI 1714, Technology and Civilization: Stone Tools to Steam Engines ,
    - i. New: 4.0 to 3.0 credit(s)
    - ii. Old: 4.0 to 4.0 credit(s)
  - r. HSCI 3714, Technology and Civilization: Stone Tools to Steam Engines, Credits:
    - i. New: 4.0 to 3.0 credit(s)
    - ii. Old: 4.0 to 4.0 credit(s)
  - s. HSCI 1815, Revolutions in Science: Lavoisier, Darwin, and Einstein , Credits:
    - i. New: 4.0 to 3.0 credit(s)

- ii. Old: 4.0 to 4.0 credit(s)
  - t. HSCI 3815, Revolutions in Science: Lavoisier, Darwin, and Einstein, Credits:
    - i. New: 4.0 to 3.0 credit(s)
    - ii. Old: 4.0 to 4.0 credit(s)
  - u. IOFT 1312, Course Title:
    - i. New: Preparing for Careers in Science and Engineering
    - ii. Old: Exploring Careers in Science and Engineering
    - iii. Credits New: 1.0 to 1.0 credit(s),
    - iv. Old: 2.0 to 2.0 credit(s),
    - v. description edits
  - v. MATH 2243, Linear Algebra and Differential Equations, Prerequisites:
    - i. New: 1272 or 1282 or 1372 or 1572 w/grade of at least C-
    - ii. Old: 1272 or 1282 or 1372 or 1572
  - w. MATH 2263, Multivariable Calculus, Prerequisites:
    - i. New: 1272 or 1372 or 1572 w/grade of at least C-
    - ii. Old: 1272 or 1372 or 1572
  - x. MATH 2373, IT Linear Algebra and Differential Equations Prerequisites:
    - i. New: [1272 or 1282 or 1372 or 1572] w/grade of at least C-, IT
    - ii. Old: [1272 or 1282 or 1372 or 1572], IT
  - y. MATH 2374, IT Multivariable Calculus and Vector Analysis, Prerequisites:
    - i. New: [1272 or 1282 or 1372 or 1572] w/grade of at least C-, IT
    - ii. Old: [1272 or 1282 or 1372 or 1572], IT
  - z. MATH 2283, Sequences, Series, and Foundations, Prerequisites:
    - i. New: & [2243 or 2263 or 2373 or 2374] w/grade of at least C-
    - ii. Old: & [2243 or 2263 or 2373 or 2374]
  - aa. MATH 3283W, Sequences, Series, and Foundations: Writing Intensive, Prerequisites:
    - i. New: & [2243 or 2263 or 2373 or 2374] w/grade of at least C-
    - ii. Old: & [2243 or 2263 or 2373 or 2374]
5. Action Items (new course syllabi are below):
- a. CE 3201, Transportation Engineering, Prerequisites:
    - i. New: Phys 1301, CE 3101 (Computer Applications in Civil Engineering I), CE 3102 (Uncertainty and Decision Analysis in Civil Engineering)
    - ii. Old: Phys 1301
  - b. New Courses: CE 4000H/GEOE 4000H: Honors Research Seminar
  - c. New Courses: CE 4092H/GEOE 4092H: Honors Selected Reading
  - d. New Courses: CE 4094H/GEOE 4094H: Senior Honors Thesis
  - e. New Courses: CE 4194H/GEOE 4194H: Senior Honors Thesis
  - f. New Course: CSCI 2033: Elementary Computational Linear Algebra
  - g. New Course: GEO 2203: Earth Surface Dynamics
  - h. IE 5441: Course Title Long: New: Financial Decision Making Old: Engineering Cost Accounting and Cost Control and description update (tabled past two meetings)
  - i. New Course: IOFT 1313: Exploring Careers in Science and Engineering
  - j. New Course: PHYS 5970: Physics Journal Club
6. New Business
7. Adjourn

## New Courses Syllabi

### **CE/GEOE 4000H** (1 credit)

Students will attend one seminar each week (16 total seminars) and write a half-page summary of the seminar. Acceptable seminars include the Warren Lecture series as well as those offered by the sub-disciplines within Civil Engineering (Environmental, Structural, Transportation, Geomechanics, and Water Resources).

### **CE/GEOE 4092H** (1 credit)

Selected readings and student presentations

### **CE/GEOE 4094H and CE/GEOE 4194H** (2 credits each)

Written thesis under the direction of CE faculty member.

### **CSCI 2033**

Elementary Computational Linear Algebra, 4 credits

Prerequisites: Math 1271 or Math 1371 or #

Goal: While this class covers the fundamentals of linear algebra, it also teaches how the theory and methods answer many fundamental questions in Computer Science and Computer Engineering. The basic algorithms will also be used to introduce the core concepts of operation counting and computational complexity.

Course Description: Matrices and linear transformations, basic theory. Linear vector spaces. Inner product spaces. Systems of linear equations Eigenvalues and singular values. Algorithms and computational matrix methods using MATLAB or similar. Applications with emphasis on the use of matrix methods to solve a variety of computer science problems.

Contact Hours: 3 contact hours of lecture plus a contact hour of recitation

Workload: 2 or 3 midterms. Hands-on recitations with Matlab exercises. Weekly or bi-weekly homeworks.

Students will be expected to read approximately 1 chapter per week, or over two weeks for particularly difficult conceptual material.

Text: *Elementary Linear Algebra with Applications* by B Kolman & D R Hill, 9th edition - Prentice Hall 2008.

or: *Introduction to Linear Algebra* by Gilbert Strang, Cambridge Press 2009

The order of the topics listed below may be changed to match the textbook that is chosen for this class.

Schedule:

Week	Topic
1	Elementary Linear Mappings. Applications in Graphics and Statistics + Graphs and Matrices: Paths and Adjacency Matrix. Pagerank. + Correlations. = Elementary Matlab Programming
2-3	Systems of Linear Equations: Examples. Elementary Solution Methods. + Global Positioning System
4	Theory of Linear Equations: Complexity. Counting.
5-6	Determinants -- Theory. Proofs. + geometry: Volumes. = Matlab: functions, graphical outputs.
7-8	Vector Spaces. Abstract Linear Spaces. Subspaces. Dimensionality
9	Theory of Linear Equations: Existence, Uniqueness.
10-11	Inner Products. Orthogonality. Least Squares. Norms, Condition Numbers, and Numerical Stability. + Data Fitting. = Matlab: advanced data structures.
12	Abstract linear transformations. + Robotics + graphics: Coordinate Transformations
13	Eigenvalues. diagonalization of symmetric matrices.
14-15	+ Singular Value Decomposition. Data Mining. + Principal Component Analysis Image compression. + Non-symmetric Eigenproblems: Markov chains, Pagerank, Recurrences.

notes: + Denotes worked example: a use of matrix method in Computer Sci/Eng.  
= Denotes programming topics presented as part of basic material.

## **I OFT 1312**

Exploring Careers in Science and Engineering (1 Credit)

INSTRUCTOR: Katy Hinz M.Ed., Career Counselor

### **COURSE OBJECTIVES**

- Examine current major/career direction
- Assess interests, values, skills, strengths, and personality preferences to determine careers/work environments in which they may fit
- Investigate careers of interest through primary and secondary resources
- Become knowledgeable about fields within engineering, science, or other industries through informational interviewing and guest speakers
- Understand how your skill set may transfer to other occupations
- Learn techniques for gaining experience in your chosen field
- Create goals related to your career aspirations

## ASSESSMENT FEES (two of \$15)

This course uses four self-assessments to assist you in clarifying your personality, values, skills, strengths, and obstacles in your career path:

### Textbook Information:

To assess and better understand your strengths we will be using the following text which is available in the University of Minnesota Bookstore: *StrengthsFinder 2.0: A New and Upgraded Edition of the Online Test* from Gallup's *Now, Discover Your Strengths* by Tom Rath

### Course Calendar

Date	Topic	Assignment Due
Week 1, Day 1		Introductions, Syllabus, Pre-Test
Week 1, Day 2		Overview of IT Majors & Careers
Week 2, Day 3		Self Assessment & Values      Assessment Money Due
Week 2, Day 4		Career Fair Prep
Week 3, Day 5		Researching Majors & Careers/      MBTI/Strong Informational Interviewing      Attend Career Fair
Week 3, Day 6		MBTI & Strong Interpretation
Week 4, Day 7		Career Panel      Career Fair Reflection Paper
Week 4, Day 8		Strengths & Skills      Strengths Finder      MBTI/Strong Reflection
Week 5, Day 9		Get Experience      Your Network
Week 5, Day 10		Career Panel      Strengths Reflection
Week 6, Day 10		Group Project Presentations
Week 6, Day 11		Group Project Presentations      Informational Interview Paper
Week 7, Day 12		Decision Making/Goal Setting
Week 7, Day 13		Evaluations, Post-Test, Next Steps      Career Action Paper

## **PHYS 5970**

Objective: students learn to read physics papers critically and lead discussions.

Expectation: Students are expected to participate actively in all seminars and lead at least one seminar.

Grade is based on attendance, level of active participation in seminar and preparation for leading assigned seminars.