COLLEGE OF ENGINEERING
Proposed Catalog Changes

Effective Term (unless otherwise noted) = Summer 2015

Biological and Agricultural Engineering

1. Add the following course:

   **BAE 425 Introduction to Biomedical Engineering (3 cr)**
   Principles of biomedical engineering, including biomechanics, biomaterials, nano-osseointegration, tissue engineering, cardiovascular systems and artificial hearts, medical imaging, and a brief survey of biosensors and bio-signaling.
   **Prereq**: Junior or Senior standing in the College of Engineering or the College of Science; or Permission of Instructor

   Short Course Title: Intro to Biomedical Engr

   Rationale: There is no additional workload; this course has been taught by a member of the department as a ST 404 course 3 times previously in the last 4 years. It is a technical elective for the BAE department’s most populous undergraduate option (Biosystems Engineering). Typically, several ME undergrad students take it; graduate and undergraduate Physics and MSE students have taken it as well.

2. Change the following courses:

   **BAE J452/J552 Environmental Water Quality (3 cr)**
   Engineering design to monitor, evaluate, and minimize non-point pollution from agriculture, environmentally acceptable disposal of wastes, bioremediation. Graduate credit requires an additional project and report. Two lec and one 3-hr lab a wk.
   **Prereq**: BAE 355 and Chem 112; and Soil 205 or Biol 250, and BAE 355 or BAE 450

   Rationale: Additional course material on advanced biological sciences in response to 2013 ABET accreditation review.

   **BAE 461 Bioprocess Engineering (3 cr)**
   Carries 2 credits after ME 345. Processing principles and transport processes applied to the analysis and design of handling, processing, and producing of biomaterials and bioprocesses. Course includes advanced biological sciences applications. Two lec and one 3-hr lab a wk. (Spring only, alt/ys)
   **Prereq**: Math 310, and Engr 320 and Engr 335, or Permission

   Rationale: Additional course material on advanced biological sciences in response to 2013 ABET accreditation review.

   **BAE 462 Electric Power and Controls (3 cr)**
   Design, selection, and use of electrical equipment and electric power systems for application to biological systems; design and use of electrical, electronic, and other feedback control systems for use with biological systems. Course includes advanced biological sciences applications. Two lec and one 3-hr lab a wk.
   **Prereq**: Engr 240
   **Coreq**: Math 310

   Rationale: Additional course material on advanced biological sciences in response to 2013 ABET accreditation review.

Computer Science

1. Change the following courses:

   **CS J449/J549 Fault-Tolerant Systems (3 cr)**
   Same as ECE J449/J549. Design, modeling, analysis and integration of hardware and software to achieve dependable computing systems employing on-line fault tolerance; theory and fundamental concepts of designing reliable systems; analytical evaluation techniques, faults and advances in ultra-reliable distributed systems, fault-tolerant software systems; case studies include the space Shuttle, Airbus, and Boeing fly-by-wire primary flight computers as well as systems in reliable data bases and financial markets. Additional projects and assignments reqd for grad cr.
   **Prereq**: ECE 444 or CS 240 or Permission

   Rationale: This is a leftover prerequisite from many years ago when a course with the same name was offered in EE and this prerequisite should not be used. “CS240 or Permission” is what it should have been for many years.
Engineering

1. Add the following course:

   **TM 595 Comprehensive Exam (1 cr)**
   Comprehensive final exam which integrates degree material from TM core courses
   **Prereq:** Permission

   **Rationale:** This course is being set up to enable Technology Management students to elect to take a comprehensive exam as their program capstone. The exam is one of three choices the TM students have to complete their degree requirements.

Engineering Management

1. Add the following course:

   **EM 570 Global Product Development (3 cr)**
   Discussion of topics related to enabling effective global product development spanning the entire product development cycle from strategy development, through project execution, and ultimately post release product support. Rather than presenting a fixed methodology, this course will provide a framework for global development that can be adapted to specific environments.

   **Rationale:** This course is delivered through EO and is currently being delivered for the second time. There is no additional workload for this course as it is currently part of our 3 year plan. It fills a need for a focused course on product development from a global perspective. Students in the course have been working in global, or cross geography roles, and the course provides a good strategic framework for them to use as part of their leadership roles.

Mechanical Engineering

1. Change the following courses:

   **ME J414/J514 HVAC Systems (3 cr)**
   Application of thermodynamics, heat transfer, and fluid flow to understanding the psychrometric performance of systems and equipment; evaluating the performance characteristics, advantages, and disadvantages of the various types of HVAC systems including large tonnage refrigeration/chiller equipment, cooling coils, cooling towers, ducts, fans, and heat pump systems; economics of system and equipment selection.
   **Prereq:** ME 345
   **Recommended Preparation:** ME 345, ME 444.

   **Rationale:** This change request is to remove ME 345 and ME 444 as recommended preparation and add ME 345 as a prerequisite. Listing ME 345 as a prerequisite for ME414/514 will cover the necessary preparation for the class – especially the topics of heat transfer and psychrometrics. Psychrometrics is a learning objective of ME 322 which is a prerequisite to ME 345.

   **ME 422 Applied Thermodynamics (3 cr)**
   Advanced topics in applied thermodynamics including availability (exergy) analysis of systems, advanced power and refrigeration cycles, combustion, and thermodynamic properties of real fluids.
   **Prereq:** ME 322

   **Rationale:** Many topics in applied thermodynamics require application of real-world behavior of equipment and systems. In many energy systems, an introductory working knowledge of heat transfer (ME 345) is very helpful in understanding the advanced thermodynamics concepts.

Nuclear Engineering

1. Add the following courses:

   **NE 567 Advanced Nuclear Systems and Modeling (3 cr)**
   Comprehensive information about nuclear systems (such as, nuclear steam supply systems, safety systems, etc) and analytical modeling of nuclear systems. Description of reactor technologies (such as, Boiling Water Reactor -BWR- and Pressurized Water Reactor -PWR- systems and corresponding modeling and performance of the systems. Reactor thermal hydraulics models/tools are used to model the systems. Course projects are defined for practicing modeling techniques.
   **Prereq:** NE 565

   **Short Course Title:** Adv Nuc Systems & Model
Rationale: This course has been taught as NE 504 for 2 semesters (Fall 2013 and Spring 2013) to address the needs in nuclear engineering program. There is no same or similar course about advanced nuclear systems and modeling. This course closes a gap in the current curriculum. Understanding advanced nuclear systems and gaining modeling skills will improve students experience so that they can easily model systems and power plants using computational tools.