

CSE Curriculum Committee

Agenda Summary
September 18, 2012

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

1. Approval of January 31, 2012 meeting Minutes – see web site.
2. Meeting Schedule for fall 2012 and spring 2013 – **NOTE room changes**
 - a. 2:30 on Tuesday 2012-12-4 in 105Q Lind
 - b. 2:30 on Tuesday 2013-2-5 in 105Q Lind
 - c. 2:30 on Tuesday 2013-4-23 in 105Q Lind
3. Items for Information only (already approved in ECAS):
 - a. See web site
4. Items for Approval without Objection (already approved in ECAS):
 - a. AEM 4301 – Orbital Mechanics: Minor change to description
 - b. AEM 4495 – Dynamics Problems: Change title to *Aerospace Systems Problems* and to topics course
 - c. BBE 3002 – Introduction to Engineering Design: Renumber to 2002
 - d. BBE 4301 -- Surface and Colloid Science in Bio-based Product Manufacturing: change title to *Applied Surface and Colloid Science* and update description
 - e. BBE 4404 – Biopolymers and Biocomposites Engineering: prerequisites change
 - f. CE 5414 – Prestressed Concrete Design: prerequisites change
 - g. CHEM 1021/1022/1031/1032 – deactivate – NOTE Replaced by 1061/65 1062/66
 - h. CHEM 2301 – Organic Chemistry I: update to prerequisites
 - i. CHEM 4001 – Chemistry of Plant Materials: change title to *Chemistry of Biomass and Biomass Conversion to Fuels and Products*
 - j. CHEM 4301 -- Surface and Colloid Science in Bio-based Products: change title to *Applied Surface and Colloid Science*
 - k. CHEM 4894H – Senior Honors Thesis: NEW COURSE – returned by WI (why not 4894V?)
 - l. EE 3990 – Curricular Practical Training: change in credits
 - m. MATH 5345 – Intro to Topology: conversion to honors course
 - n. ME 4031W – Basic Mechanical Measurements Laboratory: prerequisite change
 - o. PHYS 4303 – Optics and Acoustics: title change to *Electrodynamics and Waves*
5. Action Items (new course syllabi are on separate handouts):
 - a. New course: CE 5543 – Introductory Environmental Fluid Mechanics (see syllabus below)
 - b. Chemistry credit changes (see handout)
 - i. CHEM 4311W – Advanced Organic Chemistry Lab: 2 to 4 credits
 - ii. CHEM 4511W – Advanced Physical Chemistry Lab: 2 to 3 credits
 - iii. CHEM 4711W – Advanced Inorganic Chemistry Lab: 2 to 3 credits
 - c. Material Science credit and number changes (see handout)
 - i. MATS 3801 – Structural Characterization Lab: 3 to 4 credits
 - ii. MATS 3851W – Materials Properties Lab: 3 to 4 credits
 - iii. MATS 4001 – Thermodynamics of Materials: 4 to 3 credits, renumber to 3001
 - iv. MATS 4002 – Mass Transport and Kinetics: 4 to 3 credits, renumber to 3002
 - v. MATS 4013 – Electrical and Magnetic Properties of Materials: renumber to 3013
6. New Business
7. Adjourn

CE 5543: Introductory Environmental Fluid Mechanics 4 credits

Description: Divergence theorem, Convective flux, Mass conservation, Biological reactions, Random walk and diffusive flux, Receptors and channels, Momentum conservation, Navier-Stokes equations, Boundary layer, Chemotaxis, Phototaxis, Shear dispersion, Turbulent flows.

Prerequisites: [CE 3502 or AEM 4201 or ChEn 3005], [CSE major]

Text: Cladophora filament colonized by epiphytic diatom Epithemia in a turbulent flow. Field measurements at the Angelo Coast Range Reserve, CA, Summer 2010. Courtesy of the National Center for Earth-surface Dynamics (P. Furey, A. Hansen, M. Power, and M. Hondzo).

Support material: Multimedia Fluid Mechanics, G.M. Homsy et al., Cambridge University Press, ISBN 978-0-521-72169-1, 2007.

Outline

Week of Topic

September

7 Introduction
12 Scalars, vectors, tensors
14 Divergence theorem, pressure, Archimedes principle
19-21 Convective flux, fluid mass conservation
26-28 Introduction to biological reactions

October

3-5 Random walk and diffusive flux
10-12 Receptors and channels
17-19 Momentum conservation
24-26 Constitutive relation for Newtonian fluid
31 Exam 1

November

2 Navier-Stokes equations
7-9 Boundary layer approximations of the Navier-Stokes equations
14-16 Laminar flows with microorganisms (chemotaxis, phototaxis)
21-23 Shear dispersion
28-30 Introduction to turbulent flows

December

5-7 Introduction to turbulent flows
12 Laboratory experiments (laminar and turbulent flows)
14 Nutrient fluxes to microorganisms in a turbulent flow
16-22 Final exam