

**Minutes of the I.T. Curriculum Committee
December 5, 2005**

Present: J. Carlis (CSCI), C. Clanton (BAE), C. Cramer (Chem), D. Frank (Math&Chair), Eman Haidari (ITSB), B. He (BME), P. Hudleston (ITSA), T.J. Jones (Astro), Ann Pineles (ITLD), S. Ramaswamy (BP), D. Shores (CEMS), J. Stout (Geo/Geophysics), P. Strykowski (ME),

Guest: D. Gupta (ME) presented info on the IE courses.

- 1) Minutes of September 19, 2005 were approved. However, J. Labuz (CE) later pointed out that alterations he had requested after the 9/19/05 meeting were not reflected in the minutes of that meeting. In particular, the change to CE 4413 should be withdrawn and Prestressed Concrete Design (old number CE 5412) should be renumbered 4414.
- 2) D. Gupta described a new Systems Engineering track within IE. The need for this track had been recognized by local industry. Several new courses were approved. See below.
- 3) Several program changes were discussed and approved. See below.
- 4) Actions on courses were taken; see chart below

(shaded items for information only)

In red – comments from a previous meeting or provisional approval

CP = Catalog Prerequisite

EP = Enforced Prerequisite

Course	Title	Current	Proposed	Approved/ Comments
AEM 5441	Structural Dynamics	Frequency and time domain analysis of multi-degree of freedom mechanical systems. Natural frequencies, normal modes of vibration. Free and forced vibrations of strings, rods, and shafts beams. Introduction to finite elements in structural dynamics. Design project. CP: 3031, 4301, [grad student or IT upper div]	Frequency and time domain analysis of multi-degree of freedom mechanical systems. Natural frequencies, normal modes of vibration. Free and forced vibrations of strings, rods, and shafts beams. Introduction to finite elements in structural dynamics. CP: 2012, 3031, [grad student or IT upper div] Terms most offered: fall	Table
BAE 3013	Engineering Principles of Molecular and Cellular Processes	CP: Biol 1009, [Chem 1022 or & Chem 1022]	CP: Biol 1009, [Chem 1022 or & Chem 1022, Math 1272]	Approved. Add closing bracket after "1022"

Course	Title	Current	Proposed	Approved/ Comments
BAE 4323	Machinery Elements	CP: AEM 2021, AEM 3031, upper div IT	CP: AEM 2021, AEM 3031, [CE 3502 or & CE 3502], upper div IT	Approved. Delete AEM 2021 from CP.
BME 2101	Biomedical Thermodynamics		<p>New Course: 3 cr, Lec; Grade: A-F only</p> <p>An introduction to thermodynamics with an emphasis on biological physics. Topics include: First Law, reversible processes, ideal gas, the Boltzmann distribution, reaction equilibrium, random walks, friction and diffusion in fluids, multi-component systems, Second Law, Helmholtz and Gibbs free energy, Maxwell relations, entropy of mixing, Third Law, free energy and equilibrium, phase equilibria, chemical forces and self-assembly, cooperative transitions in macromolecules, enzymes and molecular machines, machines in membranes, and an introduction to statistical mechanics. Throughout the course there will be a focus on biological molecules, including water, nucleic acids, proteins and membranes. The course will periodically and intensively review key mathematical concepts developed in the prerequisite mathematics courses.</p> <p>CP: Math 2373, Math 2374, Biol 3021, BME 2501 Math 2374, Biol 3021, BME 2501 is a co-requisite of BME 2101</p> <p>EP: Math 2373, Math 2374, Biol 3021, BME 2501 Math 2374, Biol 3021, BME 2501 is a co-requisite of BME 2101</p> <p>To be first offered Spring 2007</p>	Approved. Apparently Biol 3021 should be removed as coreq and replaced with Chem 1022. Also general comment about BME courses: if another course is coreq, need not be listed also as prereq.
BME 2401	Programming for Biomedical Engineers		<p>New Course: 2 cr, Lec; Grade: A-F only</p> <p>An introduction to structured programming relevant for numerical methods used in biomedical engineering. The aim of the course is to develop computer programming skills and logic relevant for numerical methods used for analyzing biomedical signals and solving algebraic and differential equations using Matlab. Topics include: introduction to programming languages, introduction to signal representations, numerical techniques, and scientific programming.</p> <p>CP: Math 1272, Phys 1302 EP: Math 1272, Phys 1302</p> <p>Offered even yrs, first offered fall 2006</p>	Approved.

Course	Title	Current	Proposed	Approved/ Comments
BMEEn 3401	Biomedical Systems Analysis		<p>New Course: 4 cr, Lec; Lab; Grade: A-F only</p> <p>An introduction to quantitative analysis of physiological and biological systems. Topics include: first and second order systems, linear time-invariant discrete and continuous systems, Fourier and Laplace transforms, z-transform, frequency response of systems, A/D conversion, sampling, systems classification, systems identification, introduction to linear control theory, PID control, and controller synthesis. Biological examples will be given of electrical, mechanical, thermal and chemical systems, as well as biomedical control systems. An integrated laboratory will consist of systems analysis and controlled systems. Lab modules shall include frequency analysis of linear time-invariant systems, physiological systems classification, and biomedical PID controlled systems.</p> <p>CP: BMEEn 3201, BMEEn 3101 EP: BMEEn 3201, BMEEn 3101 BMEEn 3101 is a co-requisite of BMEEn 3401 Offered odd yrs, first offered spring 2007</p>	Approved. Offered every year.
BME 5910	Special Topics in Biomedical Engineering	1-4 cr	<p>2 cr.</p> <p>Is the intent to change this to a 2 credit course only (or is it just one topic that will be two credits?)</p>	Withdrawn.
Chem 3501	Introduction to Thermodynamics, Kinetics and Statistical Mechanics	Old Title: Physical Chemistry I	New Title: Introduction to Thermodynamics, Kinetics and Statistical Mechanics	Approved. Prov. Approval 5/26/05
Chem 3502	Introduction to Quantum Mechanics and Spectroscopy	Old Title: Physical Chemistry II	New Title: Introduction to Quantum Mechanics and Spectroscopy	Prov. Approval 5/26/05
Chem 4001	Chemistry of Plant Materials		<p>New Course: 3 cr, A-F or Audit Grade Base, Lect,</p> <p>Chemical principles underlying structure, properties, processing, and performance of plant materials.</p> <p>CP: [[1002 or WPS 1301], Chem 2301, Chem 2302] or #</p> <p>Note: this is Chem version of BP 4001, with which it is cross-listed. Eff. Date Fall 2006</p>	Approved. Prov. Approval 5/26/05
Chem 4011	Mechanisms of Chemical Reactions	Chem 5011	Chem 4011, Eff Fall 2006	Approved.
Chem 4031	Computational Chemistry	Chem 5021	Chem 4021	Approved.

Course	Title	Current	Proposed	Approved/ Comments
Chem 4066	Chemistry of Industry	Chem 5311	Chem 4066	Approved.
Chem 4201	Materials Chemistry	Chem 5201	Chem 4201	Approved.
Chem 4221	Introduction to Polymer Chemistry	Chem 5221	Chem 4221	Approved.
Chem 4223W	Polymer Laboratory	Chem 5223W	Chem 4223W	Approved.
Chem 4301	Surface and Colloid Science in Bio-based Products Manufacturing		New Course: 3 cr, Stdnt Opt Grade Base, Lect, Principles of surface/colloid science, their application to understanding manufacturing/performance of bio-based products. CP: Chem 3501, ME 3321 Equiv: BP 4301 Note: This course is being added only to be crosslisted with BP 4301	Approved. Prov. Approval 11/21/05
Chem 4321	Organic Synthesis	Chem 5321	Chem 4321	Approved.
Chem 4322	Advanced Organic Chemistry	Chem 5322	Chem 4322	Approved.
Chem 4352	Physical Organic Chemistry	Chem 5352	Chem 4352	Approved.
Chem 4361	Interpretation of Organic Spectra	Chem 5361	Chem 4361	Approved.
Chem 4412	Chemical Biology of Enzymes	Chem 5412	Chem 4412	Approved.
Chem 4413	Nucleic Acids	Chem 5413	Chem 4413	Approved.
Chem 4715	Physical Inorganic Chemistry	Chem 5715	Chem 4715	Approved.

Course	Title	Current	Proposed	Approved/ Comments
Chem 4725	Organometallic Chemistry	Chem 5725	Chem 4725	Approved.
Chem 4735	Bioinorganic Chemistry	Chem 5735	Chem 4735	Approved.
Chem 4745	Advanced Inorganic Chemistry	Chem 5745	Chem 4745	Approved.
Chem 5501	Introduction to Thermodynamics, Kinetics and Statistical Mechanics	Chem 4501 Physical Chemistry I	Chem 5501	Approved.
Chem 5502	Introduction to Quantum Mechanics and Spectroscopy	Chem 4502 Physical Chemistry II	Chem 5502	Approved.
EE 5333	Analog Integrated Circuit Design	3 cr, 3 Contact Hours Fundamental circuits for analog signal processing. Design issues associated with MOS/BJT devices. Design/testing of circuits. Selected topics (e.g., modeling of basic IC components, design of operational amplifier or comparator or analog sampled-data circuit filter). CP: [3115, IT grad student] or ?	4 cr, 4 Contact Hours Fundamental circuits for analog signal processing. Design issues associated with MOS/BJT devices. Design/testing of circuits. Selected topics (e.g., modeling of basic IC components, design of operational amplifier or comparator or analog sampled-data circuit filter). Project design and simulation required CP: [3115, IT grad student] or instructor consent	Tabled
EE 5583	Error Control Coding		New Course: 3 cr, Stdnt Opt Grade Base, Lect Error correcting codes; concepts, properties, polynomial representation. BCH, Golay, Reed-Muller & Reed-Solomon Codes. Convolutional codes. Iterative codes. CP: EE 3025; Math 2373 or equiv. IT grad or dept consent EP: EE grad or CompE grad major	Tabled
Geo 1007	Geobiology: Origin and Evolution of Life on Earth		New Course: 4 cr, Stdnt Opt Grade Base, Lect, Lab Geobiology examines the scientific evidence from biology, paleontology, and geology for the origin and evolution of life over 4.5 billion years of Earth's history. Topics include the biochemical basis of life, biogeochemical cycles, natural selection and the origin of species, genetics, phylogeny reconstruction, and the timescales for evolution. CP: None To be submitted to CLE for BIOL SCI/L	Approved.

Course	Title	Current	Proposed	Approved/ Comments
Geo 1105	Geology and Cinema		Version of 1005, without lab and for 1 fewer credits Equiv: 1005	Tabled. It was pointed out that if the lecture contains two different populations of students (those enrolled in lab and those who are not) there is a problem with testing.
Geo 1106	Oceanography		Version of 1006, without lab and for 1 fewer credits Equiv: 1006	Tabled.
Geo 1111	Volcanoes		Version of 1011, without lab and for 1 fewer credits Equiv: 1011	Tabled.
Geo 3890	Geologic or geophysical field study.			Deleted from agenda.
Geo 4402	Biogeochemical Cycles in the Ocean		New Course: 3 cr, Stdnt Opt Grade Base, Lect, Introduction to marine biogeochemistry and chemical oceanography. Processes controlling the chemical composition of the oceans today and in the past. Cycles of major and minor constituents including carbon, nitrogen, phosphorus, silicon, and oxygen as well as their isotopes. Role of these cycles in the climate system. CP: One year calculus, Chem 3501, or # EP: None	Approved. Delete "One year calculus" from CP. Provisional approval 10/19/05
HSci 1714, 3714	Technology and Civilization: Stone Tools to Steam Engines	Old Titles: Technology and Western Civilization: To the Industrial Revolution	New Titles: Technology and Civilization: Stone Tools to Steam Engines	Info only. Approved through CLA.
HSci 1715, 3715	Technology and Civilization: Waterwheels to the Web	Old Titles: Technology and Western Civilization: Since the Industrial Revolution	New Titles: Technology and Civilization: Waterwheels to the Web	Info only. Approved through CLA.
HSci 1814, 3814	Revolutions in Science: The Babylonians to Newton	Old Title: Introduction to History of Science: Ancient Science to the Scientific Revolution	New Title: Revolutions in Science: The Babylonians to Newton	Info only. Approved through CLA.

Course	Title	Current	Proposed	Approved/ Comments
HSci 1815, 3815	Revolutions in Science: Lavoisier, Darwin, and Einstein	Old Titles: Introduction to History of Science: Modern Science	New Titles: Revolutions in Science: Lavoisier, Darwin, and Einstein	Info only. Approved through CLA.
IE 5111	Systems Engineering I	Unedited description here: This course provides a broad-brush overview of systems-level thinking and techniques in the context of an integrated, design-oriented framework. It focuses on the elements of the systems engineering process including lifecycle, concurrent, and global engineering. Students will exit this course with a framework for engineering large-scale, complex systems. This framework will provide students with an understanding of how specific techniques (to be explored in depth in subsequent courses) fit into the larger framework, providing motivation for their study and application.	New Course: 2 cr, Grading Base: A-F or Audit, Lect only. offered every fall Overview of systems-level thinking and techniques in the context of an integrated, design-oriented framework. Elements of the systems engineering process, including lifecycle, concurrent, and global engineering. Provides a framework for engineering large-scale, complex systems, and an understanding of how specific techniques fit into this framework. CP: IT upper division or grad student EP: IT upper division or grad student	Approved. Provisional approval 11/1/05
IE 5112	Introduction to Operations Research	Unedited description here: This course is a survey of Operations Research models and methods in deterministic and stochastic settings. Topics covered include linear programming, integer programming, networks, forecasting, Markov chains, and queuing systems. Examples from a variety of application areas, such as systems engineering, logistics, design, and project management, will be included.	New Course: 3 cr, Grading Base: A-F or Audit, Lect only. offered every fall and spring Survey of Operations Research models and methods in deterministic and stochastic settings. Topics include linear programming, integer programming, networks, forecasting, Markov chains, and queuing systems. Examples from a variety of application areas, such as systems engineering, logistics, design, and project management. CP: Math 2243 or 2373 or equivalent, one semester of probability or statistics, IT upper division or grad student (MSIYE-IE track students may not use this course toward their degree program) EP: IT upper division or grad student	Approved. Provisional approval 11/1/05
IE 5113	Systems Engineering II	Unedited description here: This course provides a more in-depth view of systems engineering thinking and techniques presented in Systems Engineer I course. Students will gain a hands-on understanding of techniques learned in Systems Engineering I, through application to specific problems. Additionally, the course will introduce topics pertinent to the	New Course: 4 cr, Grading Base: A-F or Audit, Lect only. offered every spring In-depth view of systems engineering thinking and techniques presented in IE 5111, with hands-on understanding of techniques learned in that course through applications to specific problems. Topics pertinent to the effectiveness of the design process, including design practices and organizational and reward structure required to support a collaborative, globally distributed design team.	Approved. Provisional approval 11/1/05

Course	Title	Current	Proposed	Approved/ Comments
		effectiveness of the design process (by which complex systems are engineered) including design practices and organizational and reward structure required to support a collaborative, globally distributed design team.	CP: 5111, course on basic probability, IT upper division or grad student EP: IT upper division or grad student	
IofT 1311	Engineering Basics		New Course: 2 cr, Grade Base: A-F only, Lect. Elements of engineering. Philosophy, tools, practice. Role of engineering in society. Engineering's relationship to science. Modeling, mathematical analysis, software tools, hands-on design-and-build project. Students work in teams. CP: IT lower div or #	Approved. Provisional approval 10/11/05
Math 4567	Applied Fourier Analysis	Old Title: Introduction to Fourier Analysis	New Title: Applied Fourier Analysis	Approved.
Math 4606	Advanced Calculus	Equiv: 01072 - Math 4606/Math 5615/Math 5616	Equiv: Credit will not be granted if credit has been received for:5615	Approved.
Math 4707	Introduction to Combinatorics and Graph Theory	Equiv: 01073 - Math 4707/Math 5705/Math 5707	Equiv: Credit will not be granted if credit has been received for: 5705, 5707	Approved.
Math 5467	Introduction to the Mathematics of image and data analysis	Old Title: Introduction to the Mathematics of Wavelets	New Title: Introduction to the Mathematics of image and data analysis	Approved at meeting; later withdrawn at request of Math.
Math 5651	Basic Theory of Probability and Statistics	Equiv: 00259 - Math 5651/Stat 4101/5101	Equiv: Credit will not be granted if credit has been received for: Stat 4101, Stat 5101	Approved.
Math 5705	Enumerative Combinatorics	Equiv: No course equivalencies	Equiv: Credit will not be granted if credit has been received for: 4707	Approved.
Math 5707	Graph Theory and Non-enumerative Combinatorics	Equiv: No course equivalencies	Equiv: Credit will not be granted if credit has been received for: 4707	Approved.
MatS 2001	Introduction to the Science of Engineering Materials	3-4 cr, Grading Base: Stdnt Opt, Lect & Lab Introduction to structure-property relationships of engineering materials. Atomic structure and bonding; crystal structures; imperfections in solids; strength of materials and strengthening mechanisms;	3 cr, Grading Base: A-F Only, Lect only Introduction to structure-property relationships of engineering materials. Atomic structure and bonding; crystal structures; imperfections in solids; strength of materials and strengthening mechanisms; phase transformations; heat treatment and control of microstructures; materials selection and design. Integrates	Approved. Add CP: Math 1372, Chem 1022, Phys 1301W. Provisional approval 10/06/05

Course	Title	Current	Proposed	Approved/ Comments
		phase transformations; heat treatment and control of microstructures; materials selection and design. Integrates properties of metals, ceramics, polymers, and composites. Laboratory experiments deal with material strength, creep, and fatigue of engineering alloys, and heat treatment of steel and aluminum.	properties of metals, ceramics, polymers, and composites. Note: the lab is being split from MatS 2001 as a separate course.	
MatS 2002	Introduction to the Science of Engineering Materials Laboratory		New Course: 1 cr, Lab, A-F only, Laboratory experiments dealing with the mechanical properties of engineering materials, including elastic modulus, tensile strength, creep, impact strength and fracture. CP: MatS2001 or &MatS2001; no credit for MatS majors EP: MatS2001 or &MatS2001 Note: this is the lab from the old MatS 2001	Approved. Provisional approval 10/06/05
MatS 4400	Senior Design Project	Grade base: Stdnt Opt, 2 contact hrs per wk, Component 1: CaseStudy, Component 2: None Integration of coursework and lab experiences by applying scientific and engineering principles to comprehensive design project. Individual or team work on a project with faculty guidance. Areas of project selection typically include electronic materials, polymers, metals or ceramics. Written report and oral presentation required. CP: 4401; sr mat sci major EP: MatS major - sr	Grade base: A-F only, 5 contact hrs per wk, Component 1: Lect, Component 2: Disc Students work in teams to apply their growing expertise in materials science and engineering toward a specific project. With guidance from a mentor from industry or a faculty member, each team defines a problem and follows design steps that culminate in a product design. CP: 4401; sr MatS or ChEn major EP: None	Approved. Provisional approval 10/06/05
ME 4431W	Energy Conversion Systems Laboratory	Consent: Department CP: 3333, 4031W, [IT upper div or grad student]	Consent: No required consent CP: 3333, 4031W, [IT upper div or grad student]	Approved
Phys 3022	Cosmology and the Early Universe		New Course: 4 cr, Grade Base: Stdnt Opt, Lect only Large-scale structure and history of universe; dark matter, cosmic microwave background. Introduction to Newtonian and relativistic world models. Physics of early universe. Cosmological tests CP: 2601 Ed Note: Offer undergrad Cosmos course. The 5XXXX level Cosmos course is intended for and should be limited	Tabled

Course	Title	Current	Proposed	Approved/ Comments
			to prepared grad students.	
Phys 3201	Statistical and Thermal Physics		New Course: 3 cr, Grade Base: Stdnt Opt, Lect only Principles of thermodynamics and statistical mechanics. Selected applications such as kinetic theory, transport theory, phase transitions CP: 2601 Equiv: Phys 4201/5201 Ed Note: 3XXX level is more appropriate number, allowing students to enroll earlier in their undergrad career. The course is not intended for graduate students	Tabled
Phys 5041	Analytical and Numerical Methods of Physics I	CP: Grad or #	CP: Grad or 2601 Eff fall 06 Ed Note: Changed prereqs from grad or # to grad or 2601. This course covers methods which are applicable to a broad variety of technical fields, but does not assume previous material beyond general mathematical sophistication. It can therefore be taken by upper division students and graduate students without distinction. With added prereq, undergrads will enroll with appropriate minimal background.	Tabled
Phys 4201	Statistical and Thermal Physics	Active	Inactive Note: 4201 replaced by 3201 effective fall, 06	Tabled

CDTL or CSci (Professional Masters) Courses

SENG 5708	Advanced Database Management	Old Title: Object-Oriented Databases	New Title: Advanced Database Management
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Program Changes:

A BAE Replacement of Required Courses

1. Replacement of a required course

Current: ME 3324--Intro to Thermal Sciences (4 cr)

Proposed: ME 3331--Thermal Sciences I (3 cr)

Comments: The course ME 3324 dropped most of the thermodynamics, thus BAE is asking to switch to ME 3331 to bring thermodynamics back into our curriculum. Heat transfer will be added to BAE 4013--Transport in Biological Systems.

2. Replacement of a required course

Current: Rhet 3562--Technical and Professional Writing (4 cr)

Proposed BAE 5212--Safety/Environmental Health Issues in Plant/Animal Production/Processing (3 cr)

Comments: BAE would like all BAE students to have a safety type course and make it required of all students, instead of just as an elective. Since there are no free electives in the curriculum, thus Rhet 3562 was decided to be dropped as a required course as the only least disruptive option.

The above changes in BAE were APPROVED.

B BME Possible changes to program depending on outcome of CLE action on Phsl 3063.

Phsl 3063 (the combination of two Phsl courses, for BME students only) is being proposed to satisfy the Biological Sciences with Lab core requirement.

The above change in BME was TABLED.

C Industrial Engineering Change in name of program and designator (**for information**)

IE (Industrial Engineering) becomes ISYE (Industrial and Systems Engineering)